Clinical Judgement of Critical Care Nurses in the Context of the Ventilated Patient in Pain in the Immediate Phase Post Cardiac Surgery: A Case Study

Laserina O'Connor

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ABSTRACT

The critical care environment is a complex arena in which clinical judgements of the ventilated patients pain state are made over the course of their surgical trajectory. The presence of the critical care nurse at the bedside is the key to informed judgement in this unpredictable and fragile situation. This study sought to capture the judgement process of thirty critical care nurses in the context of the ventilated patient in pain in the immediate phase after cardiac surgery i.e. six-hours. Evidence of the judgement process was sought using the Lens Model as a framework, utilising the cognitive side of the model. Moreover, in order to capture this phenomenon of interest, the researcher observed the pain behaviours of thirty ventilated patients in the immediate phase post cardiac surgery. Within-methods triangulation was employed as an approach for justifying and underpinning knowledge by acquiring additional knowledge, which was seen as pertinent to this naturalistic case study.

The data collection approach included think-aloud by thirty critical care nurses and simultaneous researcher observation over a six-hour period in the natural habitat of the ventilated patient post cardiac surgery. The findings give tentative support for the hypothesis that critical care nurses use a pattern of cues to make a judgement of ventilated patients’ pain state in the immediate phase post cardiac surgery. Conversely, there was tentative support for the hypothesis that ventilated patients convey a pattern of cues to the critical care nurse in the immediate phase post cardiac surgery.

Moreover, tentative conclusions are afforded which are as follows: a judgement structure is employed by critical care nurses which is comprised of two stages. The initial stage involves a pattern of physiological, behavioural general, covert behaviour, physical, overt motor pain behaviour, mechanical, technical, paraclinical, knowledge and pain descriptor cues. These aforesaid cues are utilised and integrated into a small number of intermediate judgements which operate as second order cues. Consequently the second order cues are combined in order to make a final judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery: ‘(s)he is in acute pain’ or ‘(s)he is not in acute pain’. In addition, critically ill ventilated patients convey a pattern of pain cues to the critical care nurses which comprises of physiological, behavioural general, overt motor pain behaviour cues, patient ventilator synchrony cues and verbal subjective pain behaviour cues. The pattern of cues conveyed by the ventilated patient may be influenced by many factors in an unpredictable and delicate surgical trajectory and chief among these factors is haemodynamic instability. The critical care nurse must make sense of all of this to gain access to the pattern of cues.
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FIGURE 5.33A: (S)he is not in acute pain at present
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Cue Categories: The Judgement Process - Across One Pain Incident - Rest

FIGURE 5.34A: (S)he is in acute pain
FIGURE 5.34B: (S)he is not in acute pain

Comparison of the Judgement Process - Across Two Pain Incidents - Turned Chest X-Ray Versus Rest

FIGURE 5.35A/B: (S)he is not in acute pain
FIGURE 5.36 A/B: (S)he is in acute pain

Comparison of Patient's Pain Behaviour Cues Across Two Pain Incidents

FIGURE 5.37: Pain Incidents: Turned Chest X-Ray Versus Rest
CHAPTER ONE

1.0 REVIEW OF THE LITERATURE: CLINICAL PAIN

1.1 INTRODUCTION

Critical care nurses are in the unique position of being able to comprehend both the pain experience and the meaning that the patient brings to that pain experience by assessing and interpreting the patient's pain state. The main concern of critical care staff in the immediate post-operative period is to return the patient to physical equilibrium after the effects of anaesthesia and surgical trauma. Moreover, concern attunes the critical care nurse to cues that relate to the ventilated patient's pain experience in the immediate phase post cardiac surgery in the intensive care unit (ICU). When a ventilated patient wakes up from open-heart surgery, the situation, from the patient's perspective, is foreign and ill-defined. The patients feel situationless and remain so until they regain full consciousness and once again have some command of their skilled body (Benner & Wrubel 1989, p.80).

Caring for the critically ill patient in pain involves more than a set of activities. Caring places the critical care nurse in the situation in such a way that relevant cues are perceived and interpreted and the patient's response to interventions are identified, this then guides subsequent care. The actualised caring moment despite its power is fragile, this comes from the nurses' presence and limited ability to control pre-conditions and context (Euwas & Chick 1999). Nurses' presence in the critical care context is not the physical proximity of the nurse (Doona et al. 1997). It is about the relationship between a unique ventilated patient experiencing pain and a unique critical care nurse. According to Copp (1974), several intensive care patients stressed an awareness of their own anxiety and suspiciousness of persons who did not make themselves available; just being there, when they were in the throes of their pain or suffering (Copp 1974, p.493).

This chapter will analyse various definitions of pain including a description of acute pain and clinically inflicted pain post cardiac surgery. The assessment of pain behaviours is discussed in depth, incorporating various measurement tools, with particular emphasis on their appropriateness in the critical care setting. The validity of anxiety scales are also presented. The complexity of the critical care nurse's clinical judgement is explored in the context of knowing the patient, pain cues, the clinical trajectory and the task of pain relief.

Acute pain such as post-operative pain has been characterised as a combination of tissue damage, pain and anxiety (Melzack & Wall 1996) of short duration and high physical pathology (Turk & Okifuji 2001). The term pain represents a multifaceted set of events, signifying a whole host of different unique experiences, having diverse causes, characterised by dissimilar qualities and varying along a number of sensory, affective, and evaluative dimensions (Melzack & Wall 1996). Consequently, efforts at a precise pain definition carry the assurance that terms important to some observers will probably be omitted (Fordyce 1976).
1.2 PAIN DEFINITIONS

The International Association for the Study of Pain (IASP) defines pain as an unpleasant sensory and emotional experience arising from actual or potential tissue damage or described in terms of such damage (IASP 1979, p.249). The qualities of this definition are its explicit recognition of the loose association between injury and pain, and its inclusion of the emotional dimension of the pain experience in addition to its sensory dimension (Melzack & Wall 1996). With respect to definitions of pain, 44% of critical care nurses defined pain as an unpleasant sensation and another 44% defined it as a physical condition and expressed the need to look for a pathological basis in pain assessment (Aslan et al. 2003). However, the word 'unpleasant', the affective dimension, fails to reflect the misery, anguish, desperation and injury that are part of some pain experiences (Melzack & Wall 1996). According to Schott (2004), the word description is most inadequate in the above definition and represents the problem of description that bedevils the communication of the experience of pain. Another definition put forward by Sternbach (1968) refers to pain as an abstract concept which refers to (1) a personal, private sensation of hurt; (2) a harmful stimulus which signals current or impending tissue damage; (3) a pattern of responses which operate to protect the organism from harm. The multiplicity of pain experiences illuminates why it has not been viable so far to realise a satisfactory definition of pain.

Clinicians who address the problem of defining pain typically replicate the platitude that pain is a private, subjective experience (Chapman 1989). Pain is not simply what a patient says it is, according to Fordyce (1976), because the patient’s knowledge and perception will limit his/her ability to distinguish well enough what is going on and secondly, the person must, in some mode, communicate to the immediate environment that (s)he is experiencing pain. “In order to describe pain; it is necessary for the patient to do something ... in order for us to determine that (s)he is experiencing pain” (Sternbach 1968, p.13). Therefore, nurses cannot inform patients when they hurt, how they feel when they are in pain, or stifle the expression of pain. The patient’s pain experiences is his/her own, and through their expression nurses learn how to be most professionally accountable and responsive (Copp 1985).

A formidable problem is that the theorist is obliged to reproduce the subjective experience of the patient, and this involves the intentional oversimplification of a phenomenon that is closely and inextricably linked to human suffering (Chapman 1989). According to Copp (1974) some (ICU) patients stated that suffering, the response to pain, seemed to begin even before the pain and included many anticipatory fears that sometimes were even more acute than the eventual pain. These indicators have been referred to as prodromal symptoms. The intensity of suffering is mainly determined by what the pain means to the patient. The experience of pain, although varied and private, is also consistent. According to Closs & Briggs (2002), like all subjective experiences, there is sometimes doubt as to whether the patient has something which should be called by another term, such as discomfort, or whether it should be regarded as unpleasant but not painful. Pain is of primary concern to patients post cardiac surgery, which is explored in the following section.
1.3 Pain and Cardiac Surgery

Coronary artery bypass grafting (CABG) is one of the most common surgical procedures performed worldwide. The surgical incisions normally adopted in open-heart surgery: sternotomy and thoracotomy are extremely traumatic accesses, which inflict a major injury on the tissues and elicit a marked inflammatory response even before the institution of coronary artery bypass (Biglioli et al. 2003). Besides, surgical trauma and pain cause an endocrine response that increases the secretion of cortisol, catecholamines and other stress hormones (Anand et al. 1990, Weissman 1990). Tachycardia, hypertension, regional decreases in blood flow, alterations in immune response, hyperglycaemia, lipolysis and a negative nitrogen balance can occur as a result of these and other metabolic changes (Cousins 1989).

Over the last decade, increased financial restrictions imposed on the medical profession have provoked the search for new approaches to anaesthesia and post-operative care that would enable faster recovery of cardiac surgical patients. These selected patients are targeted for extubation within six to eight hours of completion of the cardiac procedure, an ICU length of stay, less than twenty-four hours, and total hospital length of stay of four to six days (Cheng et al. 1997, Ranucci et al. 1999, Alhan et al. 2003). One of the main problems raised by this fast-track technique is the control of post-sternotomy pain; these patients are not protected by long-acting opioids and must experience pain immediately after the end of the operation, rather than over a longer time period (Ranucci et al. 1999).

Post-operative pain for the adult cardiac surgery patient is a multidimensional phenomenon. Pain is caused by the surgical trauma itself, which consists of the musculoskeletal distortion of the thoracic cage, as well as the surgical manipulation of the parietal pleura and costal and sternal periosteum (Immer et al. 2003). Furthermore, multiple cannulations persisting after the operation, and care activities such as endotracheal suctioning and chest tube removal provide many occasions for the activation of pain-sensing fibers (Mueller et al 2000a, Stanik-Hutt et al. 2001, Jacobi et al. 2002). Median sternotomy, which is performed in the majority of patients requiring CABG and harvesting of the internal mammary artery (IMA) were found to be very painful (Meehan et al. 1995, Mueller et al. 2000). The area most frequently involved is the incisional area (Puntillo 1990, Meehan et al. 1995, Mueller et al. 2000a, Yorke et al. 2004). Incisional pain, which is high for the first twenty-four to seventy-two hours post-operatively, depends upon the type of surgery and on an individual’s pain tolerance (Fagerhaugh & Strauss 1977).

Arterial grafts are the first choice as a conduit for myocardial re-perfusion, however, with advances in interventional radiology, most CABG procedures require several grafts. The reversed saphenous vein is the most commonly used conduit for myocardial re-perfusion. Leg complications are common after leg vein harvest, with most patients having some problem as a direct result of the saphenous vein harvest (Garland et al. 2003), including pain regardless of harvest technique (Tevaearai et al. 1997, Allen et al. 1998, Yorke et al. 2004). The incidence of major wound problems is fortunately low, but less severe complications such as inflammation, serous discharge, haematoma formation, separation of the tissues and pain are probably underestimated (Black et al. 2002).
Effective pain relief after cardiac surgery can reduce cardiovascular instability (Liem et al. 1992), the incidence of ischaemia (Searle et al. 1994) and minimise patient discomfort. Severe post-operative pain results in extreme patient discomfort. Severe unrelieved pain increases morbidity, and even mortality, in the setting of acute pain (Siddall & Cousins 2004). Severe pain also has neurohormonal effects, including increased sympathetic activity and increased levels of stress hormones, which may increase the incidence of post-operative complications such as myocardial infarction (Muller 1999). Furthermore, post-operative pain is associated with significantly longer lengths of hospital stay and delayed ambulation following surgery (Morrison et al. 2003). Moreover, unrelieved pain may promote confusion and delirium in the elderly patient (Lynch et al. 1998), atelectasis in the critically ill (Puntillo & Weiss 1994) and pulmonary dysfunction in elderly post-operative patients (Shea et al. 2002).

Equally, a considerable proportion of work with, and around, critical care patients involves the inflicting of pain. It is associated with a host of important tasks: with diagnosis, surgery, various therapies, schedules and even with the technicalities of giving adequate nursing care. In these situations, one of the patient’s major tasks is to cooperate with, and endure, painful but necessary procedures (Fagerhaugh & Strauss 1977). In particular, clinically inflicted pain may be one of the most frequently overlooked aspects of the patient’s experiences of illness, this is analysed in the following section.

1.4 Clinically Inflicted Pain

Clinically inflicted pain refers not only to procedures during which the person’s body is touched, handled and invaded by instruments, but also, created in the process of medical interventions (Madjar 1999). The intensive care environment and the procedures associated with it can potentially increase patients’ perceptions of pain in several ways. Cardiac surgical intensive care (n=43) patients recalled physical stressors, i.e. pain, suctioning and hyperinflation in the ICU to be the most burdensome in the early post-operative period (Soehren 1995). Pain in patients following cardiac surgery may arise from numerous sources, including cannulation sites, endotracheal tube (ETT), chest drains and surgical incisions. A variety of discomforts post surgery can be anticipated, such as dry mouths and irritation from tubes placed in various body orifices (Fagerhaugh & Strauss 1977). It was reported that ETT irritation in patients post CABG surgery occurs at multiple levels, i.e. pharyngeal, laryngeal and tracheal mucosal areas with patients using word descriptors such as, uncomfortable, sharp pain, sore throat, choking and gagging (Grap et al. 2002). On the other hand, nurses do not routinely assess the location of acute pain (Herr et al. 2004a). Sometimes, following persistent promptings by patients, nurses focus on particular sources of pain or discomfort other than the incision site (Manias et al. 2002).

Routine care activities, such as mobilisation post CABG surgery, may cause intense pain, this is evident in the following studies where data collection occurred across various time frames i.e. from post-operative day one onwards. Moreover, repositioning the patient and suctioning may be undertaken by critical care nurses to relieve some of the patient’s discomfort. However, procedures associated with the greatest pain or discomfort for critically ill patients included endotracheal suctioning, endotracheal and nasogastric tubes, mechanical ventilation, arterial puncture and turning (Nelson et al. 2001). Turning was found to be the
most painful procedure for critically ill adults and also the most distressful procedure. A significant increase in pain was associated with the activity of turning patients post cardiac surgery (Puntillo 1990, Watt-Watson et al. 2001, Milgrom et al. 2004, Watt-Watson et al. 2004, Yorke et al. 2004) as was coughing (Puntillo 1990, Milgrom et al. 2004, Yorke et al. 2004). In addition, CABG patients volunteered descriptors about pain on movement including ‘feels like a truck on my chest’ and ‘pain is exhausting’ (Watt-Watson et al. 2004, p.80). However, studies indicate that nurses were never observed to assess patients for pain prior to movement or to ask about their pain (Kloppenstein et al. 2000, Manias et al. 2002). Notably, turning may be performed many times a day, and often no analgesics are administered before the procedure. The lack of specific assessment of pain on movement post cardiac surgery may have been a reason why nurses did not administer analgesia (Watt-Watson et al. 2001). The same finding is true for patients undergoing endotracheal suctioning and chest drain removal (Puntillo 1994, Puntillo et al. 2001).

Nevertheless, when nurses make judgements without validating their assessment with the patient, clinically inflicted pain is made invisible (Doona et al. 1999). The power of the patient’s voice is highlighted by Madjar (1997) who stated the voice has the power to influence the shared situation, to force others to take notice, when absent it allows others to define the situation in their terms and bypass the lived experience in pain (p.68). In an earlier study, Bergbom-Engberg & Haljamae (1989) explored the experience of security or insecurity of critically ill (n=158) medical and surgical patients during respirator treatment and found that the most important reason for feeling secure was the presence of a nurse. Nursing presence not only provides an antidote to depersonalisation for the person in pain and their family, but it is also the context for informed judgement, guard against distance and detachment (Doona et al. 1997), and it facilitates communication (Patak et al. 2004) and vigilance with the critically ill patient (Grambling 2004).

The critical care nurse’s concern, apart from pain relief, will incorporate an urgent need to return the patient to a physiological equilibrium, which may require more inflicted pains and much discomfort. A comprehensive approach to post-operative pain assessment requires evaluation of the following: (1) patient perceptions; (2) physiological responses; (3) behavioural responses; and (4) cognitive attempts by the patient to manage pain (AHCPR 1992, p.11). Taking cognisance of the previous recommendation and despite the complexity of post-operative pain assessment in the critical care context, there are many reliable and valid measurement indices evident in the literature; these will be discussed in the following sections.

1.5 Assessment: Non-verbal Pain Behaviour

The behavioural form of assessment may have particular advantages with individuals who are unable to precisely describe their pain because they lack language skills, suffer momentarily from an impaired ability to communicate, or are reluctant to verbally describe their pain problems. Pain behaviour is defined as any and all outputs of the individual that a reasonable observer would characterise as suggesting pain (Keefe 1989), such as posture, facial expression, verbal complaints of pain and suffering, non-language, paraverbal sounds (e.g. moans, sighs), the display of functional limitations or impairments and behaviours designed to reduce pain, such as medication use and use of the health care system (Fordyce}
1976, Loeser & Fordyce 1983). Self-report and observational pain measures provide complementary, but different, kinds of information that are essential to a comprehensive understanding of the pain experience. Neglecting to rely, as much as possible, on both types of pain indices could lead to under-treatment and/or over-treatment depending upon the circumstances (Labus et al. 2003). Diverse patterns of verbal and non-verbal behaviour promote the means whereby subjective states, ranging through thoughts, feelings, needs, motives and pain, are communicated to others (Hadjistavropoulos et al. 1996).

Pain behaviours narrowly defined contain verbal reports of pain, as well as convincing and precise descriptions of the quality, intensity and distribution of pain (Fordyce 1976). It is the patient’s pain behaviours that the clinician evaluates in the establishment of diagnosis and treatment outcome. The scope and definition of a clinical pain problem is to be found in what the patient does as well as what (s)he says; patient behaviour is a critically important element (Fordyce 1976). Pain behaviour can indicate a painful place, but the subject of the pain is the individual who gives it expression (Wittgenstein 1968). Pain behaviours have been differentiated into three categories: overt/motoric, covert/subjective and physiological, all of which need to be considered to adequately describe the pain problem and find appropriate intervention methods (Turk & Flor 1987). Motor pain behaviours, also described as non-verbal indices of pain (Keefe et al. 1984), such as guarded movement, body posturing, facial grimacing and rubbing the painful area, are observable actions that communicate the fact that pain is being experienced (Fordyce 1976, Keefe et al. 1985, McDaniels et al. 1986, Sanders et al. 2001). Movement clearly affects pain behaviour (Fordyce 1976, Keefe et al. 1984).

Non-verbal expression provides an alternative source of pain information that would be expected to supplement and complement self-report measures. Non-verbal expression of pain is the facial expression of pain (Von Baeyer et al. 1984), which offers a promising adjunct to self-report measures of pain (Craig & Prkachin 1983). It may contribute more to clinical judgements of pain than patient report (Johnson 1977), in particular the affective state (distress) of the pain patient (Beecher 1959, Von Baeyer et al. 1984). Information about pain is conveyed by a discrete set of actions in facial expression that provide a valid and potentially sensitive indication of pain. Grimacing, an obvious facial expression of pain (McDaniel et al. 1986), includes furrowed brow, narrowed eyes, tightened lips, corners of the mouth pulled back and clenched teeth (Keefe et al. 1984), and serves a communicative function (Prkachin 1986, Prkachin et al. 1994). Studies confirm the existence of an integrated pattern of movement of muscles of the face that can be called a facial expression of pain (LeResche & Dworkin 1984, Prkachin & Mercer 1989, Hadjistavropoulos & Craig 1994). Moreover, facial expression is a valid and reliable indicator of pain in critically ill patients (Payen et al. 2001).

Pain expression is likely to transpire when the sufferer’s estimate of the subjective experience is quite high. Pain expressions evolve in a manner that is dependent on the severity and duration of the experience (Prkachin & Mercer 1989). Health care professionals ought to be aware that if pain is being expressed, chances are good that, from the sufferer’s point of view, the experience is intense; in contrast, the absence of a display cannot be interpreted as indicating that there is no pain (Prkachin & Craig 1995). According to Prkachin (1992), there are individual differences in the extent to which facial display will be present during painful events and it is possible for some individuals to endure painful events
impassively. There is evidence that clinicians tend to underrate pain based on facial expression. Clinicians need to be aware of this bias and take it into account when important decisions may follow their evaluation of another's suffering (Prkachin & Craig 1995).

Thoughts and self-evaluative statements should be viewed as covert/subjective pain behaviours which are usually related to, and reflective of the patient's perceptions of their disability and physical limitations (Follick et al. 1985). The only way clinicians can be aware of these internal processes is by the patient's self-reports and thus, self-reports are pain behaviours (Turk & Flor 1987). Meanwhile, physiological responses such as heart rate have been viewed as categories of pain behaviours which are interrelated with self-report and motoric components (Turk & Flor 1987). The physiological variables most commonly used are heart rate, blood pressure, diaphoresis and tearing. Liberation of catecholamines increases blood pressure, cardiac output and the rate of ventilation (Chapman & Syrjala 2001). Besides, critically ill patients who cannot communicate their pain should be assessed through the observation of pain related behaviours, i.e. movements, facial expression and posturing (Riker et al. 2001, Jacobi et al. 2002) physiological indicators, i.e. heart rate, blood pressure and respiratory rate and the change of these parameters following analgesia therapy (Jacobi et al. 2002). Some descriptive characteristics defining the nursing diagnosis of pain following CABG surgery were verbal report of pain, discomfort, guarding, restlessness, facial mask of pain, increased blood pressure and heart rate, changes in respiratory patterns, immobility and anxiety (Correa & da Cruz 2000). Similar defining characteristics of acute pain are presented by the North American Nursing Diagnosis Association (NANDA) (2004-2005), who also include diaphoresis and pupillary dilation as autonomic responses of pain.

Behavioural methods, such as observations, can play an important role in pain assessment and treatment. In evaluating behavioural assessment methods, however, consideration should be given to the concept that pain is a complex perceptual experience and multiple forms of assessment are appropriate in that context. While observation of pain behaviour is important, it cannot and should not replace other pain measurement methods (Keefe 1989). Discrepancies in the methodology of pain assessment, the wide disparity in surgical patients' responses to pain and the use of analgesics are possibly fundamental factors in the under-assessment of post-operative pain. Even when the clinician obtains indicators of behaviour when measuring pain, it is necessary to validate such measures with subjective reports of pain which forces the dependence on the reliability of the patient's data (Chapman & Syrjala 2001). More importantly, the level of pain reported by the patient must be considered the current standard for assessment of pain in the critically ill patient and response to analgesia whenever possible (Jacobi et al. 2002). The self-report of pain is also described in the literature as covert/subjective; this is presented in the following section.

1.6 Assessment: Patient's Self-Reports of Pain

The interpretation of a subjective phenomenon such as pain poses many problems, both for the assessor and for the person experiencing it, because of the many factors that influence the perception, response and report of subjective events. The private subjective world of pain is a formidable barrier to sensitive assessment and therapeutic intervention (Copp 1985), as no one can directly observe another person's experience (Huskisson 1974); all nurses can do is observe behaviours (Davitz et al. 1980). The evaluation of pain in critically ill patients can
be very challenging. Many patients are intubated and unable to self-report their pain intensity. Others may have altered mental status, rendering the report of pain by the patient unreliable or impossible. These difficulties in expressing needs along with altered levels of consciousness, often lead to the perception that analgesics are not required (Sanders et al. 2001). In addition, the level of residual sedation after general anaesthesia may influence the patients ability to use pain scales (Kalkman et al. 2003). Notwithstanding the concern in the literature that intubation is an obstacle to the successful reporting of pain intensity, in Puntilllo’s (1994) small, single unit study, she found that patients between post-operative day one and day three were still able to communicate wide-ranging information about procedural pain, even when intubated. Despite the sampling limitations, the findings present some insight into the potential of gathering noteworthy information from intubated patients when appropriate assessment tools are utilised. The intubated patients in the aforementioned study used a variety of valid pain assessment tools to give information about their pain, such as a numerical rating scale (NRS), a body outline diagram to locate the painful areas and also a word list form MPQ-SF to express their feelings and sensations. Patients have much work to do in the context of their pain to legitimate its existence despite receiving numerous diagnostic and therapeutic modalities during their surgical trajectory. In an earlier study with a small sample, Puntilllo (1990) reported that surgical intensive care patients, five days post major thoracoabdominal surgery, recalled using signals with their eyes, facial expressions or hand motions, or sought attention by moving their feet up and down, shaking or tapping the bed rails or by grabbing the nurse by the arm and not letting go, to communicate their pain. A clinically significant proportion of patients treated with mechanical ventilation in the ICU communicate to nurses primarily through gesture, head nods and of mouthing the words (Happ et al. 2004).

In measuring human pain, verbal report is naturally relied upon to provide the most direct access to subjective experience. The single most reliable indicator of the existence and intensity of acute pain (AHCPR 1992, APS 2003, Arderuy et al. 2003) and any resultant affective discomfort or distress is the patient’s self-report (AHCPR 1992). However, the description of pain can create difficulties. Keele (1942) suggested that inaccuracies of pain description on the part of the patient arise from three main causes: difficulty in finding words to describe an unusual, if not unique, experience; confusion about what features are relevant to the observer; and difficulties in remembering the experience. However, the patient’s self-report of pain must be coaxed into reality by the critical care nurse so that the experience can be interpreted and managed. If the only external sign of the felt-experience of pain is the patient’s verbal report, then to bypass the voice is to bypass the bodily event, to bypass the patient, to bypass the person in pain (Scarry 1985, p.7). Furthermore, with a diverse sample, Closs et al. (2005) concluded that nurses need to initiate regular pain assessments as some older residents with cognitive impairment proactively offered information about their pain, while others only reported pain reactively in response to an enquiry from a carer.

Pain is now regarded as the fifth vital sign and patients are frequently asked to score the intensity of their pain on a numerical rating scale (NPRS) (Clark et al. 2002). Conversely, several studies report that nurses do not consistently use a standardised method of quantifying pain across a diverse population of patients; elderly patients (Herr et al. 2004; Herr et al. 2004a); patients post cardiac surgery (Watt-Watson et al. 2001, Watt-Watson et
al. 2004); and patients post major surgery (Zalon 1993). Although nurses stated that patients’ self-reports of pain are the most accurate, they indicated that physician or nurse pain ratings were more valid than patients self-reports (Howell et al. 2000, McMillan et al. 2000). Therefore, there may be inconsistencies in what nurses say they do and what they actually do in practice. There is some evidence to show that this occurs in relation to pain assessment (Herr et al. 2004; Herr et al. 2004a). Some nurses do not perceive pain scores as useful (Young et al. 2006a) as patients do not always understand the concept of putting a number to their pain (Schafheutle et al. 2001).

Moreover, many studies have documented that nurses have a significant deficit in knowledge that interferes with pain assessment and management (Clarke et al. 1996, Katsma & Souza 2000, McCaffery et al. 2000, Edwards et al. 2001, Sloman et al. 2001, Van Niekerk & Martin 2001). The barrier that created the most challenge for nurses assessing pain was the difficulty of communicating with patients (Herr et al. 2004a). Cognitive impairment may present a substantial obstacle to pain assessment and management. The literature suggests that older surgical adults had difficulty using the visual analogue scale (VAS) (Gagliese et al. 2005). Nonetheless, age as a variable was not found to impact on the failure to use selected pain scales, rather those conditions more commonly associated with old age, including cognitive impairment and psychomotor impairment, impact scale use, regardless of the age of the subject (Herr et al. 2004, Herr & Mobily 1993). Given that fewer failures occurred across scales by older subjects with prior scale experience, it would seem that familiarising patients with pain scales and assuring their understanding of their use is important in minimising the failure to use a scale correctly (Herr & Garand 2001). The instructions need to be clear in order to capture the desired measurement point, whether it be resting or movement pain postoperatively (Zalon 1999). The timing between various assessment strategies is relevant in the context of pain. Labus et al. (2003) revealed that there was a significantly higher correlation between observed pain behaviour and current self-reports of pain intensity when the self-report of pain intensity measure was collected just after a pain behaviour observation session than when the self-report of pain intensity measure was collected just prior to a pain behaviour observation session.

On the other hand, most elderly patients with mild to moderate cognitive impairment have intact pain perception and are capable of using self-report tools to rate their pain (Ferrell et al. 1995, Manz et al. 2000, Chibnall & Tait 2001). The scale most preferred to represent pain intensity by patients, including the elderly with mild to moderate cognitive impairment, was the numerical rating scale (NRS), followed by the Verbal Descriptor Scale (VDS) (Huskisson 1974, Kremer et al. 1981, Jensen et al. 1989, Herr et al. 2004, Kaasalainen & Crook 2004, Gagliese et al. 2005) and the Faces Pain Scale (FACS) (Taylor & Herr 2003). Meanwhile, critically ill patients may not be able to communicate their pain. Nevertheless, the numerical rating scale (NRS) is recommended to assess pain in the critically ill patient (Jacobi et al. 2002, Puntillo et al. 2002); it is a valid and reliable tool for detecting changes in pain over time among post-operative patients (Jensen et al. 1998), it requires less cognitive energy (Kremer et al. 1981) and is liked by patients (Jensen et al. 1989). In particular, the simplicity of application of the NRS encourages frequent assessment of pain, and it, therefore remains, a valuable tool when used within the context of an individual patient’s goals as a means of assessing response to treatment (Hartrick et al. 2003). Furthermore, severe post-
operative pain soon after awakening from general anaesthesia can be predicted with a scoring rule, using a small set of variables that can easily be obtained from all patients at their pre-operative visit: age, gender, surgical procedure, pre-operative pain severity, expected incision size and the anxiety level and information level scores (Kalkman et al. 2003).

However, unidimensional pain scales tend to focus only on pain intensity and carry an increased risk of oversimplification of the experience (Turk 1989, Chapman & Syrjala 2001). Even with the best craftsmanship, a single measurement will not reveal the pain contribution, but will instead represent only a point presumed to be somewhere along it (Melzack 1987). According to Chapman & Syrjala (2001), the greatest difficulty in measuring pain is the predicament of measuring subjective states which provide estimates of a person’s pain and not actual scores. Pain measurement is vulnerable to bias on the part of both the patient and the caregiver. Likewise, the patient’s self-report of pain is inherently subjective. According to Williams et al. (2000), some reflection is necessary on the common practices of requiring patients to indicate multiple pains and multiple dimensions on a single scale. On the other hand, Turk (1989) posed a very thoughtful question: can we presume that we have scaled what we set out to scale because patients co-operated and gave us numbers that fit our expectations? Pain measurement along the solitary dimension of intensity fails to recognise the reactive (emotional) and sensory (feeling) characteristics of pain (Tursky et al. 1982). Moreover, as unidimensional tools measure mainly the severity of pain, multidimensional methods include the quality and temporal sequence of pain, the affective contributions, and the patient’s belief system (Gracely 1992, Clark et al. 2002). The word ‘pain’ represents a category of experiences. Pain, therefore, is defined in terms of a multidimensional space compromising several sensory, affective and evaluative dimensions (Melzack & Torgerson 1971, p.58).

Melzack invented a diagnostic tool with his colleague Torgerson named the McGill Pain Questionnaire (MPQ) that enables patients to articulate the individual character of their pain. According to Melzack (1975), the assumption underpinning the tool was that the human voice, far from being an unreliable narrator, is capable of accurately uncovering even the most resistant aspects of material reality. The Long-Form MPQ is an excellent example of multidimensional measurement by attribution because it is designed not to score the patient, but to allow the patient to score the pain (Chapman 1989). A precise understanding of the patient’s pain complaint is necessary for a diagnosis to be made and for appropriate treatment to be instituted. Nevertheless, the LF-MPQ takes approximately twenty minutes to complete, which may not be appropriate in the critical care setting. The Short-Form McGill Pain Questionnaire (SF-MPQ) is a simplified version designed by Melzack (1987) for use when the time to obtain pain information from patients is limited. The SF-MPQ is more appropriate for evaluating the characteristics and patterns of post-operative pain (Zalon 1999) and procedural pain in critically ill patients (Puntillo & Ley 2004). Another tool that measures the multidimensional component of pain is the Brief-Pain Inventory (BPI). The BPI is reliable for use with post operative patients (Zalon 1999) and measures not only the pain’s intensity, but also its interference with daily activities (Daut et al. 1983).

A Behavioural Pain Scale based on a sum score of three items - facial expression, movement of upper limbs, and compliance with mechanical ventilation was used by Payen et al (2001) with thirty mechanically ventilated patients who were receiving analgesia and
sedation in order to establish its validity and reliability. Each patient was assessed at three predefined times (morning, afternoon and night), starting twelve to twenty-four hours after intensive care admission (Payen et al. 2001). The noxious (endotracheal tube suctioning and mobilisation-rolled to one side from their initial position) procedures in critically ill patients resulted in a four-fold increase in the Behavioural Pain Scale (BPS) score compared with the non-noxious (compression stocking applications and central venous catheter dressing changes) procedures (Payen et al. 2001). Furthermore, changes in haemodynamics were found concerning heart rate and blood pressure during noxious procedures, whereas neither changes in blood pressure nor changes in heart rate were found during non-noxious procedures (Payen et al. 2001). Similar findings were reported by Aissaoui et al. (2005) with a sample of medical patients who were ventilated in critical care: they found that heart rate and mean arterial blood pressure increased significantly during painful procedures, with the increase for heart rate measuring approximately 10%. In addition, the routine observation from critical care nurses that a mechanically ventilated patient’s response to a noxious stimulus is associated with a change in compliance with ventilator (cough, fight) was found to be as relevant a pain-related expression as facial expression and movement of upper limbs (Payen et al. 2001). In more recent studies, the BPS was found to be a reliable and valid tool for measuring pain in non-communicative ICU patients during suctioning (Aissaoui et al. 2005). It is noteworthy that no movement means no response which is awarded a score of 1 and along with two additional items a score of 3 means no pain on the BPS.

Similarly, another study was undertaken by Young et al. (2006) to establish the validity of the BPS for the assessment of pain in critically ill patients by evaluating facial expressions, upper limb movement and compliance on the ventilator. Despite the fact that Young et al. (2006) concluded that the BPS was a valid and reliable tool for use in the assessment of pain in the unconscious, sedated, ventilated patient, there is little detail on each individual item on the BPS, as results are presented collectively. Therefore, it is difficult to locate the cues exhibited by the ventilated patients excluding the physiological cues, i.e. heart rate and blood pressure. Another point to be made is that the verbal report of pain is presented in the literature as a pain behaviour, is overlooked in the BPS, as communication is often inhibited by the endotracheal tube, medications and altered levels of consciousness (Hamill-Ruth & Marohn 1999, Kwikkeboom & Herr 2001). Moreover, Hadjistavropoulos & Craig (2002) emphasised the importance of relying on both self-report and observational, non-verbal measures to assess pain because both types of measurements seem to be conveying different but complementary information.

Pain assessment is an ongoing process, especially as nurses come to know patients in context — their needs, hopes, aspirations and values (Copp 1985). However, diverse philosophies of pain greatly influence transactions relating to medications, this is discussed in the following paragraphs.

1.7 ASSESSMENT AND PAIN RELIEF WORK

One of the major issues for the potential reliever of pain is that of properly assessing the amount indeed, the very presence of pain and the person who claims to have pain must legitimate it (Fagerhaugh & Strauss 1977). The assessment of pain is not a simple matter.
Assessments are based on minimal information and on the nurse’s ability to read overt, covert and physiological cues sent out by the patient. According to Fagerhaugh & Strauss (1977), this reading is greatly affected not only by patient biographies but also by nurses’ psychosocial and pain biographies. The critical care nurse’s role in providing pain relief is to acknowledge the importance of ‘doing for’ and ‘being with’ the ventilated patient, who may be unable to communicate their pain verbally, and to establish priorities to meet the patient’s needs. Caring for patients in pain is central to post-operative nursing care, yet studies demonstrate that pain relief after surgery is not always ideal. Discrepancies between clinicians’ and patients’ pain assessments have been reported in a variety of settings (Seers 1987, Zalon 1993, Puntillo et al. 1997, Ferguson et al. 1997, Puntillo et al. 2003).

Most studies undertaken on pain assessment have compared the visual analogue scale (VAS) ratings of pain by patients, with independent, simultaneous ratings given by patients, physicians and nurses. The findings indicate that doctors and nurses constantly and methodically underestimate patients’ pain. While numerous studies have found that doctors and nurses report lower levels of pain compared to patients’ self-reports, the ratings between the two may be significantly correlated, signifying that caregivers are receptive to degrees of pain intensity in patients, but are either hesitant to rate pain at high levels or have greater difficulty in assessing significant pain accurately (Teske et al. 1983, McKinley & Botti 1991, Paice et al. 1991, Harrison 1993, Zalon 1993). Moreover, it seems that nurses underestimate patients post-operative pain, especially when the patient’s rating is at the higher level of the pain scale (Seers 1987, Zalon 1993, Sloman et al. 2005). These findings have been supported in many studies involving diverse groups of patients, including patients with burns (Choiniere et al. 1990) and cancer (Grossman et al. 1991).

The significance of these findings need to be reviewed in the context of the properties of the scales used. In several cases the VAS was implemented whereby patients were asked to rate their pain on a scale of 0 to 10, where 0 represents no pain and 10 represents worst possible pain, therefore: patients were requested to rate their pain according to their own frame of reference. The only method that would achieve a perfect or near-perfect correlation between nurses’ and patients’ pain intensity ratings would be if nurses had enquired about their patients’ pain prior to presenting their rating and had accepted the patients’ ratings as an indicator of pain intensity. However, different approaches are taken in the following studies. Puntillo et al. (1997) required subjects to complete their rating prior to the patient’s rating to reduce any influence on the critical care nurse’s rating by the patient’s reported score. In contrast, in a study comparing patients’ self ratings of pain with nurses’ rating of patients’ pain, Sloman et al. (2005) utilised a researcher to undertake the pain rating prior to, and independent of the surgical nurses’ pain rating of the same patient. Moreover, some study descriptions do not specify that nurses were given the chance to do this.

Dahlman et al. 1999, Watt-Watson et al. 2001). In addition, the trends in patients' pain intensity following CABG surgery revealed that worst pain scores increased as time passed after the operation, yet the amount of opioids patients received decreased (Ferguson et al. 1997, Milgrom et al. 2004, Watt-Watson et al. 2004, Yorke et al. 2004). The finding of small and infrequent analgesic doses is consistent with other studies (Cohen 1980, Donovan et al. 1987, Paice et al. 1991, Maxam-Moore et al. 1994, Oates et al. 1994, Stanik-Hutt et al. 2001) in spite of more liberal orders (Puntilllo 1990, Sun & Weissman 1994). Moreover, post-operative pain in a sample of CABG patients predominantly described as tiring/exhausting and rated as moderate to severe reflects the fact that pain post cardiac surgery has a strong emotional component (Yorke et al. 2004). More importantly, in light of the above studies, patients may experience difficulties in reaching the planned goals of care.

Critical care nurses have much control over the frequency, amount, and type of medications patients receive as analgesics are usually prescribed in a way that allows, even assumes critical nursing judgement. Physicians assign almost complete responsibility for pain and sedation control to nursing staff (Fagerhaugh & Strauss 1977, Sun & Weissman 1994), yet some nurses consistently give a lower dose, while others give the higher dose (Fagerhaugh & Strauss 1977). The beliefs of both nurses and patients may contribute to failure of pain relief. Critical care nurses indicated they would reduce older patients' pain medication, even though the patient reported severe pain (Tittle & McMillan 1994, Carroll et al. 1999, McMillan et al. 2000). Similar findings were evident in the actual clinical practice of critical care nurses in a cardio-thoracic unit (Yorke et al. 2004). Nevertheless, age, more than weight, was found to be a variable that influenced the amount of analgesic medication administered (Weis et al. 1983).

In many hospitals, the standard prescription order states PRN (pro re nata or as needed), which essentially means that the drug is given only after pain returns (Melzack 1990, p.20). The PRN technique requires a nurse to interpret both a doctor’s prescription and the patient’s response to the administered drug (Owen et al. 1990). However, there is a time delay between the patient’s request for analgesia and the nurse’s response, this is a problem with PRN prescription techniques. Patients suffer needlessly because they presume that nurses will routinely deliver the drugs on schedule without his/her asking for pain relief post surgery. Probably, the most common way in which nurses deal with patients’ pain in hospital settings is to assume that when a patient has pain, (s)he will say so and then the nurse will refer to medication order charts to determine when the next analgesic dose is due (Manias et al. 2002). Aslan et al. (2003) surveyed ninety-one critical care nurses to determine their approach towards assessing patients’ pain levels in confused, intubated patients or patients with tracheostomies. The findings revealed that with regard to the proportion of analgesics administered as needed; over half of the nurses initially attempted to assess the patient, establish the nature of the pain, complete a vital signs check, check if the patient had any known allergies and check the side effects of drugs before administering the medication, suggesting a lack of awareness, on the part of the nurse, of the consequences of unrelieved pain (Aslan et al. 2003). Typically, greatest attention was paid to determining the patient’s pulse and blood pressure before administering medications (Manias et al. 2004).

Post-operative pain is a significant problem in clinical practice. Just as there is an assessment task, there is also a relief task, which, to be done properly, depends on the
appropriate assessment of pain. Pain relief requires an active involvement in the world of the patient which enables knowledge about the patient to develop which in turn assists the nurse in attending to the personhood of the patient. The doubt of other individuals amplifies the suffering of those already in pain as the accompanying pain is disbelieved and pain medication underprescribed (Scarry 1985). Furthermore, if nurses think of relieving pain only in terms of matching a medication to a pain, they oversimplify tremendously what is involved (Fagerhaugh & Strauss 1977). Simply providing more pain medication may be inappropriate or undesirable for all patients (Kuperberg & Grubbs 1997) as patients post surgery often have their own pain philosophies, which they might or might not openly express (Fagerhaugh & Strauss 1977).

The health professional has the difficult job of trying to assess a subjective event being experienced by another person. This is particularly difficult when a person is consciously or unconsciously trying to control the expression of the sensations being experienced or when verbal and non-verbal behaviours are inconsistent. Relieving pain may seem to be a task only for the staff, but it is one which is shared with the patient; there is work for each to do (Fagerhaugh & Strauss 1977). Pain is apparently viewed by many people as a private experience that one tries to keep to oneself. This suggests that, for whatever reasons, many patients will not verbally communicate that they are in pain until the pain is very severe, and some may not verbally communicate it at all (Fagerhaugh & Strauss 1977, Carr 1990, Cousins et al. 2004, Yorke et al. 2004). Reasons cited for the non-communication of pain post surgery included a lack of information about the importance of pain treatment, the wish to be a good patient, not wanting to take the nurse away from other patients, avoiding unpleasant analgesic side effects (Oates et al. 1994, Kuperberg & Grubbs 1997, Dillon et al. 2000) and under-reporting of pain due to stoicism (Cousins et al. 2004). Furthermore, older patients may use different terms to convey their pain. In a study of 417 patients post orthopaedic surgery, 16% scored their pain as zero on verbal rating and visual analogue scales; yet, when asked to describe what they felt, they used words such as ‘sore’, ‘stabbing’ and ‘ache’ rather than ‘pain’ (Closs & Briggs 2002). In another study, evidence suggested that nurses missed pain cues when cues were ambiguous such as the post-operative patient indicating that they were not in pain but sore (Manias et al. 2005).

Because of the familiar character of some surgical trajectories, patients are generally aware that some pains and discomforts must be endured from both the surgery and treatment. Moreover, the majority of patients expected to have pain of moderate to severe intensity after surgery (Weis et al. 1983, Oates et al. 1994, Carr & Thomas 1997, Salomaki et al. 2000, Svensson et al. 2001). Since over two-thirds of patients said they would wait until they were in severe pain before requesting analgesia, or not ask at all, it is not surprising that so many patients experienced severe, unrelieved pain post-operatively (Fagerhaugh & Strauss 1977, Owen et al. 1990, Watt-Watson et al. 2001). The staff may assume that a patient has been given adequate information about his or her responsibilities in the drug transaction, but in fact the information may be far from adequate. Patients expected nurses would know how much pain they were experiencing because they were the experts (Cohen 1980, Seers 1987, Zalon 1993). However, critical care nurses expected that patients would voluntarily communicate their pain (Watt-Watson et al. 2001); in post-operative pain in general, nurses
felt that patients would ask for a painkiller if they needed one (Cohen 1980, Cartwright 1985, Seers 1987, Oates et al. 1994).

Clearly, many patients will not communicate their pain and will make strong efforts to conceal it. The process of pain assessment requires active effort on the part of the nurse. Differences in pain intensity are also related to which surgical procedure the patients have undergone and critical care nurses expect a certain degree of pain intensity for different surgeries (Guyton-Simmons & Ehrmin 1994, Carroll et al. 1999, Sjostrom et al. 2000). An assumption among nurses is that post-operative pain decreases as the patient recovers. Although pain decreased for the majority of major abdominal surgical patients from the first post-operative day, for several patients pain actually increased (Tittle et al. 1992, Carr & Thomas 1997, Zalon 1999). It is evident from these studies that nurses cannot accurately diagnose the intensity of all patients’ pain based on assumptions about the progress that the patient has made post-operatively. If nurses do not expect him/her to have pain, then the patient must make their pain plausible, that is, manage to legitimate its existence (Fagerhaugh & Strauss 1977, p.140). However, nurses may not question patients about their pain post-operatively, which highlights the patient's role in pain work. Some surveys demonstrated that the most common reasons for nurses not asking patients a pain-related question post-operatively were that patients were asleep, had recently had an analgesic (Oates et al. 1994, Schaafheute et al. 2001) or were the result of misconceptions among health professionals regarding pain assessment tools (Young et al. 2006a).

Inconsistency in titrating intravenous morphine for pain relief following cardiac surgery occurred, according to Kai-Chenng Chuk (1999), due to various criteria of pain assessment adopted by critical care nurses who indicated that severe pain is always accompanied by an elevation of vital signs, where the most reliable indicator of pain was the patient’s verbal report, may be considered of secondary importance (Kai-Chenng Chuk 1999, Sjostrom et al. 2000). Critical care nurses’ knowledge about pain assessment and management may impact on patient care and outcome. The relationship between two variables in pain assessment (length of time after surgery and ventilator status) and medication decisions made by critical care nurses (n=71) was explored by Gujol (1994) using vignettes. According to Gujol (1994), critical care nurses’ assessment of pain and their choice of narcotic doses were affected by patients’ ventilator status and the length of time post surgery, which led to poor judgement in the management of the patients’ pain (Gujol 1994). Although the survey design is limited by self-reported data, which may superficial, the results of this survey revealed many misperceptions affecting critical care nurses’ decisions regarding pain control.

Intensive care patients may experience warnings of pain before its onset. The prodromal symptoms most frequently experienced were restlessness and tremor, generalised uneasiness, and perceived anxiousness and irritability as their control lessened (Copp 1974, p.493). Pain is multidimensional where sensory and affective dimensions are two of its salient dimensions. Some critical care patients stated that suffering, the response to pain, seemed to begin even before the pain and included many anticipatory fears that sometimes were even more acute than the eventual pain (Copp 1974). One of the greatest challenges for critical care nurses is differentiating indicators of pain from indicators of anxiety as some patients who were both anxious and in pain showed multiple, conflicting cues (Stannard et
In particular, it is difficult for a less experienced critical care nurse to distinguish between post-operative pain and other problems such as anxiety and fear (Sjostrom et al. 2000). Furthermore, the assessment of pain and anxiety in ventilated patients can be very taxing for the critical care nurse as the behavioural responses to pain and anxiety, e.g. movement, ventilator dysynchrony and restlessness, have many similarities. Moreover, to promote comfort critical care nurses need to assess and seek ways to avert and alleviate anxiety during intensive care therapeutic modalities pertinent to patient recovery post CABG surgery, this is illustrated in the next section.

1.8 Anxiety and Pain

The affective component of pain includes anxiety. Anxiety is one factor that has consistently been shown to influence perception and adjustment to pain in the critically ill patient (Guyton-Simmons & Ehrmin 1994, Nelson et al. 1998, Hadjistavropoulos et al. 2004). Anxiety has been defined as a vague uneasy feeling of discomfort or dread accompanied by an autonomic response (NANDA 2003-2004, p.9). Moreover, anxiety and sleep deprivation are common among critically ill patients and they act synergistically to increase pain perception and analgesic requirements (Sanders et al. 2001). Characteristics of anxiety include subjective feelings of tension, apprehension, nervousness and worry, accompanied by activation of the autonomic nervous system (Nelson et al. 1998). The autonomic patterns are virtually identical in pain and anxiety (Stembach 1976, p.293). Anxiety evokes similar responses in the physiologic system as pain, and may therefore, be a potentiator of pain. Excessive fear and anxiety can potentiate pain and increase the risk of physiological responses as diverse as haemorrhage and cardiac arrhythmias (Benner & Wrubel 1989). In addition, an anxiety state is often diagnosed by critical care nurses based on physiological and behavioural cues. However, these cues may be unreliable (McKinley et al. 2004). Correspondingly, critically ill patients are often limited in responding to validated anxiety scales that absorb cognitive effort the patients cannot maintain and verbal responses they cannot construct because of tracheal intubation (Chlan 1998, McKinley et al. 2003).

In a more recent study, Moser et al. (2003) surveyed critical care nurses in order to identify the clinical cues that critical care nurses consider to be the defining attributes of anxiety in critically ill patients. The findings are interpreted in the context of a 31.6% response rate. The three most commonly reported individual cues of anxiety in the physical/physiological category were increased heart rate, increased blood pressure, and increased respiratory rate, while few nurses indicated pain as indicative of anxiety (Moser et al. 2003). Agitation/tension was the most commonly used subcategory in the behavioural indicator group. In addition, nurses also observed that anxious patients failed to cooperate with care by displaying distrustful behaviour to health care providers and interfering with care by pulling out tubes, lines, removing oxygen masks and refusing care (Moser et al. 2003). Traumatically injured adults during the first seventy-two hours of hospitalisation who refused to be turned had significantly higher anxiety scores than did those who agreed to be turned (55.9 vs. 44.4, p=.02) (Stanik-Hutt et al. 2001). Therapeutic modalities which are part of the surgical trajectory of the critically ill patient post cardiac surgery may heighten the patient’s anxiety which is evident in the following narrative: he is becoming more and more anxious, he’s very uncomfortable with the endotracheal tube (Stannard et al. 1996, p.439).
Anxiety may be difficult to detect in the critically ill patient in the immediate phase post cardiac surgery. Pain and anxiety commonly coexist in critical care patients and nurses make comprehensive clinical judgements about medications intended to relieve pain and anxiety which are administered at the discretion of the critical care nurse (Ticney 1992, Stammard et al. 1996, Frazier et al. 2003, Manias 2003). Anxiety and post-operative pain may affect each other in a linear relationship because as anxiety increases, so does pain (Seers 1987, Rhudy & Meagher 2000). In addition, anxious patients were found to have significantly higher pain scores on day two post surgery than less anxious patients and changes in anxiety were significantly related to changes in pain (Carr et al. 2005). Moreover, the alleviation of pain experienced by patients post major surgery is a high priority because the greater the patient’s anxiety, the greater the chance of complications (Fagerhaugh & Strauss 1977). Conversely, interventions that relieve anxiety may also relieve pain. However, while nurses were observed to perform some form of pain assessment, they rarely conducted any assessment of anxiety (Manias 2003). Likewise, restlessness may have many causes and patients are not methodically assessed for the causes of their symptoms, which could be related to excessive symptoms of pain and anxiety and treatment for these symptoms could be as different as suctioning, analgesia, human contact, ventilator setting change and reality training (Egerod 2002). Two terms, fighting the ventilator/non-compliant and patient-ventilator asynchrony, are used interchangeably by critical care nurses but warrant two very distinct treatments. The problem, fighting the ventilator/non-compliant may merit that the patient be given analgesia or sedation, while, in contrast, patient-ventilator asynchrony may necessitate a change in ventilator parameters (Egerod 2002).

There is evidence from Kremer et al. (1981) and Clarke et al. (2002) that patients who were depressed and/or anxious reported higher levels of post-operative pain on unidimensional scales. Moreover, responses to a set of pain-rating scales which assessed the emotional as well as sensory aspects of pain would provide additional information that would help the caregiver determine more precisely the medications that would be best for a particular patient at a particular time, i.e. for pain at rest and for evoked pain during a cough (Clark et al. 2002). In the critical care situation, McKinley et al. (2003) assessed the ability of intensive care patients to respond to the newly developed Faces Anxiety Scale and found that it is easy to administer, subjects the respondent to minimal burden and appears to elicit anxiety self-report from critically ill patients (McKinley et al. 2003). In a follow-up study, the Faces Anxiety Scale was found to be a valid measure of state anxiety in ventilated, dependent intensive care patients (McKinley et al. 2004). However, difficult problems remain when applying an instrument such as the Sedation-Agitation Scale to critically ill patients, as a small number of patients fall into a crossover situation, i.e. they may appear sedated or difficult to arouse, but become agitated once stimulated during suctioning (Riker et al. 1999).

Critical care nurses learn to judge levels of distress not only by the patient’s overt behaviour, but also by the context of the pain, the patient’s physiologic responses and therapeutic response. Recognising the changing relevance of different cues and recognising alterations in the clinical circumstances are subtle aspects of clinical judgement. The background of clinical judgement is clinical experience: the things clinicians have learned at
the bedside in the care of sick people (Feinstein 1967). Knowing the patient is fundamental to
skilled clinical judgement, this is exemplified in the next section.

1.9 CLINICAL JUDGEMENT AND KNOWING THE PATIENT

Part of the complexity of clinical judgement in the immediate phase post cardiac
surgery is the fact that large amounts of data must be evaluated by the critical care nurse at
the bedside. Central to the clinical judgement of expert critical care nurses is what they
describe in their everyday discourse as knowing the patient, i.e. knowing the patient’s typical
pattern of responses and knowing the patient as a person (Thomas & Fothergill-Bourbonnais
experientially gained clinical knowledge sensitises the nurse to potential issues and concerns
in particular situations (Benner et al. 1996). Using this particularistic knowledge of the
patient, critical care nurses formulated a sequence of clinical judgements about the patient’s
status and potential, upon which they based their choice of intervention strategies (Jenny &
Logan 1992). Furthermore, knowing the patient is equated with nursing gestalt which was
found by Pyles & Stern (1983) to be a process used by experienced critical care nurses
whereby fundamental knowledge, past experiences, cue identification and sensory clues were
linked, leading to a categorisation of the patient picture that involved a synergy of logic and
intuition. Besides, knowing the typical pattern of responses sets up the possibility for the
critical care nurse to notice subtle qualitative changes in the patient’s pain state. By seeing
many critically ill patients in post-operative pain, a pattern of normal pain can be identified
by intensive care nurses in the form of a clinical eye, meaning reliable and valid knowledge
of the form of pain, i.e. the external gestalt of pain (Sjostrom et al. 2000).

Knowing the patient is a unique form of knowledge that nurses achieve only through
interpersonal relationships (Jenks 1993). Having relationships with impaired older adults was
central to the nurses’ ability to form hypotheses about the meaning of pain cue clusters that
allowed them to infer pain was a problem (Parke 1998). Besides, the construction of a unique
pattern is developed through close and ongoing interaction with each critically ill patient and
through comparison with other critically ill patients (Guyton-Simmons & Mattoon 1991,
Guyton-Simmons & Ehrmin 1994). The aforementioned authors suggest that the expectation
of a typical pattern of pain was based on previous experiences with similar patients. The
expert critical care nurse linked assessment cues to form a typical pattern of pain for an
individual patient which included the individual’s pain threshold, the particular location of
the pain, the sequence of events leading to the pain, the sequence of progression of the pain,
the type of surgery, prior relief from pain with a particular dose of medication, the time since
previous medication and the level of activity (Guyton-Simmons & Mattoon 1991, Guyton-
Simmons & Ehrmin 1994). Thus, the number of assessment cues collected was dependent on
how well critical care nurses knew the patient and the patient status at a particular point in
time (Guyton-Simmons & Mattoon 1991, Guyton-Simmons & Ehrmin 1994). Furthermore,
expert critical care nurses make their ultimate judgements on the basis of several cues, rather
than on one, this is reflected in the following narrative: you can’t go on one parameter alone,
it’s the whole picture (Pyles & Stern 1983, p.53).

A study of gerontological nurses’ knowledge about pain cues in cognitively impaired
older adults and of how nurses bring together objective, scientific knowledge with intuitive
knowledge to realise that an impaired older adult is in pain was reported by Parke (1998). Two ways of knowing were found to be in operation: knowing simply by knowing the person and knowing by intuitive perception (Parke 1998). It was through the process of familiarity with the older adult that nurses were able to recognise when something was different or wrong (Parke 1998). Similarly, knowing the patient was described by nursing home staff as central to identifying pain cues, while standardised pain assessment measures were not widely valued in focus group discussions (Clarke et al. 2004). Moreover, individualised knowledge was seen as critical, because each cognitively impaired older adult provided nurses with their own set of subtle pain cues whereby nurses were required to learn the meaning of the cues because the impaired older adults could not verbalise what they wanted the nurses to know (Parke 1998). A deeper level of knowing was achieved by some nurses who could interpret certain patients’ non-verbal cues (Tutton & Seers 2004). It is through nurses’ repeated experience with patients that nurses’ begin to perceive the particular rather than the typical, care becomes individualised rather than standardised and planning becomes anticipatory of change rather than simply responsive to change (Benner & Wrubel 1989).

Moreover, critical care nurses reported connecting with patients within a matter of minutes, and a relationship over time was not seen as an essential component of assessing subtle patient changes (Minick 1995). Specific knowledge has to do with the individual patient and can be based on either long-term or short-term experience with the patient (Benner & Wrubel 1989, p.92). Knowing about patients in pain post-operatively is important, but, additionally, critical care nurses rely on having personal relationships with their patients. Many judgements that nurses perceived as difficult, were difficult as a result of not knowing the patient, this is described in the following narrative: pain is difficult to assess sometimes because people react to pain in different ways and if you don’t know that person you may not know how to deal with it (Jenks 1993, p.401). Knowing the patient also allows the nurse to personalise the patient’s plan. The process of assessing the patient is a domain of judgement chiefly characterised by the process of the critical care nurse getting situated and oriented to the patient in the situation, learning from the patient’s response, which enables the nurse to plan for contingencies for that patient and personalise the treatment plan (Stannard et al. 1996, Radwin 1998). In actual practice, it is the critical care nurse who spends the most time with the patient most frequently notices the initial pain cue, this will be revealed in the next section.

1.10 CLINICAL JUDGEMENT AND PAIN CUES

Pain is a most difficult symptom to accurately evaluate because the reaction to a painful stimulus varies among individuals. There is no ideal objective assessment. It is equally challenging for the critical care nurse to assess pain by noticing and interpreting physiological and behavioural cues in the context of the ventilated patient post CABG surgery. Pain assessment is not only possible, but even more significant when the available cues are subtle and can easily be attributed to other causes such as anxiety or haemodynamic instability as alluded to earlier.

Physiologic responses to pain, which are numerous, are seen in the respiratory, cardiovascular, gastrointestinal, urinary, neuroendocrine and metabolic systems (Miller 1994). Many of these responses can be attenuated or eliminated through the provision of

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adequate analgesia. Pain causes mydriasis, and pupillary size changes of 200% are common in response to noxious stimulation and have been shown to be more dramatic than associated haemodynamic changes (Larson et al. 1993). In addition, the use of catecholamine infusions in the critically ill may cause mydriasis and tachycardia in the absence of pain, while a morphine infusion may cause miosis without relieving the patient’s pain (Sanders et al. 2001). While physiologic measures such as heart rate and blood pressure offer reproachable, identifiable numbers, the co-founding variables found in critical illness make the use of a single scale difficult (Hamill-Ruth & Marohn 1999).

Critical care nurses rely on monitoring physiological cues not only for precise immediate changes in the patient’s condition, but also as cues of the pain state. A monitoring schema by critical care nurses of alterations in values of heart rate, blood pressure, respirations, and oxygen saturation and a rising carbon dioxide (PCO2) were used with ventilated patients post major surgery who were unable to express their pain verbally (Guyton-Simmons & Ehrmin 1994, Stannard et al. 1996). Another study examined the type and frequency of behavioural and physiological indicators that critical care nurses (n=14) selected from a pain assessment and intervention notation algorithm as indicative of pain on thirty-one surgical patients who were either in the intensive care unit or the post-anaesthesia care unit (Puntillo et al. 1997). Patients were mechanically ventilated or had been extubated <4 hours before the time of data collection (Puntillo et al. 1997). The assessment was repeated at hourly intervals for a total of five pain assessments (time one to time five). However, it is not apparent if all of the assessments were undertaken at rest. The most frequently noted physiological indicators of pain were increased heart rate (HR), increased blood pressure (BP), and increased respiratory rate in time one (Puntillo et al. 1997). Haemodynamic responses such as increased BP or HR, lacrimation and moist/sticky skin were also considered to be more specific pain cues in mechanically ventilated patients than insufficient depth of anaesthesia by a cohort of nurse anaesthetists surveyed who were employed in post-anaesthesia care units (Stomberg et al. 2001).

A survey of ninety-one critical care nurses designed to determine their approach towards assessing pain levels in patients having difficulty articulating their pain symptoms found that less than half of the critical care nurses sampled would use vital signs as the most appropriate approach to pain assessment in critically ill patients (Aslan et al. 2003). The aforesaid researchers refer to their survey as being partially qualitative which seems to refer to open-ended questions aimed to assessing nurses’ definitions and assessment of pain in confused or intubated patients who were unable to communicate their pain verbally. However, the questionnaire was delivered but not administered by the researchers. Moreover, the critical care nurses’ narratives demonstrated that physiological cues, i.e. increases in blood pressure, were taken to indicate pain in critically ill patients post major surgery who not only deny pain but also do not report pain (Guyton-Simmons & Ehrmin 1994).

Critical care nurses validated their hunches, thus confirming the presence of pain with patients who could not communicate verbally, through a process of trial and error which involved identifying pain cues, implementing treatment modalities and observing the patients’ responses to the modalities. The following narrative demonstrates how a critical care patient’s response to analgesia was utilised as a critical cue in diagnosing pain if the patient’s blood pressure and heart rate, which increased prior to the analgesia, returned to
baseline parameters post the analgesia when no others cues were apparent: if heart rate and blood pressure increased and after I gave pain medication, they went down to the prior rate then I use those cues to judge that the patient was in pain (Guyton-Simmons & Ehrmin 1994, p.40). With a different sample, many nurses reported that they would administer a treatment and look for a return to the older adults’ usual or expected status, and an intervention was considered effective when the pain cues subsided and the older adults’ expected status re-emerged (Parke 1998). Essentially, prior to acknowledging a significant patient response, the nurse must have a sense of the patient’s baseline or continuum of homeostatic changes (Jacavone & Dostal 1992, p.58). Physiological cues are not only used as an indication of the current pain state, but also of pain progression. According to Guyton-Simmons & Mattoon (1991), critical care nurses utilised physiologic variables such as skin colour and blood pressure as signs of a progression of pain relief, in addition to verbal and non-verbal responses.

The assessment of pain in critically ill patients warrants not only the detection of physiological cues, but also of behavioural cues to complete the pain picture. The behavioural cues of pain are central when critically ill patients are non-responsive verbally. The most notable differences in types and numbers of behavioural cues chosen by critical care nurses were between the first assessment (post-operative day one) and the subsequent four assessments (Puntillo et al. 1997). At the first assessment (time one), nurses noted grimacing, frowning, or wincing (61%); no movement (31%); restlessness (42%); wrinkled forehead (33%); vocalisation (32%); muscle tension (32%) and seeking attention through movements (37%) (Puntillo et al. 1997). With subsequent pain assessments, the predominant behavioural cue reported by critical care nurses and postanaesthesia care unit nurses was no movement, while other behavioural indicators decreased in frequency, which may suggest that patients had been medicated as pain intensity decreased by time two (Puntillo et al. 1997). In addition, nurses used discrimination at each assessment time and did not simply repeat their assessment of cues from previous time points (Puntillo et al. 1997). According to Ferguson et al. (1997), critical care nurses may monitor the patient more closely during the initial critical stage (time one) than at any other time in the post-operative period and, as a result, may be more sensitive to possible cues for pain or distress.

The interpretation of behavioural pain cues necessitates that the critical care nurse is consistently attentive at the bedside. Severe pain causes a behavioural change toward a more immobile posture (Sanders et al. 2001). Critical care nurses identified characteristic pain behaviours, such as the subdued patient (hold very still) or the withdrawn patient as reflecting the patient’s response to pain (Jacavone & Dostal 1992). However, there are differences in the interpretation of some behavioural cues, in particular, no movement by critical care nurses in the following studies. The behavioural cue, i.e. ‘no movement’ or ‘not restless’ was used by critical care nurses to indicate that no pain medication was required as the patient did not appear to be in pain (Guyton-Simmons & Ehrmin 1994) a peacefully sleeping patient is not seen as being in pain (Sjostrom et al. 2000) while the tapering off of energy-conserving behaviours was identified as a sign of pain relief (Jacavone & Dostal 1992). The criterion ‘hardly dared to move’ was interpreted by critical care nurses as a cue that pain existed, but lack of the same criterion was also interpreted as no pain (Sjostrom et al. 1999). Besides, it is the frequency of assessments that teaches nurses to validate their pain
assessment with the ventilated patient and, in particular, the patient who is asleep. Since human behaviour is complex and nurses cannot truly know what other people are experiencing, the nurse validates or refutes the diagnosis based on the patient's response (Lunney 2001).

Nurses use objective and subjective indicators which influence their clinical judgement in the context of the patient's pain. Critical care nurses indicated that facial grimacing, poor eye contact, grabbing at the pain site, guarded movement, and, in particular, increase in restlessness from baseline were good indicators of the patient's pain post major surgery (Guyton-Simmons & Ehrmin 1994); these cues were more heavily weighted than concrete data, such as laboratory values, monitor changes or vital signs (Guyton-Simmons & Mattoon 1991). Besides, surgical critical care nurses felt that laboratory numbers taken alone could be misleading; the validity of the patient's numbers were tested by checking them against such things as physical appearance or things patients said or wrote which were accepted as stable and reliable indicators of the patient's status and thus thought of as constants in the assessment equation (Longo 1994).

Subjective and individual experience of pain is emphasised and the essence of the critically ill patients' statements determines whether the patient is in pain or not in the following studies. The majority of critical care nurses rely on the patient’s verbal report as the most accurate approach to pain assessment (Sjostrom et al. 1999, Aslan et al. 2003), the focus is on the content of the post-operative patient’s verbal communication (Kim et al. 2005). However, for some critical care nurses, a preference for non-verbal reaction to pain and for physiological cues is evident, particularly in the case of the ventilated patient (Guyton-Simmons & Ehrmin 1994), whereas, if the patient was not on a ventilator, critical care nurses relied heavily on the patient's verbal statements of pain (Guyton-Simmons & Mattoon 1991, Tierney 1992, Guyton-Simmons & Ehrmin 1994). Critical care nurses also gather additional assessment data when patients' verbal and non-verbal behaviour are inconsistent. Several patients exhibited non-verbal signs of distress, but denied having pain until the nurse questioned them directly and pointed out that they looked uncomfortable (Guyton-Simmons & Mattoon 1991, Guyton-Simmons & Ehrmin 1994, Stannard et al. 1996).

The Jacavone & Dostal (1992) study was designed to reveal the thought processes of expert (n=4) cardiac nurses as they assessed and treated cardiac pain. The exemplar provided demonstrates how the expert critical care nurse notices cues, e.g. short of breath, restless, anxious, funny dry cough, few crackles and ECG changes during her assessment with the patient. This expert nurse did not have an intimate knowledge of the patient but had the ability to zero in on the relevant symptoms. Moreover, it was the nurse’s extensive experience of cardiac arrests which informed her of the impending change in the patient, despite objective data, such as normal vital signs, which was based on her qualitative distinctions which influences her judgement. The expert nurse recognises the clinical patterns of low cardiac output without the aid of technology. According to Jacavone & Dostal (1992), the expert critical care nurse sees the entire picture and does not need to view each clinical element separately to make a judgement; this is referred to as holistic perception. So, it seems that the critical care nurse has developed a pattern based on previous experiences with similar patients and this guides the search for additional cues which Jacavone & Dostal (1992) refer
to as ‘clinical pattern’. This enables the critical care nurse to recognise a pattern that ‘she has witnessed in other patients’ and apply it with a personal dimension in this case. In contrast, beginners frequently concentrated on their role and actions or lack of them, in crises rather than focusing on the patient. According to Guyton-Simmons & Mattoon (1991), although subtle cues were monitored for change in status, expert critical care nurses did not follow standardised assessment guides, but selectively gathered data in a given situation, i.e. they knew what they needed to know.

Therefore, this study by Jacavone & Dostal (1992) seems to suggest that expert critical care nurses develop nucleus constructs from their clinical experience, i.e. created as situations which they anticipate will occur, which are in the form of a perceptual pattern. A perceptual grasp of a situation means a clinician does not have to consciously reflect on the situation in order to identify what is relevant (Benner & Wrubel 1982). Polanyi (1958) calls this perceptual recognitional ability of the expert clinician ‘connoisseurship’. Furthermore, Bryczynski (1999) found that expert nurse practitioners described a perceptual awareness that something wasn’t right referred to as assessment expertise which seems to accrue through spending time with patients, focused listening and experience in recognising subtle cues.

The effect of practical knowledge on the nurse’s clinical judgement in assessing and treating the patient’s pain responses is also emphasised in the following small-scale studies. Sjostrom et al. (1999) aimed to validate different categories used in acute pain assessment by intensive care nurses (n=10), while carrying out pain assessment of post-operative patients (n=30) within twelve hours after the operation. The critical care nurse identified how the patient looked category, which comprised of two dimensions: orientation towards the objective, i.e. facial expression, grimaces and other physical movements, but also clinically accepted changes such as size of pupils, temperature of skin, pulse rate, skin characteristics, the flow of tears and blood pressure (Sjostrom et al. 1999). In a follow-up study, Sjostrom et al. (2000) scrutinised the variations in critical care nurses’ (n=30) conceptions of the impact of clinical experience on competence in post-operative pain assessment. Similarly, the category to be able to see, which comprised the created perceptions of how the patient looks, i.e. the patient picture and objective physical expressions of post-operative pain (Sjostrom et al. 2000). Likewise, a more recent small study was undertaken using semistructured interviews to determine the criteria that ten surgical nurses used to assess post-operative pain. The study found that they used three categories: how the patient looked, what the patient said and experience with similar circumstances (Kim et al. 2005). In addition, the participants in the aforesaid study had created a typology of cases as an assessment strategy that could be used for classifying post-operative patients, e.g. type of surgery, time post surgery, patient’s age and responses and actual personal experience with pain. The most frequent assessment strategy reported by the surgical nurses was related to the patient’s appearance and they drew on their past experience in terms of what physical signs to look for, such as facial expression, bodily movement and heart rate (Kim et al. 2005).

In two earlier studies, the more experienced critical care nurse tended to consistently evaluate the patient’s appearance, i.e. how the patient looked and the anxiety and restlessness of the post-operative CABG patient, in contrast to the novice nurse who relied heavily on standing orders, monitor pressures and help from the more experienced nurse (Auld Bruya &
The expert critical care nurse is immersed in the urgency of the situation when caring for a labile critically ill patient, constantly juggling the patient’s pain state and preventing a haemodynamic crisis. Because the patient is unstable, everything shows up as a puzzle which is particularly complex for the inexperienced clinician because everything leads to other things (Auld Bruya & Demand 1985, Benner et al. 1999). The continual assessment of patient responses to treatment requires the close presence of the nurse at all times during acute episodes of pain. Monitoring, in fact, is seen as a continuous evaluative exercise in which the expert critical care nurse is constantly making judgements about the patient’s status with the goal that all conclusions or judgements should make sense and fit the picture (Longo 1994). The nurses’ continual presence is also based upon a theoretical and practical understanding of how rapidly changing pathology of cardiac pain may lead to a swift deterioration in the patient (Jacavone & Dostal 1992).

The process of maintaining critically ill patients within specified physiological parameters depends on a sophisticated knowledge of the pharmacological properties of the medication; the effects of patient activity or agitation on blood pressure and the judgement of whether the activity and concomitant physiological response is transient; and finally, an understanding of the particular patient’s responses (Benner & Wrubel 1989, Jacavone & Dostal 1992, Stannard et al. 1996). The knowledge and skill necessary to keep particular patients carefully within the established haemodynamic parameters are implicit because the knowledge is informal and particular. Practical skills and practical experience contain much more information than people possessing this expert knowledge can ever tell (Polanyi 1958). Moreover, studies have shown that expert nurses have the ability to rapidly recognise subtle changes without being able to clearly verbalise these perceptions (Pyles & Stern 1983, Parke 1998) and many aspects of skilled know-how are silent and invisible (Benner et al. 1999, Benner 2004a).

1.11 SUMMARY OF LITERATURE REVIEW

This literature review presented various definitions of pain, highlighting the multifaceted dimension of acute pain. Pain was viewed as a multidimensional phenomenon with sensory, emotional, motivational and behavioural dimensions. Moreover, pain post cardiac surgery which was rated as moderate to severe by patients was related to the surgical trauma, routine activities such as turning, suctioning and irritation from various tubes and cannulations. Pain behaviours were differentiated into three categories, i.e. overt/motoric, covert/subjective and physiological, which need to be considered to adequately describe the pain problem in the immediate phase post cardiac surgery. Moreover, the private subjective world of pain is a formidable barrier to sensitive assessment and therapeutic interventions in the context of critical care. Despite this, there are numerous valid and reliable unidimensional pain scales. In addition, the Behavioural Pain Scale (BPS) was reported as a reliable and valid tool for measuring pain in non-communicative intensive care patients. The assessment of pain in critically ill patients by nurses warrants not only the detection of behavioural, the detection of motoric and physiological cues, but also, physical and personal cues, which nurses reported were necessary to complete the patient pain picture.

Nonetheless, many of the patients’ cardiovascular states are fragile and unstable in the first few hours post cardiac surgery and this necessitates constant surveillance and meticulous
tracking of cues by the critical care nurse. The critical care nurses’ continual presence at the bedside is based on a theoretical and practical knowledge of how rapidly changing trends in cues and pain pathology can lead to the swift deterioration of the patient and promote haemodynamic abnormalities. Clinical judgement of the ventilated patient’s pain state by critical care nurses is complex and is based on the nurse’s ability to read overt, covert and physiological cues conveyed by the patient. However, studies indicate that critically ill patients may be unable or may choose not to convey their pain state based on their own pain philosophies. In addition, one of the greatest challenges for the critical care nurse is differentiating cues of pain from cues of anxiety and haemodynamic instability. Knowing the patient was seen as being central to clinical judgement and this enabled the expert critical care nurse to get situated and orientated to the critically ill patient. Moreover, the expert critical care nurse had an expectation of a typical pattern of post-operative pain based on practical knowledge and not on an intimate knowledge of the patient and the nurse integrated this understanding rapidly in order to differentiate atypical from typical pain and located additional cues to formulate a complete picture of the case.

Nursing practice is becoming increasingly complex and challenging, especially in critical care, where technology is sophisticated and patient problems are multifaceted. Likewise, the clinical judgements that critical care nurses must make of the ventilated patient’s pain state are often made in situations of haemodynamic instability and uncertainty. In the immediate phase after cardiac surgery, patients’ cardiovascular states are often unpredictable and unstable during the first few hours. Therefore, the patient’s state can abruptly and catastrophically deteriorate because of bleeding or haemodynamic changes, a state that places the patient at risk of major organ dysfunction and delayed recovery. Therefore, great skill and knowledge are required on the part of the critical care nurse to swiftly and precisely detect subtle cues not only of haemodynamic instability, but also of the patient’s pain state. Moreover, acute pain can contribute to haemodynamic abnormalities (Hamill-Ruth & Marohn 1999, Blakely & Page 2001), necessitating therapeutic interventions not only to provide comfort, but also to stabilise the patient’s condition.

The literature review indicated that a patient’s self-report of pain is the most sensitive and reliable measure, and must be used to validate objective indicators of pain. However, evidence and clinical reality suggests that, in the absence of such a report, critical care nurses who care for ventilated patients in pain post major surgery often rely on objective and physiological cues to make an inference of a patient’s pain state in the context of critical care. Furthermore, critical care nurses are often not consciously aware of how they make a judgement in such complex situations and, therefore, research is needed to capture their judgement policies in the context of the ventilated patient in pain in the immediate phase post cardiac surgery, i.e. within the first six hours. Nevertheless, several of the studies cited reflected the objective and physiological cues used by critical care nurses with the aid of a PAIN algorithm while assessing patients pain in the context of twelve to forty-eight hours and onwards post major abdominal and thoracic surgery in critical care and post-anaesthesia care units. In addition, in some studies critical care nurses were interviewed subsequent to the pain event. Furthermore, in a number of these studies some patients were ventilated while others were extubated, which could impact on their ability to convey a self-report of pain. As such, little is known about how critical care nurses at the bedside make a judgement about
the ventilated patient's pain state in the immediate phase post cardiac surgery, i.e. within the first six hours post cardiac surgery.

In undertaking this study of clinical judgement in nursing, the researcher believes that the research has practical as well as theoretical significance for nursing. This research is directed towards understanding and subsequently, improving what the researcher believes to be at the heart of professional nursing: observing the patient in their natural habitat while the critical care nurse is making inferences about the ventilated patient's pain state in the first six hours post cardiac surgery. Ultimately, in the performance of their professional activities, the critical care nurse routinely makes numerous and important judgements based on uncertain, fallible and inter-substitutable data. It is anticipated that this study will give an understanding of the strategy by which critical care nurses assemble and use multiple fallible cues to reach a judgement about the pain state of the ventilated patient in the immediate phase after cardiac surgery. The theoretical model chosen to guide the study is known as the Lens Model, which will be discussed in-depth in Chapter Two.
CHAPTER TWO

2.0 THEORETICAL FRAMEWORK

2.1 INTRODUCTION

Judgements made by critical care nurses may have a significant impact on health care outcomes and coronary artery bypass (CABG) ventilated patients' pain experiences in the intensive care unit (ICU). The increasingly blurred boundaries between health care professions mean that nurses' judgements have more potential than ever to impact on patients' lives and experiences (Dowding & Thompson 2003). In addition, the critical care environment is not simply dominated by technology, but also characterised by complex social, psychological and ethical interactions between nurses, patients, families and staff on the interdisciplinary team (Chase 1995) and is one in which complex judgements are made rapidly in uncertain situations. First, consideration will be given to some of the difficulties and confusion that have occurred because of a failure to distinguish clearly between judgement and other similar activities, such as decision making and diagnosis. A discussion of perception and thinking in the context of Brunswik's theory of probabilistic functionalism will be presented in conjunction with the Lens Model, the evolution of quasi-rationality, Cognitive Continuum Theory and Social Judgement Theory. The latter section will reveal policy capturing studies within Social Judgement Theory and clinical inference in nursing. Finally, some controversial issues with Judgement Analysis research is also summarised.

Lack of clarity regarding the terms 'judgement', 'decision' and 'diagnosis' exists in the wider research literature on judgement (Maule 2001). In 1971, Slovic & Lichtenstein failed to differentiate between the terms judgement and decision and argued that the terms could be used interchangeably. Moreover, judgement and decision making should be treated as different activities (Goldstein & Hogarth 1997) because they generate different cognitive demands, and pose unique and distinct challenges for researchers seeking to describe and evaluate them (Dowding & Thompson 2003). The distinction between decision and judgement is somewhat arbitrary (Connolly et al. 2000). Judgements are generally regarded as assessments, estimates, or predictions that can provide input into decision making in a similar way that perception can provide input into action (Harvey 2001). Earlier, Einhorn et al. (1979) adopted an intermediate position, arguing that although judgement is not synonymous with choice, under certain conditions it will be closely based on evaluative judgement.

Judgement may be identified as the evaluation or categorising of an object of thought; the material is merely judged, i.e. put into one category or another (Johnson 1955). Categorisation involves an act of inference; at the perceptual level it consists of the process of identification, literally an act of placing a stimulus input by virtue of its defining attributes into a certain class, while at the conceptual level it involves fitting a set of objects or instances to the specifications of a category (Bruner et al. 1956, p.9). According to Higuchi & Donald (2002), nurses categorise when making a judgement about a patient's overall condition or status. Furthermore, Crow & Spicer (1995) suggested that the ability to
categorise patient conditions is a requirement for skilled nursing judgement. According to Pyles & Stern (1983), critical care nurses use categorisation and differentiation to arrive at diagnoses subsequent to linking basic knowledge, past experiences, cue identification and sensory clues.

Webster’s Dictionary states that judgement is the mental or intellectual process of forming an opinion or evaluation by discerning and comparing, while a decision is the act of settling or terminating ... by giving judgement, suggesting that there is little difference between judgement and decision making in ordinary discourse (Connolly et al. 2000). A judgement was defined as a statement which expresses the nurse’s estimate of someone’s condition or situation (Crow et al. 1995) simply stated; a judgement is an assertion (Kikuchi & Simmons 1999). According to Burn & Higgs (2000), Tanner (1987) describes clinical decision making as a series of judgements made by the nurse in interaction with the patient. However, Tanner (1987, p.154) clearly states that the definition of clinical judgement adapted from Kelly (1964a) is a ‘series of decisions made by the nurse in interaction with the client’ (154).

There are separate traditions of research into the two areas: those interested in decision making are influenced by economists’ and statisticians’ research into how decisions ought to be made; in contrast, those interested in judgement have been predisposed to research mainly on perception (e.g. Brunswik 1956) and are concerned with how probabilistic environmental cues relate to some states and fallible cognitive processing of those cues results in estimates or predictions for that variable (Harvey 2001). The distinction between judgement and decision is a tenuous one regardless of terminology, but one thing is certain: judgement is a fundamental cognitive activity that vitally affects the well-being or more accurately, the survival of all (Slovic & Lichtenstein 1971) and depends upon the acquisition of reliable information and its combination (Fisch et al. 1981). Moreover, decisions have consequences; judgements have no direct consequences, but they have indirect ones via the decisions that they inform (Harvey 2001).

The process of judgement involves the integration of different aspects of information about a person, object or situation to arrive at an overall evaluation (Maule 2001). Hammond (1971) uses the term ‘diagnosis’ as a specific instance of the more general process of judgement, which involves the integration of information conveyed by several cues, i.e. items of information about some state not immediately visible to the judge or diagnostician. Three premises are included in his idea of the diagnostic task: (1) there is irreducible uncertainty in diagnostic tasks; (2) diagnostic tasks necessitate integrating cues of various degrees of uncertainty; (3) cues will vary in the form of their functional relation to the state to be inferred (Hammond 1971, p.903). The primary task of clinical diagnosis, according to Hoffman (1960), is that of collecting, evaluating, and assimilating information with respect to the patient. The starting point is the information itself; the outcome is a judgement, which may take the form of a recommendation concerning treatment or discharge, a decision that certain other data is necessary before a final judgement is made, or a classification of the patient into a diagnostic category (Hoffman 1960). The diagnostic process in nursing involves an interaction of interpersonal, technical, and intellectual processes (Lunney 2001). Meanwhile, nurses make inferences about the state of a patient and this is a cognitive
activity. According to Hammond (1966), the process of making an inference entails making a judgement about an object or event on the basis of more or less insufficient data.

Human judgement is a hidden process that embraces elements of both analytical and intuitive thought (Hammond 1996). Intuition and analysis are different methods of cognition that are employed to manage uncertainty. Since intuition is hidden, it is not possible to retrace the steps that led to one’s judgement, therefore, individuals are unable to express accurately how they make their judgements (Hammond 1980). The situation is complicated further by the inconsistent nature of human judgement, for identical circumstances do not always result in identical judgements (Adelman et al. 1975). Pure intuitive thinking tends to be holistic, relying on weighing and combining multiple pieces of evidence and it tends to be relatively fast, and to make use of comparatively small numbers of cues (Mumpower & Stewart 1996). The uncertain probabilistic relations among environmental cues urge a judge to use intuitive perception in order to adapt to the environment and thus to survive (Hammond & Stewart 2001). Furthermore, a theory of perception (Brunswik 1952) known as probabilistic functionalism emphasised the probabilistic nature of the environment and the adaptation of the organism to its environment. In 1956, Brunswik expanded his conceptual framework from perception to thinking; this will be presented in the next section.

2.2 Perception to Thinking

Linking thinking and distinguishing it from, perception theoretically, Brunswik (1956) expanded his conceptual framework, indicating that both the analytical and intuitive functions of cognition could be accommodated within a single framework. Perception was described as being uncertainty-geared, as working with a multitude of vicarious cues of limited validity. Thinking, on the other hand, was described as certainty-geared, which put the principle of vicarious functioning at the heart of Brunswik’s account of cognition (Hammond 1996). Brunswik (1956) endorsed vicarious functioning as one of the most elementary principles of behaviour which lies at the heart of the private quasi-rational nature of clinical judgement. Therefore, humans are able to rely on vicarious cues, each of which have limited validity, as cues can serve vicariously for one another because they covary i.e. they are redundant and thus intersubstitutable (Hammond 1996, p.162). Therefore, the shift in cue utilisation means that if cue D is not present, the judge may move their dependence onto cue F, so cue F is functioning vicariously for cue D. The capability to transfer dependence from one cue to another is a great advantage in a shifting, uncertain ecology that offers redundant information (Hammond 1996).

As a result of vicarious functioning, the clinician may be hard pressed to give general rules that describe his or her judgements, since these judgements will be made from different cues from patient to patient, or even at different instances for the same patient (Brehmer 1994). However, clinicians can recognise, if not describe, their judgement policies (Holzworth 2001). The belief that the clinical method does not meet the criteria of science is ordinarily founded on the following grounds: the process by which the clinician arrives at a decision is private, quasi-rational and non-repeatable (Hammond 1955). Frequently, the clinician is unable to report with confidence exactly how (s)he arrives at a judgement, and if (s)he could (s)he would be doing nothing more than providing an introspective report.
Subjective accounts of the judgement process are typically incomplete, unreliable, and inaccurate (Hoffman et al. 1968).

Besides, a fundamental problem in studying the cognitive processes of the clinician lies in the lack of inter-subjective communicability: the clinician cannot give accurate verbal reports about his judgements because these judgements will be based on a variety of intersubstitutable cues and the clinician must use these cues (symptoms) vicariously as they appear (Brehmer 1994). This is not a mere technical issue to be solved by better methods of obtaining verbal reports, it lies at the heart of the clinical situation itself (Hammond 1955). Specifically, it is a consequence of the vicarious functioning which was introduced by Brunswik in 1943 that is characteristic of clinical judgement. Therefore, the assumption is that clinical judgement will exhibit a form of probabilistic functioning, and we cannot expect to find stable relations between a set of symptoms and the judgements (Brehmer 1994). This implies that the study of clinical judgement must be undertaken by means of statistical methods as Brunswik proposed; statistics is the basis for a unified methodology in psychology (Brehmer 1994). An effort to remove the above criticisms has centered around the development of clinical tests, the aim being to produce a retraceable process: a reasonable facsimile of the clinician (Hammond 1955, p.255).

Brunswik first (1952) presented a model of intuitive cognition, developed from his theory of visual perception, using the analogy of rays of light passing through a convex lens to describe the concept of the relationship between the interpretation of cues and the actual relationship of those cues to the real world. The cues were termed fallible (i.e. probabilistic) sources of information. According to Hammond (1996), the word ‘fallible’ is of crucial significance, as this term brings us face to face with uncertainty in the natural world around us. Furthermore, according to Hammond (1996), the source of uncertainty lies in the environment as well as in us. Besides, Brunswik’s model of this situation is called the Lens Model. Brunswik indicated that organismic and environmental systems should be directed in symmetrical terms, symbolised in what Brunswik described as the Lens Model of behaviour (Hammond 1996a); this is described in some detail in the subsequent section.

2.3 THE LENS MODEL

The Lens Model assumes that individuals infrequently have direct access to the depth variable (i.e. the distal state) that they must judge (Hammond 1996). Instead, the environment gives rise to a number of surface variables (i.e. proximal cues) of imperfect reliability and validity, upon which judges base their inferences. As Brunswik describes the Lens Model, it becomes clear that he employs a principle of parallel concepts: each concept on one side is paralleled by a similar concept on the other (Hammond et al. 1975). According to the Principle of Parallel Concepts, the zone of ambiguity between the depth variable conditions (what is inferred) and the surface cues (what is given) in the judgement task is paralleled by a similar zone of ambiguity between cues and the judge’s inference in the cognitive system (Hammond et al. 1975, Hammond et al. 1977).

It is the properties of this conceptual space (the zone of ambiguity) that make judgement tasks more or less difficult (Hammond et al. 1977); it is also the source of the misunderstandings and disagreements that occur when judgements differ (Hammond et al. 1977).
Causal ambiguity is produced because (1) surface (effect) data are less than perfectly related to depth (cause) variables; (2) functional relations between surface and depth variables may assume a variety of forms (linear, curvilinear); and (3) the relations between surface and depth may be organised (or combined) according to a range of principles (for example, additivity or pattern), which give added precise meaning to the phrase causal ambiguity (Hammond et al. 1975). Cue information seldom comes to the judge as independent, non-overlapping bundles of information; this cause of uncertainty led Brunswik to suggest the processes of vicarious mediation within the zone of ambiguity of the judge's cognitive system (Cooksey 1996a). The Lens Model of the judgement situation is presented in Figure 2.1, which indicates that judgement is a cognitive process similar to inductive inference (Connolly et al. 2000).

According to Hammond (1966), inductive inference is the process of reasoning from the particular event to the general case. The schematic depiction of the Lens Model in Figure 2.1 illustrates that judgement is a cognitive or intellectual process in which a person draws an inference (Ys) about a state (Ye) which is not visible, on the basis of cues (Xi) which are visible, so judgements are made from tangible data which serve as cues to intangible states. The wide-ranging arc connecting Ys and Ye, labelled ra, indicates the degree to which the judgement Ys was accurate, that is, the extent to which the judgement coincides with the actual state to be judged (Cooksey 1996a). The Lens Model in Figure 2.1 also indicates the concept of differential weight, where cues may have differential weight in making inferences about states. That is, if a cue has a very strong relation (a high degree of covariation) with a state to be judged, it will be more functional than one that has a weak relation. Therefore, cues with high degrees of covariation with the state to be inferred have a large degree of ecological validity; their weight is greater than those with low degrees of covariation (Connolly et al. 2000).

The parallel to the ecological validity (re) of a cue is its utilisation (rs) by the judge (see Figure 2.1). Cues may also be used to a larger or lesser degree, consequently, with regard to their subjective utilisation. Thus, a researcher may compare the differential weights of a set of cues (re,i) in the task, with the weights completely allocated to them by the judge making the inference. One source of poor judgement lies in the failure to attach the correct relative weights or importance to cues (Connolly et al. 2000). Cues may be related to the variable to be inferred (Ye) by means of different function forms. In parallel, cues may be related to judgement (Ys) by means of various function forms also, and the comparison, or match, between task function form and subjective function form will also structure the basis for accurate or inaccurate judgements (Connolly et al. 2000). Although such diagrams are useful, they do not show one of the most important aspects of the judgement process, the organising principle, the cognitive mechanism by which the information from multiple fallible indicators is organised into a judgement (Hammond 1996). Such data may be organised by adding them, Ys = X1 + X2 + X3 +X4; by averaging them, Ys = (X1 + X2 + X3 +X4) /4; or by making use of some configural or patterning principles, Ys = X1 + X2X3X4 (Connolly et al. 2000). It is important to consider the consistency with which the same judgement is made in response to the same data; perfect consistency in judgements is suitable only when there is no uncertainty whatsoever in the task situation; such simple task
Figure 2.1: The Lens Model

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situations require little in the way of judgement, inasmuch as a given cue always evokes the same judgement (Connolly et al. 2000).

Therefore, on the left of the Lens Model is the state of the patient, that is, what actually occurred after the judgement was made, on the right side is the judgement itself, and intervening between the judgement and the state of the patient are cues used to make the judgement. The relations on both sides of the Lens Model are probabilistic; that is, there is an element of uncertainty in the relation between the cues and both the state of the patient and the judgement. This is an example of the parallelism between the properties of the environmental and cognitive sides of the Lens Model that is central to Brunswik's theory (Hammond et al. 1975). The Lens Model represents an uncertain world represented by many fallible cues and a judge that has the capacity to integrate them without awareness into a judgement that displays remarkable accuracy in visual perception and various degrees of accuracy in other circumstances (Hammond 1996). It is our lack of awareness of how cues are combined that makes it an intuitive process and human cognition is capable of both intuition and analysis and each has a value (Hammond 1996). Furthermore, according to Hammond (1996), humans oscillate back and forth from intuition to analysis as they form judgements, when time permits. In humans, the two levels of cognition coexist, mostly in peace, sometimes in conflict (Brunswik 1956). The difference between intuition and analysis seems to be merely one of degree (Brunswik 1937), which is reflected in what is now called Cognitive Continuum Theory, a theory so called because it is based precisely on the premise that there is a continuum, not a dichotomy, between intuition and analysis (Hammond 2001).

In 1996, Hammond presented a theory based on the notion of a cognitive continuum that is paralleled by a task continuum. The cognitive continuum is anchored at one end by the concept of analysis and at the other by the concept of intuition. The task continuum is anchored by analysis-inducing tasks and intuition-inducing tasks. Five premises represent the basis of the theory: (1) a cognitive continuum; (2) common sense; (3) theory of task structures; (4) dynamic cognition and (5) pattern recognition and functional relations (Hammond 1996). A concept that depends on the principle of a cognitive continuum is quasi-rationality that permits a variety of forms of imperfect reasoning, which means that there is room for intuitive as well as analytical methods (Hammond 1996).

Human judgement is based on analysis and experience, rather than on analysis alone, and this mixture is called quasi-rationality (Brehmer 1976). Quasi-rationality also allows room for the combined use of rational/analytical cognition and intuitive cognition in what is also called common sense (Hammond & Stewart 2001). Our enthusiasm for common sense (unaided intuition) arises from the many obstacles to both analysis and intuition, as well as from the need for a compromise between the advantages and the dangers of analytical cognition and those of its rival, intuition (Hammond 1996). Most real-world problems evoke a mode of response that is neither purely intuitive nor purely analytical, but involves a mixture of analysis and intuition that can be described as quasi-rationality (Brunswik 1956). Characteristics of the type of judgement task that provokes cognition to move away from its analytical structure toward the intuitive extremity of the continuum include the following: (1) the presence of a large number of cues of limited validity that present themselves simultaneously rather than sequentially; (2) the need to define, label, and measure the cue values oneself; and, most importantly, (3) the absence of a familiar, readily applied, explicit
principle for organising information into a judgement, and (4) a short time in which to make
a judgement (Hammond 1996).

The above ideas were later expanded to employ the metatheories of correspondence
and coherence (Hammond 1996) to describe the work in the field of judgement and decision
making (Hammond & Stewart 2001). The goal of a Correspondence Metatheory is to
describe and explain the process by which a person's judgements achieve empirical accuracy,
while, in contrast, a Coherence Metatheory of judgement describes and explains the process
by which a person's judgements achieve logical, or mathematical, or statistical rationality
(Hammond 1996). The best overall descriptive model of human judgement engaged in
judgement judgements is known as the linear model, which simply means that the cue is
linked to the object in a straight-line fashion and that the information from the cues is
combined by simply adding or averaging it; most clinician's will resist this conclusion
(Hammond 1996). One of the purposes of using a linear model to represent the judgemental
process is to make the judge's weighting policy explicit; it is capable of highlighting
individual differences and misuse of information, as well as making explicit the causes of
underlying disagreements among judges in both simple and complex tasks (Slovic &
Lichtenstein 1971). Within the Lens Model framework, the use of linear models is motivated
by a fundamental aspect of the clinician's task: intersubstitutability of cues and the attendant
need to capture the resulting cognitive process of vicarious functioning (Brehmer 1994).

Correspondence researchers assume that the natural world offers multiple tangible cues
of its intangible aspects and that these cues are fallible in the sense that they do not signify
with certainty; indeed, much of the uncertainty in diagnostic judgements stems from this fact
(Hammond 1996a). There are few unequivocal signs and symptoms, i.e. few that can be
relied upon with assurance to indicate one, and only one, underlying cause; thus, it is
believed by the correspondence researchers that judges must rely on probabilistic cues. The
broad conclusion drawn by correspondence researchers is that cognitive competence, which
they define as empirical accuracy, is widespread among species, but in general, task
conditions can degrade accuracy, and in particular, conditions under which physicians work
can degrade the accuracy of diagnostic judgement (Hammond 1996a). No matter how well
informed the expert, field conditions almost always produce uncertainty sometimes more,
sometimes less in the application of his or her knowledge (Hammond et al. 1992).

Correspondence researchers, moreover, use a behavioural model of inference to study
the subject's diagnostic processes, rather than a mathematical model to evaluate the
competence of a subject's justification of his or her decisions (Hammond 1996a). Brunswik
was a correspondence theorist, focusing his research on the empirical accuracy of physical
and social perception, the correspondence between the judgement and object (Hammond
1996). Intuition and analysis are different methods of cognition that are employed to manage
uncertainty. In contrast to the use of analytical models, intuition is always available and is
readily induced by irreducible uncertainty, produced by time pressures, confusing states or
information overload, in short, when analytical models cannot be readily applied (Hammond
1996). Intuition perception is robust but imprecise; analytical cognition is precise but subject
to large errors, when errors are made (Hammond 1996). In contrast, pure analytical thinking
relies on a step-by-step rule bound approach, is comparatively slow, uses a large number of
cues, and involves greater conscious awareness as the problem is worked through explicit
stages that characteristically provide for a clear retracing of process (Mumpower & Stewart 1996). The more important properties of intuition would include its rapidity and snapshot nature, its covert non-retraceable nature, its inconsistency, its propensity to create conflict because of non-retraceability and its dependence on vicarious functioning (Cooksey 1996).

Another conceptual framework to study human judgement is known as the Social Judgement Theory (SJT). This framework incorporated a quantitative method of describing the manner in which individuals combine multiple cues into a single judgement (Adelman & Mumpower 1979). Moreover, according to Cooksey (1996a) SJT is particularly well-suited for providing insights into the quasi-rational region of the Cognitive Continuum, which will be discussed presently in the context of policy capturing otherwise known as judgement analysis.

2.4 POLICY CAPTURING SOCIAL JUDGEMENT ANALYSIS

Social Judgement Theory (SJT) evolved through the 1960s and 1970s and is rooted in Brunswik’s (1943, 1952) theory of probabilistic functionalism and employs Brunswik’s Lens Model to study applied judgement problems (Hammond 1964, Cooksey 1996a). The SJT approach analyses judgements by decomposing the judgement process after the judgement has been made. A person’s judgement policy can be captured after judgements are made in hypothetical cases and the policy may then be applied to real cases (Connolly et al. 2000). The name policy capturing implies that the subjects have some policy that can be captured, and that the circumstances under which the subjects are requested to make their judgements are associated with the conditions under which they normally do so (Brehmer & Brehmer 1988). The approach known as judgement analysis (policy capturing) involves an a posteriori decomposition of the judgement process decomposing it into weights, function forms, organisational principles and consistency after the judgement is made (Cooksey 1996a). SJT methods maintain close contact with ecological circumstances by employing the principle of representative design (which focuses on how the researcher obtains the cues for judgement) and avoiding unwarranted over-generalisations from nomothetic aggregation (e.g. averaging across judges) through the use of idiographic-statistical analysis (Hammond 1955, Harries et al. 1996, Dhami & Harries 2001). SJT methods have proven valuable in the analysis of individual judgements, as well as group based judgements, where conflict becomes likely (Cooksey et al. 1986, Cooksey 1996a).

SJT provides a theoretical framework for understanding disagreements because it describes the cognitive systems policy-makers employ to model the environment as they see it (Adelman et al. 1975). Therefore, the basis for policy disagreements can be explained by describing and subsequently comparing the cognitive systems, or judgemental policies that policy makers utilise (Adelman et al. 1975). Disagreement can be explained by describing the manner in which different persons combine the same information into a judgement (Adelman & Mumpower 1979).

Such differences will be reflected in one or more of four ways:

1. Different organising principles: Two experts may disagree concerning the appropriate way to combine information.
2. Different weights: Experts may believe that different pieces of information are more important.

3. Different function forms: Two experts may disagree concerning the appropriate functional relationship between levels of cues and judgements.

4. Differences in bias: Even if two experts use the same organising principle and their relative weights and function forms are identical, they may still make different judgements because of differences in the mean and variance of their judgements (Mumpower & Stewart 1996, p.195).

The task of the expert judge, no matter what his/her occupation, requires him to combine items of information into a decision or judgement (Slovic 1969, Phelps & Shanteau 1978). The nurse's task is to infer correctly the impalpable state of the patient from the uncertain, palpable data presented by the patient; the challenge to the researcher is to describe the cognitive process which controls such inferences (Hammond 1966). Evidence in studies show considerable variation among judges in how cues are used to make a judgement, which appears to reflect different policies among individual judges; this will be addressed in the next section. According to Brehmer & Kostron (1970), the amount of conflict between pairs of subjects varies directly as a function of the difference in the weights subjects attach to different cues, that is, to the different dimensions of their judgemental policies. Cue weights are one of the crucial aspects of the judgement process reflected by the policy capturing procedure, as they are used to infer the degree of salience a cue has for the person rendering the judgement (Cooksey 1996a); this will be explored in the next section.

2.5 Capturing a Judge's Policy Judgement Strategies

Judgement analysis studies (policy capturing studies) have frequently shown wide individual variation among judges with respect to all characteristics of policies: the number of cues utilised, which cues are utilised, organising principles, weights, consistency and insight (Hoffman et al. 1968, Slovic 1969, Ullman & Doherty 1984, Brehmer 1988, Wigton 1988). Since there are an infinite number of ways of combining even two cues, there is an infinite number of possible strategies available to the expert judge for any specified cue set (Hoffman et al. 1968, p.346). It appears that conflicts arise as a result of differences in inductive judgements. Unreliability in processing subjective information is pervasive in human judgement and some studies have found that it increases as the predictability of the environment decreases (Brehmer 1988). Earlier, Brehmer (1974) showed that when one cue was valid, the level of agreement was high, but only when the task predictability was high. According to Brehmer (1976), subjects change their cognitive systems to adapt to the task and the structure of the subject's policies is affected by the characteristics of the task. Furthermore, supplementary information could serve to advance the judge's understanding of the ecological states at the time of the judgement, however, it also increases the complexity of the judgement task and may enforce a cognitive burden on the judge that surpasses human information-processing capability (Brehmer & Joyce 1988). It is not surprising, therefore, that a number of studies have found that people only use a subset of available information and that the accuracy of judgements does not increase with increasing information (Lusk & Hammond 1991).
Both experts and novices know how to recognise and make use of multiple sources of information, but the ability to discriminate the relevant from the irrelevant in a given situation is what distinguishes the expert from the novice (Shanteau 1992, Lamond & Farnell 1998). The cognitive abilities and limitations of expert judges (Experiment I) was investigated by Phelps & Shanteau (1978), who demonstrated that expert livestock judges could use nine to eleven dimensions of information when making quality judgements of breeding gilts (simulations). This result far exceeds the number previously reported by Slovic (1969) who found that stockbrokers use six to seven dimensions of information despite the fact that more relevant information was available, which means that important decisions may be reached without sufficient attention to all the relevant information. Moreover, Phelps & Shanteau (1978) reported that when the stimuli were naturalistic photographs (Experiment II), the same experts used fewer than three pieces of information, suggesting the judges were using many more dimensions (Experiment I) than in the more realistic second experiment; an explanation for the discrepancy may lie in the research design selected (Phelps & Shanteau 1978). Another study using the Lens Model found that physicians' judgements appeared to rely almost exclusively on certain cues, while ancillary diagnostic test information was not perceived as important or was not utilised by physicians for predicting haemodynamic status (Speroff et al. 1989). Using stimulated recall protocols, Reischman & Yarandi (2002) compared diagnostic cue utilisation of expert (n=23) and novice (n=23) cardiovascular nurses. Considering all written simulations, the authors found that expert cardiovascular nurses were more accurate and had higher highly relevant cues to total cues than did novice nurses (Reischman & Yarandi 2002).

Hammond argued that the judge is frequently unaware of the real system (s)he uses to make his/her expert judgements. (S)he may even believe that (s)he operates in a very different fashion from the way (s)he actually does. Clinical judgement was investigated in seventeen cardiologists and twenty-five internists from four district hospitals, using the probability assessment of heart failure diagnosis in thirty case histories based on real cases (Vancheri et al. 2003). The authors found no significant difference between cardiologists and internists, however, within each group of specialists, there was a wide inter-observer variation in the probability assessment of heart failure in the same case histories; the probability ranged from 25.6 to 83% (Vancheri et al. 2003). In addition, there were considerable differences between the importance of clinical cues expressed in the judgements and that reported based on the doctor's own opinion (Vancheri et al. 2003). Very large differences in the way general practitioners (GPs) use clinical cues (case vignettes) was also demonstrated by Skaner et al. (1998). Furthermore, there were differences of opinion among the GPs about their own judgement strategies, i.e. they utilised information about dyspnoea less than they thought they did, and information about a history of myocardial infarction and about enlargement of the heart more than they thought they did (Skaner et al. 1998). If the physician is unaware of, or is inaccurate about, the kinds of information that (s)he uses in arriving at his/her decisions, the relative importance (s)he attaches to each item, and the considerations that determine how (s)he combines them, (s)he will be unable to give stable judgements even when the items and their values are identical (Joyce & Hammond 1983). Doctors have insight into what cues they do not make use of, but have reduced insight about the cues they actually use; in other words, when a doctor says they are using a cue they may or may not be using it (Harries et al. 1996).
In an earlier study based on the methods of SJT, Evans et al. (1995) set out to determine both the tacit and stated policies of each member of a sample of British GPs (n=35) in the prescription of lipid lowering agents and to compare these with their stated policies by analysing decisions made over a large number of hypothetical cases in which cues were allowed to vary. Insight was considered by interviewing subjects and asking them to identify the cues which they believed to be influencing their judgements (Evans et al. 1995). Large variations between doctors in both their tacit and stated policies for prescribing and a fairly low level of insight were found. In general, doctors believed they used many more cues than they actually did. However, this lack of insight does not account for the policy differences; even in stated policies, there was substantial variation between doctors in their beliefs about how information should be used with regard to prescribing (Evans et al. 1995). Clinical judgement analysis was also used to explore how forty-eight rheumatologists weighted patients’ clinical signs and symptoms to judge disease activity in rheumatoid arthritis (RA) (Kirwan et al. 1983a,b, Kirwan et al. 1984). The authors found great variation in physicians’ diagnostic strategies as determined from their decisions about paper cases (Kirwan et al. 1983a). Rheumatologists as a group do not seem to adopt a single underlying policy for the assessment of changes in disease activity in RA, each has his/her own approach to such judgements (Kirwan et al. 1983a). Although inconsistency in judgement played some role, much of the variation among physicians in the study reflected differences in the judgement policies (weights) themselves (Kirwan et al. 1983b). In a subsequent study, Kirwan et al. (1984) found that physicians’ weights derived from their responses to paper cases predicted their responses to new cases better than either a strategy of equal weighting or the strategy the physicians thought they were following. Some early studies of clinical judgement found considerable variation among expert physicians in how clinical information is used in diagnosing gastric cancer (Slovic et al. 1971), depression (Fisch et al. 1981), pulmonary embolism (Wigton et al. 1986) and the idiosyncratic use of signs accounted in part for the variation in their judgements. The variation may not decrease with increased experience (Wigton et al. 1986).

People may have better self-insight than hitherto believed while making holistic judgements, but cannot adequately express that insight by the subjective weighting procedures that have been commonly used (Reilly & Doherty 1989). The very knowledge researchers wish to capture is the knowledge the expert can least discuss (Woolery 1990). Hammond (1955) posed the question: if it is found that two experts do equally well in terms of matching a criterion, yet they do not have similar weighting of cues, what are we to say? We can only say that in a high probabilistic world, there may be many routes to the same goal (Hammond 1955) and that there may be more than one way to perform the cognitive tasks involved in judgement (Einhorn 1974).

The above studies show that physicians frequently do not make judgements in the way they think they do, which appears to be related to the view that insight occurs without awareness, i.e. intuitive process. Furthermore, the nature of ambiguity in the task that judges are confronted with has much to do with the number of cues offered. Moreover, the abundance of cues offered are fallible. Therefore, wide variation among physicians is related to the weighting of cues. In addition, the Lens Model illustrated earlier shows how a physician’s judgement of a patient’s state is made on the premise of multiple fallible cues.
(left side of model) and the right side shows the utilisation of several cues into a judgement. The Lens Model is a robust enough representation for studying human judgement, in that it can be varied and extended in several ways without losing or distorting its essential concepts (Cooksey 1996). The Lens Model representation in SJT can be modified to produce different system designs which invoke different methodologies for studying judgement processes (Cooksey 1996a, p.145); this is addressed in the following section.

2.6 LENSMODEL SYSTEM DESIGNS SOCIAL JUDGEMENT THEORY (SJT)

The single system case in the Judgement Analysis paradigm represents the simplest methodology for studying human judgement within the SJT approach, whereby the judgement strategies of the individual making the judgement are the only phenomena of concern (Cooksey 1996a). No task information other than the value of the cues and possibly their interrelations is considered by the researcher (Hammond et al. 1975). The single system design represented in Figure 2.2 illustrates the single system case as it would be represented in the Lens Model framework.

In the single system design, one need only have available a sample of cue profiles representing cases or circumstances (real or simulated) for the human judge to process (Cooksey 1996a). The vital drawback of the single system case is that the task outcome is not known. The interrelationships between the judge's cognitive system and the task system, which Brunswik felt were the appropriate focus for psychology (the wide-arched dependencies represented by achievement and comparisons of ecological and cue utilisation validities cannot be scrutinised (Cooksey 1996a). Therefore, little insight into a judge's awareness of a task is permitted because task outcomes and most essential task characteristics remain unknown. However, one can learn how well the judge applies whatever task knowledge (s)he does have (Cooksey 1996a). In a single system design with respect to the judges, information can be gained, at the idiographic level, on: (1) the weighting applied to each cue when forming judgements (often termed the judge's policy); (2) the character of the function form (linear or nonlinear), relating each cue to the judgements made; (3) the degree of cognitive control which the judge exercises over the application of his/her policy and (4) the judge's organising principle for integrating cue information (Cooksey 1996a). Cue weights, function forms, extent of cognitive control and many types of organising principles can be readily recognised using the method of multiple regression to capture the policy of the judge. A final stage in some single system designs may be to cluster analyse the captured policies of several judges to look for common policies (Cooksey 1996a).

Studies employing the single system design strategy are frequently identified as policy capturing studies. Many studies of human judgement have been designed as policy capturing or single system studies because of methodological constraints which centers upon the unavailability of an ecological criterion measure (Cooksey 1996a). It is these restrictions which serve to limit the focus of study to the cognitive side (right side) of the Lens Model (Figure 2.2) limiting the kinds of assertions one might make about the human judgement process as it interacts with the decision task itself (Cooksey 1996a). Nevertheless, if one is mindful of the restrictions, much of importance regarding social policy judgements can be learned from single system design research: how policy-makers use cues to inform their
Figure 2.2: Lens Model Representation – Single-System Design

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oftentimes value laden judgements and how adequately they can control the application of their knowledge of the problem when making judgements (Cooksey et al. 1986). The unavailability of an ecological criterion for a policy capturing judgement single system design study may occur for legitimate reasons such as:

- Infeasibility
- Confidentiality, ethical, legal or potential bias implications
- Irrelevance to the research goal: this is quite frequently done in research conducted to examine explicitly the cognitive systems of judges, perhaps with a view to assessing the value systems of judges (i.e. establishing what they perceive to be important in a judgement context) and/or identifying common patterns in the judgement systems of different people (Cooksey 1996a).

In the final stage of single system design, the researcher may analyse the captured policies of numerous judges to look for common policies. In contrast to the single-level judgement process, the policy-maker may employ a two-step inference process (Adelman et al. 1975, Cooksey et al. 1986). Therefore, the cues for a judgement may be the judgements themselves. Firstly, integrating cues to make judgements about the general intangible aspects of the situation and secondly, the judgements about intangible elements may be used to make an overall judgement (Adelman et al. 1975). Therefore, the judgement task is broken down into hierarchical levels, where judgements made within one level structure become the cue values for profiles judged in the next level, using the single system design or a choice of other designs such as the n-system. The idea of a judgement structure, introduced by Mumpower & Stewart (1996), often takes the form of a hierarchy, describing how concrete data are organised into intermediate judgements, which are, in turn, organised into higher-level judgements. This hierarchical judgment model is described in the next section.

2.7 THE HIERARCHICAL JUDGEMENT MODEL

‘Hierarchical’ implies that a particular order for taking into consideration subset contributions is of principal concern (Cooksey & Freebody 1987). Under certain conditions, such hierarchical problems can be divided into numerous simple judgement problems, each of which can be analysed separately (Hammond et al. 1975), which can reduce the complexity of the task. In the hierarchical judgement design, the task ecology is broken into smaller sub-problems, each of which examines judgement using one of the four basic Judgement Analysis system designs (or some combination of them) (Cooksey 1996a).

Hierarchical judgement takes an explicitly multi-layered approach to decomposing the judgement process, where lower-order judgements/first-order judgements are cognitively integrated by higher-order/second-order judgements (Cooksey 1996a). Therefore, first-order judgements become second-order cues to be integrated to reach the final judgement.

The hierarchical model represents an important application and expansion of Lens Model theory, theoretically as well as methodologically (Lusk & Hammond 1991, Hammond 1996a). The model (see Figure 2.3 – read from left to right) represents each phase at which human cognitive processes operate (Hammond 1996a). The patient (environmental task)
Figure 2.3 Lens Model in Diagnostic Judgement

[Hammond 1996: With permission; Medical Decision Making; 16, 282]
(columns A,B,C), and the judge (columns D,E,F) are represented. The object of inference by
the judge: the intangible state of the patient is represented by multiple fallible cues in the
form of objective data (laboratory); judge data (observation or palpation); the patient's
reports of symptoms and the patient's history. The presumed degrees of fallibility in the cues
are represented by the amount of white space in the circles (Hammond 1996a). The cognitive
system of the physician begins operating at the link between phases C and D, after observing
the primary cues at phase D; from these primary cues, the physician infers the presence of
secondary cues. The physician must infer the values of the secondary cues at phase E and
integrate them into a judgement. Lusk & Hammond (1991) distinguish between primary cues
that are directly observable from the presented information and secondary cues that must be
extracted from a combination of the primary cue values. Since there are multiple cues, the
judge is required to integrate them, that is, organise them in a usable form that permits a
judgement (diagnosis) of the patient's (intangible) state. Phase F is the likelihood of the
occurrence of the state. The hierarchical nature of the model implies not only that error at any
phase is passed on to later phases, but that errors accumulate across the judgement hierarchy
(Lusk & Hammond 1991). Consequently, the upper limit of the accuracy of the final
judgement (Phase F) depends to a large degree upon cognitive activities at previous phases
(D and E) (Lusk & Hammond 1991). The diagram oversimplifies the diagnostic process; its
principal claim is that it is a reasonable reproduction of the actual cognitive process
employed by the physician when the physician is employing the correspondence meta-theory,
i.e. using multiple fallible cues to seek accuracy without justification (Hammond 1996a).

The study by Lusk & Hammond (1991) assessed (using think aloud) agreement at each
point in the hierarchy relative to microburst forecasting and thus, determined that very little
disagreement occurred at the level of observation of the raw data (primary cues). The
elements of raw data or facts (level I) on which judgements are based are objective in the
sense that they are not controversial (Mumpower & Stewart 1996). Furthermore, Lusk &
Hammond (1991) reported that considerable disagreement occurred in judgements of
secondary cues inferential level (precursors) and actual states. Another result which suggests
an extension of the hierarchical model and Lens Model theory is variation in the magnitude
of agreement among the precursors (Lusk & Hammond 1991). Clearly, agreement according
to the aforesaid authors was much higher for some secondary cues than others, which may be
due to proximity of secondary cues to primary cues or secondary cues may be more
subjective and thus, evoke more disagreement than others (Lusk & Hammond 1991). The
consequences of errors that occur early in proximal stages will be of considerable importance
in any complex judgement task involving a hierarchy of inferences, thus, a hierarchical
model that separates inferences at the intermediate level from raw data (primary cues) has a

A generalised multivariate Lens model was presented by Cooksey & Freebody (1987),
i.e. the Hierarchical Multivariate Lens Model (HMLM) to permit the assessment of the
relative contributions of subsets of cues to overall achievement in the judgement task. In this
case, the hierarchical ordering of cue subsets was temporally determined with the unique
contributions of later information being examined after accounting for the influence of early
information (Cooksey & Freebody 1987). The authors examined the relative contributions of
a set of demographic cues and a set of cognitive cues to judgements of the potential reading
achievement of children. They argue that, in certain cases, it may be theoretically appropriate to consider the demographic cues as temporally prior (thus entering the HMLM first) to the cognitive cues (Cooksey & Freebody 1987). Subsequently, they found that while there were substantial individual differences, the general trend was for the cognitive cue subset to contribute uniquely up to four times as much to multivariate achievement than did the demographic cues. It is apparent that the cognitive cues play the larger role in judging children’s potential for reading achievement, with demographic cues contributing, but to a much smaller extent and with much less ecological validity (Cooksey & Freebody 1987).

An earlier study provided evidence that judges divide the cue dimensions into groups, where judgements are made of each group and the overall rating is then based on a combination of group judgements (Phelps & Shanteau 1978). Support of this two-stage notion came from a factor analysis of the photo ratings (pigs), where it was found that the eleven cue dimensions could easily be grouped into three identifiable factors: (1) size, (2) meat quality and (3) breeding quality. When asked about possible strategies, judges indicated that they first searched for evidence of quality within each of the three groups, then combined the groups to make an overall judgement (Phelps & Shanteau 1978). According to Mumpower & Stewart (1996), expert judgements about the value or state of environmental criteria almost always depend on prior judgements and they propose that for many problems, differences in the experts’ judgements are attributable to differences in judgement hierarchies.

The focus of Social Judgement Theory (SJT) is on the description of how judges weight and combine cues in forming judgements. The attraction of the SJT method is that it can be idiographic: the model is fitted separately to the data of each individual and provides a description of the judgement behaviour of that individual (Hammond et al. 1980). A major contention of the Judgement Analysis paradigm (Cooksey et al. 1986) is that an individual’s judgement system needs to be analysed in isolation and as a coherent whole before aggregation across judges occurs. Once a clear picture of individual policies in a particular context is obtained, the commonalities and differences between various policies can be examined through the use of cluster analysis or another typological technique (Cooksey et al. 1986, p.49). SJT provides a framework for considering the nature of human judgement, which is of particular importance in the study of nurses’ judgements as the implicit policies of individual critical care nurses may be captured and compared with those of other critical care nurses in the context of the ventilated patient in pain in the immediate post-operative coronary artery bypass graft (CABG) period.

Moreover, single system design in SJT research is frequently identified as policy capturing used to study the value systems of judges in order to establish which cues are important to the judgement and how they are utilised (Cooksey 1996a). The single system design (Figure 2.2) as it is represented in the Lens Model framework, i.e. right side of the model, will be employed in this study to establish the value system of critical care nurses with respect to available cues for judgement in the context of the ventilated patient in pain post CABG surgery in the immediate post-operative period. In essence, this study will attempt to capture the judgement process of the critical nurse from, perception of data to final judgement, through the use of a single system design in the real world of the patient. Furthermore, the analysis of the right side of the Lens Model will help to define what cues
critical care nurses use to make a judgement that the ventilated patient is in pain in the immediate phase post cardiac surgery. The task of clinical judgement in nursing has been described as complex relative to the uncertainty of data; this will be explored in the next section.

2.8 LENS INFERENCE TASK IN NURSING

The patient in the intensive care unit (ICU), presents the nurse with a set of surface cues; (s)he is then faced with the task of determining the state of the patient by using and combining various cues in order to reach a judgement. There are a number of possible ways in which this combination of cues can be realised. For example, the nurse might have some implicit view about how many positive cues one needs to have before a particular judgement of the state of the patient is likely. This sort of simple additive model is, in reality, unlikely to be helpful in any but the most simple situations (Schwartz & Kaplan 1977). More often, some complex representation in which weights are assigned to the various cues is more likely to yield valuable results; however, even this relatively complex pattern recognition problem that the nurse faces each time (s)he must make a judgement is, in reality, a bit more complicated than it first appears (Schwartz & Kaplan 1977:XVI). Hammond et al. (1966a,b,c) conducted the first major series of studies on the process of clinical inference in nursing using the Lens Model as a framework. Hammond defined clinical inference as a conclusion or judgement drawn from data (Hammond 1964, p.315). Furthermore, Hammond et al. (1966a,b,c) expected to detect patterns among nurses in their use of cues for identifying patient states and expected that these patterns would vary as a function of task complexity.

Essentially, Hammond et al. (1966b) investigated the cue utilisation and inferential processes of six female registered nurses, all of whom had experience in medical surgical nursing. Each nurse reviewed the same twelve cases, which were replicas of cases collected in Field Study II. The nurse subject selected whatever information would help acceptance or rejection of the hypothesis about the patient from a board displaying an array of cues, arranged in appropriate categories, each of which could provide information about the state of the patient (Hammond et al. 1966c). It is important to note that the nurse subject selected information in some order. At the time the nurse selected the cue (s)he also made a probability estimate of the information value of the cue selected. These two sets of data; (1) the order in which the information was selected, and (2) the probability estimate attached to each cue provided the basic data for the analysis (Hammond et al. 1966c). The results of both field studies can be summarised (Hammond et al. 1966b,c) as follows: the cognitive tasks encountered by nurses on the ward are many and varied. Even when a relatively narrow segment of the nurse’s task-environment (abdominal pain following abdominal surgery) is studied, a large amount of complexity is encountered a sample of 212 cases provided 165 cues and seventeen identifiable responses to the task. In addition, the data suggested that none of the cues analysed provided (by itself) the basis for action, nor were groups of cues arranged in various ways. In short, the cognitive characteristics of the nursing task (abdominal pain following abdominal surgery) were found to be complex with respect (1) to the number of cues involved, (2) the number of responses to the task, and (3) the relation between cues and actions (Hammond et al. 1966b).
Therefore, clinical judgement reflects a complex set of events, including the selection of relevant cues, the assignment of priority weights to each cue, and the assessment of the value of each for the states being judged. Moreover, the nurse, in determining the state of the patient, attempts to infer the cause of the symptoms directly, so that the symptoms will be alleviated immediately in the context of critical care.

Aside from some sophisticated bedside technology in critical care, the critical care experienced nurse draws extensively on perceptual skills in assessment; these skills which are subjective in nature and involve detection of subtle changes over time (Crandall & Getchell-Reiter 1993, Stannard et al. 1996 Benner et al. 1999, Bryczynski 1999). These cues were difficult for nurses to articulate and were often reported in terms of highly generalised constellations of cues (Crandall & Getchell-Reiter 1993). The nurse’s task is cognitively complex, for the effect of more sophisticated bedside technology would be to remove some of the uncertainty, to remove the necessity for acquiring redundant, and thus, confirming indicators, and to make the cognitive task more deductive (Hammond 1966). Therefore, more rule-based knowledge would be ever more present in the critical care nurse’s cognitive activity. Furthermore, it could be said of the scientific education of the critical care nurse that the acquisition of knowledge demands analytical cognition, but the application of that knowledge takes place in the natural habitat of the ventilated patient in pain in the immediate phase post cardiac surgery, i.e. in the context of irreducible uncertainty, which, according to Hammond (1996) induces intuitive cognition. Bruner (1961) defined intuitive cognition as the intellectual technique of arriving at plausible, but tentative, formulations without going through the analytic steps by which such formulations would be found to be valid or invalid conclusions.

The clinical judgement of psychiatric nurses was investigated by Holzworth & Wills (1999) using Judgement Analysis within the framework of SJT. The goal of the study was to examine nurses’ judgement about the appropriateness of seclusion and restraint. Nine nurses at a short-term psychiatric facility made recommendations concerning restraint and seclusion from eighty patients on paper in terms of seventeen cues. Nurse generally favoured the close observation of patients over seclusion and restraint and information about current behaviour and functioning had more impact on nurses’ judgements than did patient history. In addition, nurses’ insight into their own judgement policies was assessed by comparing nurses’ ratings of cue importance (subjective weights) with statistical weights derived from statistical analyses. Nurses had good insight into the nature of their own judgements (Holzworth & Wills 1999). However, individual differences in cue utilisation and inconsistency in strategy usage led to disagreement among nurses about specific recommendations for particular patients. No one patient received identical recommendations from all nurses, and nurses agreed with each other on specific recommendations only about a third of the time (Holzworth & Wills 1999). Policy consistency indices were less than maximum (1.00), indicating that lack of agreement on the type of recommendation for a particular patient may have been due to the inconsistent use of cues as well as to disagreement about the importance of cues (Holzworth & Wills 1999). However, a contentious aspect of Judgement Analysis concerns the use of written simulations or paper people cases; this will be presented in the following section.
2.9 Simulations

Any simulation is a representation of reality and its fidelity can vary (Elstein et al. 1978). Despite many innovative designs and applications, there remain major limitations to how well Judgement Analysis can model real-life judgements (Phelps & Shanteau 1978, Wigton 1988). The first, and most serious, weakness is the issue of what aspects of reality can be sacrificed to create a simulation (Elstein et al. 1978). Strategy-capturing studies in medicine have found wide variation among physicians in their responses to case vignettes (Slovic et al. 1971) and among nurses (Hammond et al. 1966b,c, Holzworth & Wills 1999). If such variation occurs in actual practice, the conclusion could be drawn that the studies are not critically important to patient care, or that the judgement process is flawed or that paper cases do not parallel real case judgements (Wigton 1996), or that the source of discrepancy may lie in the research design selected (Phelps & Shanteau 1978). According to Phelps & Shanteau (1978) expert judges were able to use information from nine to eleven cues in the first experiment; however, the second experiment, involving the same expert judges, gave an entirely different picture, i.e. used relatively few cues. Phelps & Shanteau (1978) suggested that the judges achieved this by following a two-stage judgement process. The aforesaid authors theorised that the expert judges may have been following a sequential model, where they first grouped cues according to their intercorrelations and made first-order judgements for these groups of cues and then integrated the results into an overall judgement. They concluded that the naturalist photographs gave insight into the judgement process that could not otherwise have been gained from the representative set alone in the first experiment (Phelps & Shanteau 1978).

A simulation that offers extensive cuing by providing lists of potentially available information may be invalid for an expert judge, as it does not permit the demonstration of actual data-gathering practices; however, it may still be valid for a student who has less experience in collecting data (Elstein et al. 1978). Some studies with experienced judges present tasks which may be non-representative of real patients as the patient state is judged in terms of a set of coded cues. Presentation of the cues in this way abolishes the perceptual elements from the task and thrusts it into a more conceptual domain, which may not capture how professionals naturally make their judgements (Brehmer & Brehmer 1988). Moreover, coded cues in the environment of experts may give an incomplete picture of clinical expertise (Brehmer & Brehmer 1988).

Some simulated cases contain only a fraction of the variables present in real-life situations. The information available in real-life judgements usually includes many redundant and intersubstitutable cues (Wigton et al. 1986), a feature not often included in the simulated cases and standard cues will not be able to reflect policies fully (Fisch et al. 1981). Moreover, simulations call for a judgement about all cue variables presented simultaneously, whether they are requested or not, while in the actual task, the acquisition of information is often sequential and incomplete (Wigton 1988, Greenwood 1998) with the researcher controlling the amount of information a subject can access (Greenwood 1998). In the real-world situation, where signs are likely to become available one at a time, the process may be more obviously sequential than in the experimental situation, where cues were all made available to the judge at the same time (Hoffman et al. 1968).
The core concern in relation to paper people cases is external validity, i.e. the degree
to which results acquired with paper people cases predict actual judgements outside the
policy-capturing circumstances (Brehmer & Brehmer 1988). In a study discussed earlier,
Kirwan et al. (1983a) compared judgements of disease activity for real patients suffering
from rheumatoid arthritis (RA) with paper cases of patients with the same disease profiles.
The mean correlation between the two positions of judgements for nine rheumatologists was
.90 (range .77 to .96), indicating that paper cases provide a good representation of real
patients (Kirwan et al. 1983). Similar findings with a different sample were reported by
Chaput de Saintonge & Hathaway (1981). Moreover, in paper people cases in general some
variables, particularly numerical measurements such as vital signs, or laboratory values, are
probably represented effectively in verbal descriptions to the subjects. However, other
variables such as the patient is very labile may lack the influence or impact they have in real
life situations, i.e. in the heat of surgery (Fisch et al. 1981) or in the immediate period post
major surgery. The disadvantage of verbal descriptions is their lack of realism (Slovic et al.
1971). More importantly, participants may not give the same quality of attention to a written
vignette that they would give to a real-life situation (Wigton et al. 1986).

The advantage of paper people cases is that the same standardised cases can be
presented to different subjects allowing for direct comparisons and interpersonal learning
(Denig et al. 2002). Other appealing attributes are that patient factors can be controlled by
having study subjects evaluate the same cases (Wigton et al. 1986). Simulations are
convenient and easy to administer where large numbers of subjects can be surveyed using
relatively inexpensive data collection methods. There are great advantages in entering the
concrete situation armed with conclusions obtained under controlled albeit artificial
conditions (Postman 1955). Although laboratory studies are often criticised for lack of
realism, experimental control need not be tantamount to artificiality (Phelps & Shanteau
1978). Perhaps the key to more realistic laboratory experiments lies in researchers
developing a comprehensive familiarity with the applied setting before jumping prematurely
into naturalistic settings (Phelps & Shanteau 1978) and in efforts to investigate how to
improve the paper people cases (Wigton 1996).

2.10 SUMMARY

In summary, this chapter presented various definitions of judgement, decision and
diagnosis, highlighting some of the confusion surrounding the various terminologies.
Brunswick’s theory of perception and thinking was addressed, incorporating Hammond’s
Cognitive Continuum Theory which drew a distinction between intuitive and analytical
judgement. The Lens Model, which was created by Brunswik for representing how the
various concepts involved in probabilistic functionalism could be summarised, was also
illustrated. Policy-capturing studies from medical and nursing literature were presented and
discussed. Moreover, policy-capturing as a system for the study of human judgement was
also explored, where emphasis was placed on cue weights as one of the crucial aspects of the
judgement process. The one basic single system design useful in guiding Judgement Analysis
investigations was described and discussed in the context of the current study.

The essence of a hierarchical judgement design was depicted as an important
application and expansion of Lens Model Theory, theoretically and methodologically, in the
context of clinical judgement. In contrast to the single-level judgement, the policy-maker engages in a two-step inference process, employing weights, function forms and organisational principles with varying degrees of consistency to make their judgements. Finally, some contentious issues in relation to paper people cases were reviewed. The researcher has chosen a behavioural model of inference, i.e. the Lens Model, to study the judgement process of critical care nurses in the context of the ventilated patient in pain in the immediate phase post cardiac surgery. The Lens Model which was illustrated and described in detail earlier is particularly appropriate for this purpose because, according to Hammond (1996), its emphasis on the judge’s use of multiple fallible cues. Furthermore, the case study method which will be discussed in the following chapter will aim to produce a first-hand understanding of the judgement process of critical care nurses in the context of the ventilated patient in the immediate phase post cardiac surgery.
CHAPTER THREE

3.0 RESEARCH METHOD

3.1 INTRODUCTION

Case studies have become one of the most common ways to carry out naturalistic inquiry, but they are neither new nor essentially qualitative (Denzin & Lincoln 1994, Stake 2000). There is some confusion in the qualitative literature about case study terminology. Hamel et al. (1993) pose the following question: is the case study a method or is it an approach? The goal is to reconstruct and analyse a case from a sociological perspective, thus, it is more appropriate to define the case study as an approach, although the term ‘case method’ suggests that it is indeed a method (Merriam 1988, Patton 2002, Denzin & Lincoln 2003). On the other hand, Wolcott (2002) prefers to regard the case study in a narrower sense as a format for reporting rather than as a strategy for conducting research.

In some instances the case study is neither a data collection method nor simply a design, but an all-encompassing research strategy used in many circumstances to contribute to knowledge, e.g. of individual, group, or organisation. The case study is the substance of the research inquiry, consisting of research questions, theoretical perspectives, empirical findings, interpretations, and conclusions (Yin 2003, 2004). Besides, efforts to define the case study repeatedly centres on outlining what is unique about the research design. The uniqueness of a case study lies not so much in the methods employed as in the questions asked and their relationship to the end product (Merriam 1988). Stake (1981) takes this view one step further and maintains that the knowledge learned from a case study is distinct from other research knowledge in four vital ways: more concrete, more contextual, more developed by reader interpretation and based more on reference populations determined by the reader. Therefore, the case study is the study of the particularity and complexity of a single case, coming to know its activity within important circumstances and looking for elements of interaction with its contexts (Stake 1995, 2000).

This chapter portrays a case study design, with particular emphasis on the intrinsic case study as an appropriate strategy for investigating how critical care nurses make a judgement in the context of the ventilated patient in pain in the immediate phase post cardiac surgery. The sections included present the conceptual structure and selection of the case, the philosophical assumptions underpinning naturalistic inquiry and a detailed account of the process of collecting case study evidence using two data sources, incorporating participants demographics. The coding procedure and data analysis techniques in a within-case, negative case and cross-case analysis are described. Finally, the criteria for assessing the truth value of a naturalistic case study are described.

3.2 CONCEPTUAL STRUCTURE OF THE CASE

In a naturalistic case study, the researcher seeks an advanced understanding of the case; (s)he seeks to value the uniqueness and complexity of the case, its embeddedness, and to interface with its contexts. Consequently, Stake (1995, 2000, 2005) identified three types of case study: the intrinsic (focus on uniqueness), the instrumental (focus on issues) and the
collective (i.e. investigating a phenomenon, population or general condition, multi-site qualitative study) (Stake 2005). The intrinsic case study is not undertaken primarily because the case represents other cases or because it illustrates a particular trait or problem but because, in all its particularity and ordinariness, this case itself is of interest (Stake 1995, 2000). The idea of a purely intrinsic case study is resisted by many qualitative researchers. Description itself is a delicate activity, which is inevitably theoretically laden (Silverman 2005). Some question what knowledge case study research has produced, which necessitates considering the degree of generalisability of the research. According to Mason qualitative researchers should not be satisfied with producing explanations which are idiosyncratic or particular only to the limited empirical parameters of their study.... Qualitative research should produce explanations or arguments which are generalisable in some way, or have some demonstrable wider resonance (Mason 2002, p.8). Consequently, the description of a case for description's sake, i.e. the intrinsic case study, is in a weak position.

However, the name ‘case study’ is emphasised because it draws attention to the issue of what, in particular, can be learned from the single case. That epistemological question is what drives the inquiry, i.e. what can be learned from the single case? Stake (1976) stresses designing the study to optimise understanding of the case, rather than generalisation beyond. Moreover, cases can also be critical incidents, stages in the life of a person or programme, or anything that can be defined as a specific, unique, bounded system (Stake 2000, p.436). In essence, a case is an occurrence of some sort taking place in a bounded situation, i.e. the unit of analysis. The case is, in effect, your unit of analysis (Miles & Huberman 1994). The case, or unit of analysis, is generally established during the design phase and becomes the basis for purposeful sampling in qualitative inquiry. Previous literature can also become a guide for defining the case and unit of analysis, while in some instances new units of analysis, or cases, emerge during fieldwork or from the analysis after data collection (Patton 2002, Yin 2003).

This researcher chose a case study design in order to gain an in-depth understanding of how critical care nurses make a judgement that the ventilated patient is in pain in the immediate phase post cardiac surgery. The case identified for this study was the critical care nurses’ judgement policy. This case is a bounded system bounded by time (in the immediate phase [six hours] after cardiac surgery), event (ventilated patient’s pain) and place (critical care unit). The use of two sources of evidence (think aloud data and observation) was undertaken in order to capture a detailed, in depth picture of the case, i.e. the critical care nurse’s judgement policy in the context of the ventilated patient’s pain in the immediate phase after cardiac surgery. According to Yin (2003), there are five components of a case study research design which are especially important: a study’s questions; its propositions if any; its unit(s) of analysis; the logic linking the data to the propositions; and the criteria for interpreting the findings. The components of this intrinsic case study are represented in Figure 3.1.

Yin presents four types of case study designs which can be either single-case or multiple-case design and either holistic (single unit of analysis) or embedded (multiple units of analysis) design. He comments further that a single-case design is permissible under certain conditions when the case represents (1) a critical test of existing theory, (2) a rare or unique circumstance, or (3) a representative or typical case, a (4) revelatory or (5) longitudinal purpose (Yin 1984, 1989, 2003, 2005). The researcher decides to study the
**Study Question**
How do critical care nurses make a judgement that the ventilated patient is in pain in the immediate phase of post-cardiac surgery?

**Proposition**
Critical care nurses use a pattern of cues to make a judgement that the ventilated patient is in pain in the immediate phase post-cardiac surgery.

**Unit of Analysis**
Critical care nurses' judgement policy

**Subunit of Analysis**
Patient pain behaviours

**Logic Linking the Data to Propositions**
Within-case Analysis
Cross-case Analysis
Modified Analytic Induction

**Criteria for Interpreting Findings**
Validity
Reliability
Triangulation

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Figure 3:1 A Case Study Research Design
entire case (a holistic design), or multiple subunits within the case (the embedded design),
whether the case is single or multiple-case study design. In addition, case study is the method
of choice when the phenomenon under study is not readily distinguishable from its context
(Yin 2003). This implies that capturing the richness of context demands multiple sources of
evidence, e.g. think aloud and observation in this study. This intrinsic case study employs an
embedded design of the critical care nurses’ judgement policy, which also includes a subunit
of analysis i.e. patient pain behaviours. The researcher believes that research focused on
understanding the perspectives of those being studied offers the greatest promise of making
significant contributions to the knowledge base and practice of nursing. Case study is part
of a scientific methodology, but its purpose is not limited to the advance of science. Case
studies are of value for refining theory and suggesting complexities for further investigation,
as well as helping to establish the limits of generalisability (Stake 2000).

Case studies can have general application although they may not afford a sound
foundation for scientific generalisation of a conventional kind. Moreover, Stake (1976)
suggests that if research is to be of importance to people, it needs to be framed in similar
terms as the everyday experience through which they learn about the world firsthand. Hence,
the strong point of case studies, he argues, is that they provide vicarious experience, in the
form of complete and meticulous knowledge of the particular. In doing this, case studies
facilitate what Stake & Trumbull (1982) call naturalistic generalisation and thereby, build up
the body of tacit knowledge, otherwise referred to as experiential knowledge, on the basis of
which people act. In other words, naturalistic case study inquiry tries to establish an
empathetic understanding for the reader, through thick description, conveying to the reader
what experience itself would convey. Naturalistic inquiry is always carried out in a natural
setting, since context is so heavily concerned with meaning. Therefore, naturalism seeks rich
descriptions of people and interactions as they exist and unfold in their native habitats, as it
really is (Gubrium & Holstein 1997), which involves a close and searching description of the
mundane details of everyday life (Lofland & Lofland 1995). Moreover, Geertz (1973)
extends the meaning of thick description, suggesting that actions can only be understood in
the context of narrative accounts which draw on the whole culture in which the actions occur.
This indicates that thickness is a matter of degree. Lincoln & Guba (2002) recognise this,
suggesting that the issue of what constitutes proper thick description has not been completely
resolved. Nonetheless, other than the implication that it must be preferable to thin, there is no

One question which has created much discussion in the literature has centred on
concerns about the generalisability of case study research, i.e. how can a single case possibly
be representative so that it might yield findings that can be applied more generally to other
cases? But Stake (1978, p.5) argues that one must consider the situation from the perspective
of the user of the generalisation: case studies will often be the preferred method of research
because they may be epistemologically in harmony with the reader’s experience and thus to
that person a natural basis for generalisation. Later, he argues that the reader will take both
the researcher’s narrative descriptions and assertions, i.e. narrative descriptions to form
vicarious experience and naturalistic generalisations and assertions to work with existing
propositional knowledge to modify existing generalisations (Stake 1995). Stake’s stance
gives the impression that there are two categories of generalisations, i.e. rationalistic, propositional and lawlike, while the other category is more intuitive.

Lincoln & Guba (2002) agree with Stake that while case studies have a great deal of utility in assisting reader understanding by inducing naturalistic generalisations, they replace the classic idea of generalisation with a new formulation proposed by Cronbach: the working hypotheses. Earlier, Guba and Lincoln's position on the issue of generalisability is appropriately summarised in an extract of their own words. Guba and Lincoln (1982) say that the aim of (naturalistic) inquiry is to develop an idiographic body of knowledge. This knowledge is best encapsulated in a series of working hypotheses that describe the individual case. Generalisations are impossible since phenomena are neither time- nor context-free (although some transferability of these hypotheses may be possible from situation to situation, depending on the degree of temporal and contextual similarity) (1982, p.238). On the other hand, case study researchers argue that they aim to generate an intensive examination of a single case, engaging in a theoretical analysis. The crucial question is not whether the findings can be generalised to a wider universe, but how well the researcher generates theory out of the findings (Yin 1984, 2003). Such a view places case study research securely in the inductive tradition of the relationship between theory and research. However, a case study design is not necessarily associated with an inductive approach. Case study research can be associated with both theory generation and theory testing (Bryman 2004).

Theory development as part of the design phase in case studies is essential, whether the ensuing case study’s purpose is to develop or test theory (Yin 2003). Silverman (1993) has argued that, in more recent times, qualitative researchers have become increasingly interested in the testing of theories and that this is a reflection of the growing maturity of the strategy. Although the single-case study, is a distinctive form of empirical inquiry, many research investigators nevertheless disregard the strategy as a less desirable form of inquiry than either experiments or surveys. According to Campbell & Stanley (1966, p.6-7) “...single-case studies have such total absence of control as to be of almost no scientific value. ... Any appearance of absolute knowledge, or intrinsic knowledge about singular isolated objects, is found to be illusory upon analysis. ... It seems well-nigh unethical at the present time to allow, as theses or dissertations in education, case studies of this nature i.e. involving a single group observed at one time only” (Campbell & Stanley 1966, p.6-7). In his later work, Campbell (1975) explaining how his work has undergone an extreme oscillation away from my earlier dogmatic disparagement of case studies says that “after all man is, in his ordinary way, a very competent knower, and qualitative common-sense knowing is not replaced by quantitative knowing. ... This is not to say that such common-sense naturalistic observation is objective, dependable, or unbiased. But it is all that we have. It is the only route to knowledge, noisy, fallible, and biased though it may be” (Campbell 1975, p.179).

The conception of most naturalistic case studies results from a need for accurate description and subjective, yet disciplined, interpretation; a respect and curiosity for culturally different perceptions of phenomena and emphatic representations of local settings, all blending within a constructivist epistemology (Stake 2000). A naturalistic inquiry means that the researcher seeks to gather data in naturally occurring situations and environments, as opposed to artificial ones. According to Matza (1969), naturalism is the philosophical view that strives to remain true to the nature of the phenomenon under study and ‘claims fidelity to
the natural world (1969, p.8) which implies a synthesis of elements of an interpretivist epistemology and a constructionist ontology. The principle which is concerned with the question of whether social scientific findings are pertinent to people’s everyday life in their natural habitat is termed ecological validity. As Cicourel (1982, p.15) remarks: do our instruments capture the daily life conditions, opinions, values, attitudes and knowledge base of those we study as expressed in their natural habitat? The researcher chooses to study how critical care nurses make a judgement in the context of the ventilated patient in pain in their natural habitat because the issue of ecological validity relates to the naturalness of the research approach and appears to have substantial application to naturalistic case inquiry. Moreover, Lamond et al. (1996) describe ecological validity as the extent to which the task and context adequately reflect reality.

3.2.1 SELECTION OF THE CASE

Qualitative researchers usually work with small samples of people, nested in their context and studied in depth, unlike quantitative researchers, who aim for larger numbers of context-stripped cases and seek statistical significance (Miles & Huberman 1994). Moreover, case study research is not sampling research (Stake 1995). The primary concern is to maximise what can be learned from the case. Generalisation may not be feasible from single cases or very small samples; one can learn from them and learn a great deal, often opening up new territory for further research (Patton 2002). As Denzin and Lincoln (1994) remark: many qualitative researchers employ purposive, and not random, sampling methods. They seek out groups, settings, and individuals where the processes being studied are most likely to occur, with the intention of opting for information rich cases, whose study will inform the questions under study.

In many situations, sampling decisions require considerable knowledge of the setting of the study. According to Maxwell (1996), sampling choices should take into account the researcher’s relationship with study participants, the feasibility of data collection, validity concerns and ethics. In this intrinsic single-case study, the choice of sample was not dictated solely by the need to ensure that the phenomena the researcher was interested in were likely to be exhibited. It was also influenced by the fact that the researcher had an indirect professional relationship with some of the clinical managers in that particular environment and this could facilitate the study. There is some debate in the literature regarding researchers studying familiar settings. Creswell (1998) and Glesne & Peshkin (1992) register a cautionary note about studying your own backyard, which provides easy access to informants and information at a minimal cost. However, while qualitative researchers bring their values, biases and understandings to a project, personal knowledge of a setting may be advantageous.

However, according to Creswell (1998), the negatives outweigh the positives. Taylor & Bogdan (1984) indicate that there is always the risk that the researcher in a familiar environment is likely to see things from only one point of view. More to the point, Stephenson & Greer (1981) consider that the main issues for researchers working within their own culture are: recognising patterns in familiar circumstances, the ordinariness, the nuances and interpreting meanings attached to events and problems relating to participation, observation and field relations. However, they conclude that much of the ideology underlying
these issues are themselves familiar to naturalistic researchers and embrace: bias, oversimplification, prior judgement and the inability to detach observation from feeling. In addition, in circumstances in which researchers are insiders, interaction is considered natural, because the researcher has a rapport with those who are researched, sharing the same language and the same socio-political context (Burgess 2000). Nonetheless, Stephenson & Greer (1981) suggest that researchers working within their own nests should adopt an artificial naïveté by recording as much detail as possible about the object, maintaining that familiar subject matter should be given stranger value and perceived through the eyes of a stranger. In that way, the researcher may be able to look at the objects anew and understand them and their consequences in a new light. Realistically, the researcher should have a connoisseur’s appetite for the best persons, places and occasions; best usually means those that best help us to understand the case (Stake 1995).

In summary, the case study is the essence of the inquiry, embracing research questions, theoretical perspectives, empirical findings, interpretations and conclusions. The intrinsic case study is about the particularity and ordinariness of the case. Case study research is not sampling research, the primary concern is to maximise what can be learned from the case. The main point is to aim for analytic generalisation rather than think about terms such as small sample size. There is debate in the literature regarding the study of familiar settings; caution is advised and in particular, the risk of seeing things from only one perspective is emphasised. It is recommended that the researcher should develop artificial naïveté by recording as much detail as possible about the object. Moreover, anchored as it is in a real-life situation, the naturalistic case study can offer insights and illuminate meanings that expand its readers’ experiences. The literature has suggested that the study of a particular case is not as important as studies to obtain generalisation. However, the answer to the critics is that case studies are generalisable to theoretical propositions and not to populations or universes. Besides, this intrinsic case study will attempt to provide a complete and meticulous knowledge of the particular case which Stake refers to as naturalistic generalisation.

The case study researcher contributes to reader experience based on their beliefs of knowledge and reality. Therefore, the naturalist case study researcher proceeds with a set of assumptions that reveals fundamental questions about the nature of reality and the nature of the human being in the world (ontology) and that denote a set of questions (epistemology) that (s)he considers in explicit ways (methodology, methods, analysis) to gain knowledge about that world; this will be explored in the following section in the context of a naturalistic inquiry.

3.3 NATURALISTIC INQUIRY: PHILOSOPHICAL INFLUENCES

Naturalistic researchers approach their studies with a certain paradigm or worldview, a basic set of assumptions that guides their inquiries. According to Denzin & Lincoln (2003), the constructionist or interpretive paradigm assumes a relativist ontology (there are multiple realities), a subjective epistemology (the knower and respondent cocreate understandings) and a naturalistic (in the natural world) set of methodological procedures such as case study design. The net that contains the researcher’s epistemological, ontological, and methodological premises may be termed a paradigm, or an interpretive framework, a basic
set of beliefs that guides action (Guba 1990, p.17). One missing assumption in this net is ethics, otherwise identified as axiology in the literature. Behind these assumptions stands the personal biography of the researcher, who speaks from a particular class, gender, racial, cultural, and ethnic community perspective (Denzin & Lincoln 2003).

The philosophical assumptions express the researcher’s understanding of knowledge and influence naturalistic inquiry. Figure 3.2 summarises these influences, which are explored in this section. The axiological assumption echoes either the personal beliefs, opinions, prejudices or feelings of the researcher. There is much discussion in the literature that researchers working within a naturalistic inquiry should be free of values and objective in their research. However, there is increasing acknowledgment that it is not possible to keep the values that a researcher holds absolutely in check and this can encroach at any phase during the process of naturalistic inquiry. The researcher acknowledges the value-laden nature of the study, will raise it to consciousness and use it as part of the inquiry process. According to Glesne & Peshkin (1992), who view subjectivity as virtuous, it is therefore something to capitalise on rather than to exorcise. Stake (1995) and Strauss (2003) emphasise a similar position in discussing what they call experiential data the researcher’s technical knowledge, research background and personal experiences but they highlight that it is not a licence to uncritically impose one’s assumptions and values on the research. The view of reality always integrates the stance of the observer. The focus becomes a balance between understanding and representing the world authentically in all its intricacy, while being self-analytical, politically aware, and reflexive in consciousness (Patton 2002).

The ontological belief, which relates to the nature of reality, is constructed by individuals involved in the research situation. Consequently, multiple realities subsist, such as the realities of the researcher, those of the individuals being studied and those of the reader interpreting a study. The naturalistic researcher needs to detail these realities, rely on voices and interpretations of subjects through extensive quotes, present themes that reflect words used by subjects, and advance evidence of different perspectives on each theme (Creswell 1998, Patton 2002). The researcher will attempt to capture data on the perceptions of local actors from the inside, through a process of deep attentiveness, of empathic understanding Verstehen (Miles & Huberman 1994), the knowledge of the plight of another by experiencing it yourself (Von Wright 1971).

The relationship of the researcher to those being researched relates to the epistemological assumption, as qualitative researchers interact with the participants in the study. In other words, as one engages in the practical activities of generating and interpreting data to answer questions about the meaning of what others are doing and saying and then transforms that understanding into public knowledge, one inevitably takes up theoretical concerns about what constitutes knowledge (Schwandt 2003). The context of human experience provides a means by which that experience can be discovered and understood in ways that allow research participants to provide their own meanings and explanations and to challenge the outsiders’ or etic view. The naturalistic case study researcher treats the uniqueness of individual cases and contexts as important to understanding. Consequently, (s)he utilises narratives to optimise the opportunity of the reader to gain an experiential understanding of the case (Stake 1995).
Figure 3.2: Philosophical Assumptions: Influences on Naturalistic Inquiry
The naturalistic researcher, as human instrument, builds upon their tacit knowledge, which not only intrudes into the inquiry, but which is also transformed into propositional knowledge to enable the researcher to think about it clearly and share it with others. The researcher’s conclusions are propositions about persons or things of which (s)he has had experiential knowledge through direct encounter (Heron 1981). Similarly, Lincoln & Guba (1985) indicate that the naturalistic paradigm argues for the legitimation of tacit knowledge in addition to propositional knowledge because often the nuances of the multiple realities can be appreciated only in this way, because much of the interaction between researcher and participant occurs at this level, and because tacit knowledge mirrors more accurately the value patterns of the researcher.

The methodological assumption evolves, i.e. how the researcher conceptualises the complete research process, from the characteristics about reality (ontology), the relationship between the researcher and participants studied (epistemology) and the function of values (axiology) within a case study design. Another influence on the naturalistic case study is the complex iterative reasoning of the researcher. According to Lincoln & Guba (1985), naturalistic inquiry prefers inductive data analysis for the following reasons: it is more likely to identify the multiple realities to be found in those data; it is more likely to make the researcher-participant interaction explicit; and it is more likely to describe fully the setting and to make decisions about transferability to other settings easier. However, Miles & Huberman (1994) warn that highly inductive, loosely designed studies make good sense when experienced researchers have plenty of time and are exploring exotic cultures, understudied phenomena, or very complex social phenomena. Bechhofer has argued that, although induction is frequently used by the sociologist, it is not a straight choice between induction and deduction, as he remarks: “the research process ... is not a clear-cut sequence of procedures following a neat pattern but a messy interaction between the conceptual and empirical world, deduction and induction occurring at the same time” (Bechhofer 1974, p.73). This case study researcher despite using an a priori framework, will attempt to maintain a healthy scepticism during data collection, recording and analysis.

Vaughan remarks that even when researchers believe themselves to be unfettered theoretically, they always begin a research project with an arsenal of preconceived theoretical notions accumulated from their own research, the reading of the work of others, personal experience and from literature and conversations that shape their perceptions and ideas (Vaughan 1992). The implication being that the researcher does not approach fieldwork with a blank slate or without some preconceived mental image of what the observed events in the world mean. According to Miles & Huberman (1984), any researcher, no matter how unstructured or inductive, comes to fieldwork with some orienting ideas, foci and tools. But the problem is according to Silverman (2005), that many closet naturalists fail to come clean about the theory dependence of their research. Given the intense interaction of the researcher with persons in the field and elsewhere, given a constructivist orientation to knowledge, given the attention to participant intentionality and sense of self, however descriptive the report, the researcher ultimately comes to offer a personal view (Stake 1995, p.42).

In summary, naturalistic inquiry is carried out in a natural setting in order to seek rich descriptions as they unfold in the natural habitats. The constructivist view of knowledge supports providing readers with good raw material for their own generalising. However, the
personal view of the researcher is also involved in the process. There is increasing
acknowledgement of the fact that it is not possible to keep the values and beliefs of the
researcher completely in check but that it is feasible for the vigorous reporting of values and
biases by the researcher, incorporating active reflexivity. Moreover, the naturalistic
researcher gives serious attention to ascertaining the emic view, however, the mere entry of
the researcher disturbs that context. Prolonged engagement by the researcher has the effect of
reducing overt changes in the behaviour of those studied. Although reasoning may be
primarily inductive, in practice, the naturalistic approach may involve moving back and forth
between inductive and deductive. Knowledge emerges which is inextricably linked to the
context in which it is studied. Evidence for case studies may come from many sources and
this is described in detail in the following sections.

3.4 THE PROCESS OF COLLECTING CASE STUDY EVIDENCE

The purpose of this naturalistic case study, utilising two sources of evidence, is to
provide a view of reality that is important to the study participants, rather than to the
researcher. Evidence for this case study comes from two data sources: think aloud data and
researcher observation as the researcher attempts to build an in-depth picture of the case. In
addition to the attention given to these individual sources, some key principles, according to
Yin (2003), are important to any data collection effort in doing case studies and these are
applied in this case study and reflected in Figure 3.3. The incorporation of three principles,
i.e. (1) multiple sources of evidence (evidence from two or more sources, but converging on
the same set of facts or findings), (2) a case study database (a formal assembly of evidence
distinct from the final case study report), and (3) a chain of evidence (explicit links between
the questions asked, the data collected, and the conclusions drawn), will increase its validity
substantially (Yin 2003). Furthermore, design challenges of validity and reliability need to be
addressed. In addition, the researcher records the information which Lofland & Lofland
(1995) refer to as logging the data, for example, think aloud data transcripts, observational
fieldnotes and data displays.

Throughout the data collection process, a detailed description of the case emerges, as
do analysis of patterns and an interpretation or assertions about the case by the researcher
(Stake 1995). This analysis is rich in the context of the case in which the case presents itself.
The researcher narrates the study through techniques such as a chronology of critical care
nurses’ judgement policies in the context of the ventilated patient in the immediate phase
after cardiac surgery, followed by a detailed perspective about the patient pain behaviour
incidents. This case study will provide a detailed description of each case and patterns within
the case, called a within-case analysis, followed by a pattern analysis across the cases, called
a cross-case analysis, as well as an interpretation of the meaning of the case. In the final
interpretive phase, the researcher reports, as Lincoln & Guba (1985) mention, the lessons
learned from the case.

3.4.1 THE AIM OF THE STUDY

The overall aim of this study is to capture how critical care nurses in their natural
environment weight and combine cues in forming a judgement that the ventilated patient is in
pain in the immediate phase post cardiac surgery. The specific aim is to examine the cue
Figure 3.3: Principles Data Collection Case Study Research
characteristics of each individual critical care nurse’s judgement policy, i.e. which cues are most salient (weight) for the critical care nurse and how are the cues combined in their use reflecting the critical care nurse’s judgement policy in the context of the ventilated patient in pain in the immediate phase post cardiac surgery. It is the contention of the researcher that an individual critical care nurse’s judgement policy needs to be scrutinised in isolation and as a coherent whole before aggregation across critical care nurses’ judgement policies transpires. The within-case proposition proposes that the critical care nurse uses a pattern of cues to make a judgement that the ventilated patient is in pain in the immediate phase post cardiac surgery.

Subsequent to the examination of individual critical care nurse’s judgement policies in the context of the ventilated patient in pain in the immediate phase post cardiac surgery, a cross-case analysis will examine the commonalities and differences between various judgement policies across critical care nurses. The cross-case proposition proposes that similarities in critical care nurses’ judgement policy in the context of the ventilated patient in pain in the immediate phase post cardiac surgery are due to similarities in how critical care nurses weight and combine cues.

3.4.2 Design

All case studies attempt to promote a deeper understanding of a phenomenon of interest (Merriam 1988, Stake 2004). The present inquiry is an intrinsic case study, conducted in order to examine a contemporary phenomenon in a real life context. The phenomenon under study is critical care nurses’ judgement policy in the context of the ventilated patient in pain in the immediate phase post cardiac surgery.

3.4.3 Sample Nurse Participants

In this intrinsic case study design, the cases were chosen because the researcher believes that studying them will lead to an enhanced understanding and, perhaps, enhanced theorising. It is especially apt for the researcher to refine theory through a particular set of results (Stake 2004). The sample of critical care nurses (n=30) who were employed full time in the critical care unit and who normally worked with adult critically ill patients were selected for study. The demographic data on the nurse participants are indicated in Table 3.1, 3.2, 3.3, 3.4 and 3.5 in Appendix IX. The inclusion criteria of nurse participants required that each registered nurse was responsible for direct patient care in the critical care unit. Nurse managers were excluded from the study.

3.4.4 The Demographic Data on Nurse Participants

The age of nurse participants ranged from 24 to 50 years. The mean age was 29.8 years, while the median was 30 years (see Table 3.1 of Appendix IX). There were male nurses employed in the critical care unit at the time of the study, as managers and education facilitators only, hence the thirty nurses were female. The educational background of the nurse participants (Table 3.2) indicated that 86.7% (n=26) completed a generic certificate programme, 6.7% (n=2) received a degree and 6.7% (n=2) a diploma in nursing. The mean years in professional nursing was 8.9 years with a median of 8 years which is reflected in
Table 3.3 (see Appendix IX). The critical care qualification characteristics of the sample represented in Table 3.4 specifies that 70% (n=21) had completed a certificate in critical care nursing, while 30% had no critical care certification. The nine nurses who had no critical care certification had completed a three-month orientation programme in the critical care unit. The total time experience in critical care nursing was as follows: the mean was 3.7 years with a median of 2 years represented in Table 3.5 (see Appendix IX). All nurse participants completed a maximum of two hours’ pain education (pathophysiology of pain) during the course of their professional nursing practice.

3.4.5 Setting

The hospital is an acute teaching university hospital in Ireland which provides a wide range of secondary and tertiary referral services to patients inside and outside its catchment area. It has in excess of 570 beds. The hospital has two national specialities: cardiothoracic surgery, including transplantation, and spinal injuries. The critical care unit includes an 18-bed unit, a 32-bed high-dependency unit, a 32-bed cardiothoracic unit and a separate 10-bed cardiology unit. The 18-bed critical care unit receives multiple trauma patients, acute spinal injuries, patients in medical crises, unstable surgical patients, unstable obstetrical patients and post operative cardiothoracic patients. The critical care unit is run by a medical director and full-time intensivists, with a nursing staff to patient ratio of 1:1.

The choice of setting is not simply a practical matter, but a highly intellectual one, which expresses core elements of the researcher’s ontology and epistemology (Mason 2002). The selection of a research site is therefore more complex than might first appear. According to Spradley (1980), five criteria can be identified in the selection of a research site: simplicity, accessibility, unobtrusiveness, permissiveness, and frequently, recurring activities which need to be balanced against personal interest, time constraints and theoretical concerns. However, it is rare for the researcher to be able to meet all these criteria in selecting a social setting and therefore, some compromise is essential depending on the substantive and theoretical interests of the researcher, together with the constraints on his/her work (Burgess 2000).

Two methods of data collection occurred simultaneously in the natural habitat of the participants. The primary data collection method was think aloud with critical care nurse participants. The secondary data collection method was researcher observation with patient participants, which was utilised as a supplement to the think aloud data. Each approach is discussed in detail in the following sections. In addition, the methodology of think aloud and researcher observation is also presented.

3.5 The Methodology of Think Aloud

Verbal protocol analysis using think aloud technique has been used in the field of health care and is guided by the work of Ericsson & Simon. The methodology of verbal protocol analysis has been extensively developed, theoretically and experimentally, by Newell & Simon (1972) and their colleagues in studies of problem solving, culminating in the comprehensive work by Ericsson & Simon (1984). They claim that the information-processing theory is a theory that illuminates the processes by which humans reach
judgements and solve problems. The information-processing theory proposes that the human mind, when engaged in a problem-solving task, can be considered as an information processing system in which the task environment is represented as a problem space (within the individual’s mind) in which problem solving takes place.

The data are a transcript of the subject’s verbalisations during the course of problem solving what is called a protocol, which also includes additional data, about either the subject or the environment and that bears on the total performance (Newell & Simon 1972). Thus, the analysis of verbal protocols is one methodology intended to disclose the knowledge and cognitive processes used by a person while performing a task or behaviour. This methodology is often referred to as process tracing since the continuous stream of verbalisations provides evidence for the underlying representations of knowledge and the covert psychological processes which contribute to a final task/decision outcome (Hassebrock & Prietula 1992, Kuusela & Paul 2000). One source of process data is a think aloud verbal protocol, in which subjects report their thoughts during the performance of a primary task. Think aloud protocols provide rich complex data that are approximately concurrent with the subject’s reasoning (Ericsson & Simon 1984) and thus provide information about the changes in the subject’s representation of the problem (Joseph & Patel 1990). Pressley and Afflerbach (1995, p.2) expanded the idea of rich data by noting that spoken language is the data used in protocol analysis and the richness and variability of language are the greatest assets and liabilities of the verbal reporting methodology.

Within the framework of this information-processing model, one specific assumption is that information is stored in several memories with different capacities and accessing characteristics: several sensory stores of very short duration, a short-term memory (STM) with limited capacity and/or intermediate duration, and a long-term memory (LTM) with a very large capacity and relatively permanent storage, but with slow fixation and access times compared with the other memories (Ericsson & Simon 1993). According to Ericsson & Simon (1980), within the framework of this information-processing model, it is assumed that information recently attended to (or heeded) by the central processor is kept in the STM, and is directly accessible for further processing (e.g. for producing verbal reports), whereas information from the LTM must first be retrieved (transferred to STM) before it can be reported.

The two constructs of special importance in the information-processing theory are LTM and STM. The first construct, LTM, contains knowledge of how to do things (i.e. procedural knowledge), as well as a great deal of factual knowledge (i.e. declarative knowledge) (Pressley & Afflerbach 1995). The most important characteristic of LTM is that it is vast (Pressley & Afflerbach 1995, Branch 2000). The second construct that figures largely in Ericsson & Simon’s (1984, 1993) work is STM, which is frequently considered as information currently in consciousness. The information in STM derives from two sources: external stimulation and associations from LTM. One especially central property of STM is that people can access its contents and report them. Moreover, the time of verbalisation is important in determining from what type of memory the information is likely to be drawn (Ericsson & Simon 1980). The amount of information that can exist in STM at one time is restricted to a small number of recognisable patterns (chunks). It appears that human LTM is essentially infinite, but that STM has a capacity of only a few symbols (Elstein et al. 1978).
The mechanism that prevents the subject from adopting an efficient strategy is usually the limit on the numbers of symbols (s)he can retain and manipulate in STM (Newell & Simon 1972). Accordingly, Newell & Simon argued that because of the limitations of working memory, multifaceted activities are characterised in simplified problem spaces, and as a result, understanding problem solving is considerably advanced by understanding that cognitive representation. Given the limited size of working memory, one is literally required to process data serially, to select data carefully, to represent a clinical problem in simplified ways and to work as rationally as possible within these simplified representations (Elstein & Bordage 1997). As new information is heeded, information previously stored in STM may be lost (Ericsson & Simon 1980). Therefore, it becomes more difficult to retrieve memories when indicators related to those memories are no longer there and a series of other actions has captured one’s attention and been mixed into memory.

3.5.1 THINK ALOUD PROCESSES

The interval between the moment of acquisition and the moment of recall is an important consideration in classifying verbalisation procedures (Ericsson & Simon 1980). There are two main approaches based on information-processing theory to obtaining verbal reports from participants, namely, concurrent and retrospective reports. The first type of verbal report described here is known as the concurrent report. According to Ericsson & Simon (1993), when subjects verbalise concurrently, they generally must do two things, namely, perform the task that is being studied and produce the verbalisations. Therefore, if the information is verbalised at the instant that the subject is attending to it, the process is labelled concurrent verbalisation, i.e. talk aloud and think aloud reports, where the cognitive processes, described as successive states of heeded information, are verbalised directly (Ericsson & Simon 1984, p.16). A second type of verbal report is the retrospective report. A durable (if partial) memory trace of the information heeded is laid down successively while completing a task, so, immediately after the task is finished, this trace can be accessed from STM, at least in part, or retrieved from LTM and verbalised (Ericsson & Simon 1984).

According to Ericsson & Simon (1993), concurrent and retrospective verbal reports are direct verbalisations of specific cognitive processes. Retrospection may be difficult as it is not always easy to remember exactly what one did, especially if some time has passed since the completion of the task. Sometimes, one is not very aware of what one is doing (Van Someren et al. 1994). Furthermore, retrospective reports are incomplete and subject to fabrication and reconstruction (Carroll & Johnson 1990). An alternative to retrospection is to teach the subject to verbalise at intermediate points chosen by the subjects, this is known as introspection. Introspective reports are more subject to memory errors and misinterpretation (Van Someren et al. 1994). The main distinction with the think aloud method is that it requires concurrent verbalisation and discourages introspection (interpretation) on the part of the subject. Thinking aloud, as distinguished from explanation, will not change the structure and course of the task processes, although it may slightly decrease the speed of task performance (Ericsson & Simon 1980).

The propriety of think aloud protocols also depends upon the type of task presented to subjects (Hassebrock & Prietula 1992). In other words, if the researcher seeks to attain concurrent verbal reports, then some care should be taken to select a suitable task so that the
subject's verbalisations provide appropriate data for protocol analysis. Byrne (1977) recommends the following task characteristics: (1) the task should entail a sufficient temporal duration of behaviour so that thinking aloud can develop into a more or less natural behaviour while performing the task, (2) the task should be linked with a large body of knowledge and should require subjects to search their own internal base of this knowledge to execute the task; and (3) the task should be sufficiently representative of tasks usually encountered in the subject's experience.

Two important properties of participants with regard to the applicability of the think aloud method are the degree of expertise and verbalisation skills (Van Someren et al. 1994). Experts may be able to complete a task, but they may be unable to articulate how the outcome was accomplished. Their verbalisation of the process will probably be incomplete, or even inaccurate, because they may have constructed this report from memory. According to Van Someren et al. (1994), experts that perform a task as routine and very fast, are unable to verbalise their thoughts during the performance. This type of knowing is not easy to state explicitly in a generalisable propositional form, leading Schon (1983) to observe that professionals often know more than they can say. Previously, Polanyi (1964) persuasively stated that we can know more than we can tell. However, the converse is also true that we sometimes tell more than we can know (Nisbett & Wilson 1977).

3.5.2 Completeness of Verbal Reports

An important problem that arises in using verbal reports as data is their incompleteness. Ericsson & Simon (1980) identify three different causes of incompleteness of verbal reports: (1) the information is not heeded, hence not stored in STM, hence not accessible for verbal reporting; (2) not all the information available in STM at the time of the report is actually reported; (3) not all of the information previously available in STM has been retained in LTM, or is retrievable from LTM. Another problem which may cause verbal reports to be less complete is unexpected movements in peripheral vision and loud noises, which are important causes of interruption and inattention.

Furthermore, as particular processes become highly practiced, they become more automated, meaning that intermediate steps are carried out without being interpreted, hence much use may not be made of STM (Ericsson & Simon 1980). In this instance, it is probable that the think aloud protocols will be inexact, but that the processes will not be slowed down or altered. Similar predictions can be made for tasks with a large motor-perceptual component and tasks employing complex visually encoded stimuli (Ericsson & Simon 1993). Moreover, if the task performance is not highly automated, the subjects in their actions to obey the think aloud instructions, may take time to decode their inputs and output into verbal form, and to report them, but at the expense of slowing down their performance of the task (Ericsson & Simon 1993).

Even though concurrent verbal reports lessen bias from either incomplete or selective memory retrieval, some researchers query whether subjects can be conscious of and verbally report cognitive processes. Nisbett & Wilson (1977) attempted to provide evidence discrediting verbal reports as data, summarising their review by stating, people often cannot report accurately on the effects of particular stimuli on higher order, inference-based
responses. Indeed sometimes, they cannot report on the existence of critical stimuli, sometimes cannot report on the existence of their responses, and sometimes cannot even report that an inferential process of any kind has occurred (Nisbett & Wilson: 1977, p.233). This broad interpretation has been questioned by Ericsson & Simon (1980), who claim that the instances cited of inconsistency between verbal reports and data all refer to experimental situations and procedures, where their model would predict that veridical reports could hardly be expected. In addition, Ericsson & Simon (1984) responded with an analysis of protocol validity in answer to Nisbett & Wilson (1977) based on a theory of protocol generation. In order to reduce invalidity, they warn against all retrospectively collected protocols as subject to forgetting and fabrication. Furthermore, they also recommended avoiding concurrent think aloud protocols where instructions encourage hypothesising or other introspective explanations. Therefore, concurrent verbal protocols invite participants to report their thoughts, not to explain them.

Close scrutiny of the circumstances under which reports are unreliable has shown that discrepancies were found in circumstances in which there was a delay in time between the cognitive process and the report, or there was an enquiry by the researcher that necessitated an interpretation rather than a direct report or both. When asked for memories, explanations or motivations, people answer a question not from direct memory of the cognitive process but from an interpretation that can easily be influenced by expectations (Van Someren et al. 1994). Ericsson & Simon (1984, p.27) suggested that the accuracy of verbal reports depends on the procedures used to elicit them and the relation between the requested information and the actual sequence of heeded information. Therefore, for verbal reports to be valid recollections, it makes sense for them to be as close in time as possible to the recollected material, for the procedure eliciting recall to be comparable to the original situation, for the original event to have established a strong memory by having been significant, having attracted conscious attention, or having been repeated (Ericsson & Simon 1984).

Concurrent verbal reports may be incomplete when subjects slow down the cognitive process in order to synchronise it with the verbalisation. This is consistent with the observation that, occasionally, protocols contain holes, of which it is almost necessary to assume that an intermediate thought occurred (Van Someren et al. 1994).

3.5.3 THE VALIDITY OF CONCURRENT VERBAL REPORTS

Much discussion has taken place about the validity of think aloud protocols. Russo et al. (1989) distinguish between two forms of invalidity of think aloud protocols: reactivity and nonveridicality. A verbal protocol is reactive if the activity of verbalisation interferes with the participant's primary task. Reactivity can occur either as a change in the primary task that may alter the outcome of that process or as a simple prolongation of response time. There seems to be several possible mechanisms by which protocol generation might alter the primary task. Concurrent protocols are usually constructed in the presence of a researcher and planned for subsequent transcription and analysis. Consequently, participants can anticipate unrestricted exposure of their errors, hence, verbalising participants may try to shift to strategies that tend to reduce error, but require more effort, i.e. a motivational shift toward greater accuracy (Russo et al. 1989). In addition, vocalisation (auditory feedback) creates additional aural stimulation that might either facilitate or interfere with the
performance of the primary task. In many situations, vocalising an item facilitates recall, which seems to be based solely on hearing the auditory stimulus and not on the act of articulation (Russo et al. 1989). Despite the reactivity issue and the absence of a fully adequate theory of protocol generation, Russo et al. (1989) believe that nothing can match the processing insights provided by a concurrent verbal protocol; however, the challenge is to identify and reduce the causes of their invalidity.

A protocol is nonveridical if it does not accurately reflect the underlying primary task. Veridicality relates to whether concurrent verbal protocols faithfully represent the subject's mental processing. Two dimensions of veridicality are (1) the independence of the task of verbalising and the primary task and (2) the extent to which concurrent verbal protocols are complete (Biggs et al. 1993). Nonveridical protocols include errors of omission (e.g. not reporting some thoughts) and errors of commission (e.g. reporting mental events that did not occur); although omission is consequential, fabricated intrusions are usually more serious, because these data enter the protocol's analysis as if they were veridical (Russo et al. 1989). According to Ericsson & Simon (1993), the nonveridicality of the protocol depends on the task that the subjects have to perform while thinking aloud. They developed a theory of protocol generation which states that as long as the subject reports only the contents of the STM, and when those contents are verbalisable, the protocol will be sufficiently veridical.

In summary, Ericsson & Simon (1993) present concurrent and retrospective verbal reports as routes to generate data about cognitive processes. However, some controversy exists in the literature about the validity of both concurrent and retrospective protocols. Ericsson & Simon (1984) assert that both methods have validity depending on the nature of the task. Nonetheless, they have indicated that retrospective reports may be invalid or incomplete. Furthermore, the concurrent method which this case study has utilised are less useful when the task involves a high cognitive load, when the information is difficult to verbalise, i.e. visual data, or when the processes are automatic for the subjects. Taking this into consideration, the researcher is of the opinion that verbal protocol analysis could illuminate the cues that critical care nurses use and combine to make a judgement that the ventilated patient is in pain in the immediate phase post cardiac surgery. The process of collecting think aloud data is described in detail in the following section.

3.6 THE DATA COLLECTION PROCESS: THINK ALOUD

Think aloud was the primary form of data collection used by the researcher to examine critical care nurses' judgement policies in the context of the ventilated patient in pain in the immediate phase post cardiac surgery. There were several phases during the data collection process, namely ethical considerations, the access phase, the preparatory and primary data-gathering period, the research bargain and the closing stage, all of which are considered in turn.
3.6.1 ETHICAL CONSIDERATIONS

Ethics approval was sought and granted from the Hospital Ethics Review Board. The study was conducted in accordance with the ethical principles of the Helsinki Declaration 1964 governing research involving human subjects. Consent was also sought and received from hospital management the patients and the critical care nurses involved in the study. There were no risks involved for nurse participants or patient participants. Consent was voluntary and the privacy and confidentiality of patient participant data and nurse participant data was maintained at all times throughout the project. Any identifying data in the study were deleted from transcriptions by the researcher, who transcribed all tape-recordings for both data-sets, i.e. think aloud (nurse participants) and field notes (patient participants). Pseudonyms were applied to both the think aloud data and field notes respectively.

3.6.2 THE ACCESS PHASE: THINK ALOUD

Gaining access is an essential phase in the research process. Once potential data-sources are located, researchers face the problem of gaining access and entry into the field. Entry into the field for naturalistic inquiry embraces two separate elements: (1) negotiation and renegotiation with gatekeepers about the nature of the fieldwork to be completed and (2) actual physical entry into the field to commence data collection. The terms negotiating entry or gaining access imply according to Bogdan & Biklen (1992) and Glesne & Peshkin (1992), that this is a single event that, once accomplished, requires no further consideration. However, these terms appear to lessen the persistent negotiation and renegotiation of the researcher’s relationship with those studied. Conceptualising the relationship in terms of rapport is according to Seidman (1991), also challenging because it treats the relationship as a single constant variable, rather than stressing the nature of the relationship.

The two elements of negotiation and renegotiation are closely related, for negotiations with gatekeepers will establish the rules and conditions for how one goes about playing the role of observer and how that role is defined for the people being observed (Burgess 2000, Patton 2002). Gatekeepers are those individuals in an organisation that have the power to grant or deny access to people or situations for the purposes of research (Lofland & Lofland 1995, Burgess 2000, Mason 2002). In this study, initial contact with the gatekeeper was instigated informally by the researcher via face-to-face contact as the researcher was known professionally to the gatekeeper. The researcher was very conscious of the fact that building trust and rapport with this gatekeeper was a necessary step in gaining entry into the field setting. Rapport comes slowly in most field research, even then, it may be tentative and fragile (Taylor & Bogdan 1984). Moreover, fieldworkers are most likely to be successful in their quest for access if they enter negotiations armed with connections, accounts, knowledge, and courtesy (Lofland & Lofland 1995).

Access could not be negotiated on a single occasion, but involved negotiation and renegotiation in different phases of the research process with different members of the critical care complex. Initially, the researcher negotiated with the gatekeeper (senior manager) by requesting permission to observe the ventilated patient in the immediate phase post cardiac surgery, while the nurse participant simultaneously talked aloud at the bedside of this patient participant. Anonymity and confidentiality were discussed at this point. Even at
the point of access, the researcher should be able to give some indication of the different ways in which the research results will be used, for it is important to be able to assure the gatekeepers and participants that the organisation and the real names of individuals will remain confidential (Bogdan 1972, Burgess 2000). The code that you are going to live by in this regard should be made clear to all participants from the start (Bogdan 1972), with explicit or implicit assurances that the researcher will not violate participants’ privacy or confidentiality, expose them to harm, or interfere in their activities (Taylor & Bogdan 1984).

The senior manager was prepared to facilitate the researcher’s access to the critical care unit, but made several suggestions. Firstly, she would discuss the project with the first line managers. Secondly, she recommended that the researcher should establish daily contact with managers to ascertain the feasibility of simultaneously observing the patient while the nurse was thinking aloud at the bedside in such a dynamic, high-technology environment. Thirdly, the senior manager explained that while she did not personally have any opposition to the researcher observing the patient while the critical care nurse talked aloud, she required that the managers have the right of veto over whether the nurse or patient could participate at that particular time, which realistically depended on the patient’s haemodynamic status. She requested time to consider the idea of the research project with the first line managers. The arrangement was that the researcher would contact her within two weeks. Subsequently, the senior manager contacted the researcher to say that the project could proceed and that a meeting had been arranged with the managers of the critical care unit in order to discuss the research process. However, the senior manager emphasised that if any unforeseen problems arose, she reserved the right to pull the plug on the project. The negotiation of access, while being fundamental to the research process, can also reveal to the researcher the pattern of social relationships at a research site (Burgess 2000).

Techniques employed by the researcher to disseminate information and gain participation in the critical care unit included attending meetings with senior management and staff at all levels to explain the study, wearing a name pin, making newcomers aware of her identity, and posting a flier about the study in the critical care unit and the staff room bulletin board. The researcher met with all of the managers and explained the project in some detail, being mindful not only of any suggestions made by the managers, but also retaining a heightened awareness that they could hinder or facilitate entry into the field. In addition, information sessions that did not reveal the subtleties of the entire project were conducted in the unit where the think aloud and observations were to take place; these were intended to inform health care professionals about the research. The disclosure of the research is handled by the researcher by presenting general information not specific information, about the study (Creswell 1998). Roth (1970) stated the case most concisely by saying all research is secret in some ways and to some degree we never tell the subjects everything. However, it is nonetheless advisable to provide an account that is as straightforward as you can make it (Lofland & Lofland 1995). Secrecy in research is not something to be avoided or something that can be avoided, it is rather a problem to be faced as an integral part of one’s work (Roth 1970). The researcher was mindful of Taylor & Bogdan’s (1984) advice: the approach should be truthful, but vague and imprecise.

Potential nurse participants were then approached to obtain individual consent for participation in the study. Written consent (see Appendix IV) was obtained and a
demographic questionnaire (see Appendix V) was completed by nurse participants. Getting in involves more than getting permission from gatekeepers, it also involves contacting others and seeking their cooperation (Bogdan 1972). Considerable emphasis was placed on the confidential nature of the recorded observations and subsequent transcripts. This process was the start of a very regular, daily route with managers, nurses and members of the multidisciplinary team, where explanations were regularly sought and provided on the researcher’s presence in the critical care unit. It would be an error in dealing with the way into the field to think in terms of a fixed boundary, the crossing of which provides the researcher with an open and unrestricted view of the interior of the field (Wolff 2004). Furthermore, the researcher ascertained from the managers the most appropriate dress code to be worn by her in the field setting.

The nurse participants had many questions about exactly what the researcher hoped to find at the end of the project. Perhaps the most important initial task of the overt participant in seeking to establish field relations is to overcome people’s prejudices about you and the research (Jorgensen 1989). The researcher attempted to deal with their questions openly and directly, emphasising that she was observing the patients’ behaviours and in no way was she analysing the nurses’ behaviour. Furthermore, the researcher emphasised that the research project was invaluable for critical care nursing in general and for patient care. Moreover, the researcher reassured each participant that their cooperation was voluntary, that their identity would remain anonymous, and that any information they provided would be confidential. Finally, contact is facilitated when participants and respondents view the research purposes as valuable or at least harmless and the researcher’s motives as benign (LeCompte et al. 1993).

3.6.3 The Preparatory Phase: Think Aloud

This study used the verbal protocol technique as a means of capturing how critical care nurses make a judgement that the ventilated patient is in pain in the immediate phase after cardiac surgery. Since concurrent verbal reports are held to be a more valid and reliable source of the internal cognitive processes taking place than retrospective reports (Ericsson & Simon 1984, 1993), it was decided to use this form of verbalisation as the data base of this research study on critical care nurses’ judgement policies. Concurrent verbal reports from thirty critical care nurses in real everyday practice situations were collected to capture how they made a judgement that the ventilated patient was in pain in the immediate phase after cardiac surgery.

Each nurse participant was first familiarised with the think aloud procedures of Ericsson & Simon (1984) and with the characteristics of the task. Prior to the primary task and under the guidance of the researcher, each subject was given an opportunity to practice thinking aloud during a brief training period of approximately fifteen minutes. Some participants were very nervous in the initial few minutes. The researcher explained to the nurse participants that the aim of the warm-up session was to allow them to talk aloud under circumstances in which it was comparatively easy and to ensure that each participant talked aloud. The procedure with each nurse participant followed this format: ‘Before I turn to the real task, I will start you with a practice task. I want you to talk aloud while you do this task.’ The researcher presented each participant with the same activity, i.e. preparation of the
bedside space. The instruction from the researcher was clear: 'Please keep talking out loud as you prepare your space for receiving the ventilated patient.' This activity was chosen as it is part of the critical care nurse's daily routine in preparation for any impending admission to a critical care unit. There is no indication in the literature of what constitutes an appropriate training task, despite the recommendation that training is essential prior to the main task. Some training of subjects is probably wise, since thinking aloud while performing a cognitive task is not a frequently practiced skill (Shulman & Elstein 1975, Ericsson & Simon 1984). A little training will help people to become more fluent, but differences remain, even after training (Van Someren et al. 1994). During the warm-up session, nurse participants carried a small portable tape-recorder in their pocket, and wore a voice-activated microphone on their lapel.

This practice session gave the nurse participant an opportunity not only to become familiar with thinking aloud, but also to become secure with the microphone and tape-recorder. In addition, it provided the researcher with an opportunity to train the subject to adhere to verbalising their thoughts and not to interpret their thoughts. Beside that, the researcher checked the equipment regularly during the session, as inconspicuously as possible. An important outcome of this process was that, occasionally, a nurse participant instinctively turned off the tape-recorder when other health professionals were present. The researcher had not anticipated this scenario. During the training session, the role of the researcher was a reserved one. Intrusion only occurred when the nurse participant stopped talking. Then, and then only, did the researcher prompt the subject by just saying: keep talking. Following each training session, the researcher asked each nurse participant if there were any implicit difficulties with the process. Each nurse participant stated that once the process of talking aloud started, their self-consciousnesses abated and the training session was helpful. For most people, speaking their thoughts out loud becomes routine in a few minutes (Van Someren et al. 1994).

3.6.4 THE PRIMARY PHASE: THINK ALOUD

The primary phase of data collection involved taping the nurse participant while she was thinking aloud during a six-hour period of care of a critically ill ventilated patient post cardiac surgery. This six-hour period commenced immediately with the patient's arrival from the operating room to the critical care unit following cardiac surgery and ended when the patient was weaned from the ventilator approximately six hours later. The nurse participants continued the care of their patient as they would under normal circumstances, interacting with both the patient and other members of the health care team. During data collection in the clinical setting, nurse participants carried a small portable tape-recorder in their pocket, and wore a voice-activated microphone on their lapel. In addition, nurse participants were requested not to stop the tape at any time without informing the researcher.

The nurse participant was asked to think aloud and to provide an ongoing record of her care for the ventilated patient in the immediate phase after cardiac surgery. The researcher provided an explanation about the purpose of the research, about what was going to happen and about the protection of the data. Emphasis was also placed on the fact that the critical care nurse could terminate the data collection process at any time once they communicated that wish to the researcher. If the nurse indicated at any time, or felt that the patient was
becoming agitated by the constant talking, data collection would be terminated immediately by the researcher. The talking aloud was not dissimilar to the bedside activity in critical care units and for that reason, it was not anticipated that would be a problem for the sleeping ventilated patient. Another concern of the researcher regarding the execution of talking aloud in the natural setting was the possibility of disruption to care. The concern that data collection such as think aloud in the natural setting would compromise patient care has not been borne out in some studies (Aitken & Mardegan 2000, Thomas & Fothergill-Bourbonnais 2005). This finding is not congruent with some authors (Jones 1989, Greenwood & King 1995).

Areas of thinking aloud that the critical care nurse participant felt that the patient should not overhear, or that had the potential to be upsetting to the patient, were described away from the bedside, at the site where documentation and multidisciplinary discussions took place. If family members were visiting the patient at any time during data collection, the tape was discontinued and recommenced once the visit was completed. The decision to stop the think aloud process was controlled by the critical care nurse, who was well placed to know and understand the patient and family and if this occurred, it was communicated to the researcher. The researcher again emphasised that her interest was in how critical care nurses care for the critically ill ventilated patient in pain in the immediate phase after cardiac surgery. In addition, the researcher explained that the data would be handled in strict confidence: each transcript would be given a numerical code and would not contain the name or any identifying information thus, ensuring their anonymity, and the name of the institution would not be disclosed. Confidentiality should be negotiated with organisations at the time of contracting and the issue should be open for review along the way (Stake 2004).

The instructions for thinking aloud were clear, simple and specific. During the data collection period, each participant was asked to think aloud. Thinking aloud during this judgement task required the participant to keep talking and to speak out loud whatever thoughts came to mind while performing the task at hand. The instruction to verbalise provides a direct trace of the heeded information, and hence, an indirect one of the internal stages of the cognitive process (Ericsson & Simon 1980). The essence of the instruction, for the think aloud format is described herewith in detail. In this study, the researcher is interested in what you say to yourself as you care for the ventilated patient in pain in the immediate phase after cardiac surgery. Therefore, I will ask you to talk aloud as you care for the patient at the bedside. Please keep talking out loud while you are caring for the ventilated patient in pain in the immediate phase after cardiac surgery. What I mean by talk aloud is that I want you to say out loud everything that you say to yourself silently. Just act as if you are alone in the unit, speaking to yourself. If you are silent for any length of time, I will remind you to keep talking aloud. Do you understand what I want you to do? The researcher ensured that there were no interruptions or suggestive prompts or questions as the nurse participant was encouraged to give a concurrent account of her thoughts; to avoid interpretation or explanation of what she was doing, she just had to concentrate on the task. According to Ericsson & Simon (1993), in general, thinking aloud does not interfere with, or significantly modify, task performance provided that think aloud instructions are bland and do not direct the subject to produce specific kinds of information, and the instructions are given in such a way that the subject assigns first priority to performing the task.
The request for a certain type of information may serve as a hint to subjects about what aspects of the task are important, which may affect the subsequent behaviour of participants. In addition, subjects may also alter their normal mode of processing in order to be able to give the requested information to the researcher (Ericsson & Simon 1980), thus invalidating the protocol (Carroll & Johnson 1990). More importantly, the verbal probe may be constructed to induce the subjects to generate information specifically relevant to the hypotheses under consideration and to guard against subjectivity during analysis (Ericsson & Simon 1984). Nevertheless, in order to facilitate subjects’ retrieval of the required information from memory and to induce greater completeness of the verbal reports, in this study, the verbal probe contained relevant information, i.e. as you care for the ventilated patient in pain. The researcher was interested in particular aspects of the subjects’ behaviours, i.e. in capturing how the critical care nurse makes a judgement that the ventilated patient is in pain in the immediate phase post cardiac surgery. Besides, the researcher was intensely aware that the nurse participants in the study setting were very conscious of her interest in pain, which had spanned many years.

At the concurrent think aloud report the researcher was present throughout, out of direct vision of the nurse participant whenever possible and the researcher interjected only to urge the nurse subject to keep talking if she was silent for longer than thirty seconds at a time, as recommended by Ericsson & Simon (1993). Reminders to verbalise of the keep talking variety should have a very small, if any, effect on the subject’s processing; however, a reminder of the type what are you thinking about? is more likely to elicit a self-observation process or produce an other-oriented description as a response (Ericsson & Simon 1984, p.83). Prompting was rarely needed in this study of concurrent verbal reports. In addition, the critical care nurses in this study appeared at ease and did not report any disruption to care during the process of thinking aloud.

3.6.5 THE CLOSING PHASE: THINK ALOUD DATA COLLECTION

On completion of the protocol, the tape was switched off and a debriefing session occurred to ensure that no participant was anxious about the process. All the nurse participants expressed an enthusiastic interest in the study and each nurse participant hoped that, in some way, they had contributed to the research project. No effort was made to interview the critical care nurses concerned because the focus was upon how they made a judgement in the real setting, rather than upon what they thought about what they did at the bedside. Besides, the researcher gathered firsthand information by observing the patient pain behaviours simultaneously with the critical care nurse participants think aloud data to assist with the interpretation of the think aloud data.

During the debriefing session, which lasted approximately five minutes, an overview about the aims of the research were given again, with some explanation of the way in which the protocols would be transcribed. Some participants asked if the tape-recordings would be played back to other nurses. The researcher assured each participant that the tapes would be used for research purposes only. In addition, the researcher emphasised that the tapes would be transcribed by the researcher within ninety-six hours and destroyed. The researcher was conscious that transcribing think aloud data from audiotapes would be a time-consuming activity. Furthermore, no transcript would include any personal details of any participant.
3.6.6 DEVELOPING THE CODING GUIDE: THINK ALOUD DATA

Coding is the process whereby raw data are systematically transformed and aggregated into units which permit precise description of relevant content characteristics (Holsti 1969). Categories are the classification by which the coding units are placed. Besides defining the categories into which content data are to be classified, the analyst must select the units to be coded. The coding unit in this study has been identified as a word in a segmented protocol in each transcript. The coding unit is placed into a category by inferences drawn from its meaning in context (Carney 1972). The context unit may be a sentence, or even larger, such as a paragraph. The context unit which gives meaning to the coding unit is a paragraph which incorporates a decision by the critical care nurse, subsequent to her judgement of the patient’s pain state. Context units are units of textual matter that set limits on the information to be considered in the description of coding units (Krippendorff 2004).

Some of the coding sensitising categories which related to the testing of the tentative hypothesis were determined from the literature on judgement analysis and post-operative pain cues a priori of analysis of the verbal protocols. The most important requirement of categories is that they must adequately reflect the investigator’s research question (Holsti 1969, Krippendorff 2004). The process of developing sensitising categories was possible because each protocol was to be scrutinised via content analysis for the presence or absence of a pattern of cues suggestive of how critical care nurses make a judgement (judgement policy) in the context of the ventilated patient in pain. Sensitising concepts give the user a general sense of reference and guidance in approaching empirical instances (Bulmer 1979).

The process which would indicate the critical care nurses’ judgement policy was: the utilisation of cues and cue pattern which were identified, and categories were defined that would capture them in the analysis of the protocols. Categories should not only reflect the purposes of the research. They should also be inclusive enough to hold all the appropriate items together and cover the entire array of issues pertinent to the inquiry in order to suit the subject matter. In addition to sensitising categories, indigenous categories which were created by the participants in the actual protocols, were incorporated into the coding guide. The coding guide developed for the think aloud data is presented in Appendix II. An analyst can check on the reliability of his/her assessment of items and categories by having someone else redo a part of the categorisation independently (Carney 1972).

3.6.7 INTER-CODER RELIABILITY THINK ALOUD CODING GUIDE

There is growing acknowledgement in the research literature that the establishment of inter-coder reliability is vital and a necessary criterion for valid and useful research when human coding is employed. Experience with segmentation has shown that there generally exists a high level of agreement between people asked to segment a written protocol while listening to it, however, segmentation becomes more difficult and less reliable when it is done on the basis of the written text only (Van Someren et al. 1994).
In the analysis, segments are often combined into episodes. Before the coding template was applied to the segmented protocols, consistency between codes assigned by two independent coders to the same data was sought. Reliability can be defined as the extent to which a measuring procedure yields the same results on repeated trials. Inter-coder reliability is the amount of agreement, or correspondence, among two or more independent coders. If agreement, or correspondence, i.e. inter-coder reliability, is low between two coders, this means that the coding scheme is ambiguous (Van Someren et al. 1994).

The process for establishing the reliability of the think aloud protocols was based on three entire segmented protocols and two coders. Subsequent to the transcription and segmentation of the think aloud protocols, three entire protocols, which comprised 1,500 segmented protocols in total, were presented to the independent coder. The protocols were encoded with their contextual information, where the preceding and succeeding segments were displayed and presented to the independent coder. The formula used for inter-coder reliability was an agreement-based coefficient, providing beyond-chance indicators, known as Scott’s pi (1955), which, in correcting for the role of chance agreement, uses a joint distribution across two coders. This takes into account not only the number of categories, but also how these categories are utilised by the coders. According to Krippendorf (1980), who refers to Scott’s formula, it is important to note that when the number of coders is exactly two, the categories of the variables are unordered (nominal scale) and the sample size is very large, then our agreement coefficient equals Scott’s (1955) pi:

\[
\pi = 1 - \frac{\text{100} - \% \text{ of observed matches}}{\text{100} - \% \text{ of expected matches}}
\]

In this study, the population distribution is well defined since it was based on 10% of the data, i.e. three entire transcripts comprising of 1,500 segmented protocols in total. The agreement coefficient, alpha, was calculated using Scott’s (1955) pi. The statistic’s normal range is from .00 (agreement at chance level) to 1.00 (perfect agreement), and a value of less than .00 indicates agreement less than chance (Neuendorf 2002). The inter-coder reliability was calculated using three segmented think aloud transcripts, which comprised 1,500 segmented protocols. The agreement coefficient, alpha, was 0.84 for the first tape, 0.87 for the second tape and 0.90 for the third segmented transcript, which was considered to be a very acceptable level of inter-coder reliability. Achieving a satisfactory level of inter-coder reliability is important to provide basic validation of a coding scheme: that is, it must be established that more than one individual can use the coding scheme as a measurement tool with similar results. As Tinsley & Weiss (1975) remark, it is important to demonstrate that the obtained ratings are not the idiosyncratic results of one rater’s subjective judgement.

In summary, think aloud data was the primary data collection method, which necessitated a process of gaining access, ethical considerations, a preparatory phase, a primary phase and a closing phase, followed by the development of a coding guide phase, which necessitated the establishment of inter-coder reliability. Conversely, a similar process
for collecting observation data was adhered to; this is described in detail in the following section.

3.7 COLLECTING THE CASE STUDY EVIDENCE: OBSERVATION DATA

In order to capture the phenomenon of interest i.e. the critical care nurses’ judgement policy in the context of the ventilated patient in pain, the researcher also observed the ventilated patients’ pain behaviours in the immediate phase post cardiac surgery. The process is discussed below.

3.7.1 AIM OF THE STUDY

A secondary aim of the study was to describe how the ventilated patient in a critical care unit in the immediate phase post cardiac surgery convey their pain state to the critical care nurse. It was anticipated that the ventilated patient in the immediate phase post cardiac surgery at the bedside might transmit a pattern of cues of their pain state to the critical care nurse. In addition, it was anticipated that ventilated patients in the immediate phase post cardiac surgery might convey similar cues to critical care nurse of their pain state.

3.7.2 SAMPLE PATIENT PARTICIPANTS

The patient sample selected were adult patients (n=30) who underwent median sternotomy for conventional on-pump coronary artery bypass surgery (CABG) and fulfilled selection criteria to minimise the heterogeneity of the sample and to ensure proper data collection. The criteria included: adult intensive care patients over 18 years of age, who were mechanically ventilated following elective conventional on-pump CABG. The patients arriving in the 32-bed cardiothoracic ward of a 570-bed tertiary care hospital were screened daily prior to cardiac surgery to identify a patient most likely to meet the inclusion criteria. In addition, daily visits were undertaken by the researcher in the critical care unit to ensure that the patient participant met the inclusion criteria perioperatively as some of the exclusion criteria could manifest only at this time. Patients were excluded if they had previous cardiac surgery, or required a ventricular-assist device, an intraaortic balloon counterpulsation, difficulty separating from bypass, organ system failure, neurologic dysfunction, emergency surgery or any significant perioperative event which might delay extubation. In addition, any patients who received spinal morphine, or who were receiving continuous intravenous morphine by infusion, were excluded. The demographic data (gender and age) of patient participants is presented in Tables 3.6 and 3.7 (see Appendix IXA).

The age of patient participants ranged from 47 to 81 years. The mean was 62.1 years and a median of 62 years while 56.6% (n=17) were male and 43.4% (n=13) were female (see Tables 3.6 and 3.7 in Appendix IXA). In addition, a detailed description of the perioperative characteristics of the patient sample is presented in Appendix IXB.

3.8 THE METHODOLOGY OF RESEARCHER OBSERVATION

Fieldwork is the central activity of naturalistic inquiry. Going into the field means having direct and personal contact with the people under study in their own environments — getting close to the people and situations being studied to personally understand the realities
and minutiae of daily life (Patton 2002). The naturalistic penchant for direct observation and apprehension of the social world reflects a certain epistemology: (1) that face-to-face interaction is the fullest condition of participating in the mind of another human being; and (2) that you must participate in the mind of another human being (in sociological terms, take the role of the other) to acquire social knowledge (Lofland & Lofland 1995, p.16). The main goal was to collect the richest possible data through direct, close and prolonged immersion in the situation. The more intrinsic the case study is, which is pertinent to this study, the more attention needs to be paid to the context. The development of vicarious experiences for the reader, to give them a sense of being there, necessitates that the physical situation should be well described, i.e. the uniqueness and the ordinariness of the place (Stake 1995).

Observation... allows the researcher to see the world as their subjects see it, to live in their time frames, to capture the phenomenon in and in its own terms, and to grasp the culture in its own natural, ongoing environment ...and to build on tacit knowledge, both his/her own and that of members of the group (Guba & Lincoln 1981, p.193). According to Yin (2003), such a perspective is invaluable in producing an accurate portrayal of a case study phenomenon.

The choice of fieldwork in this study, i.e. observation of patients’ pain behaviours was utilised to add new dimensions to understanding how critical care nurses make a judgement in the context of the ventilated patient in pain in the immediate phase after cardiac surgery. More importantly, it was hoped that the researcher’s observations of patients’ pain behaviours would provide a check on what was reported by nurse participants in the think aloud data. The researcher’s commitment is to understand the world as it unfolds, to be true to complexities and multiple viewpoints as they emerge, and to be balanced in reporting both confirmatory and disconfirming evidence with regard to any conclusions presented (Patton 2002).

3.8.1 VARIATIONS IN ROLES: PARTICIPANT OR RESEARCHER OR BOTH

A major differentiation has been made between active and passive roles, open and closed roles, and known and unknown participant observers. Despite alleged discrepancies in the literature between the various roles, the essential typology was conceptualised by Gold (1958), based on Junker’s suggestion of four theoretically possible roles for sociologists conducting field work: complete-participant, the participant-as-observer, the observer-as-participant and the complete observer. Therefore, the complete-participant hides the observer dimension of the role, with the result that covert observation is involved, while the participant-as-observer role absorbs situations in which the researcher participates as well as observes by developing relationships with the participants. The third role referred to by Gold (1958) is observer-as-participant, which is used to refer to situations where contact is brief, formal and overtly classified as observation. Finally, the complete-observer-role is identified as eavesdropping and reconnaissance in which the researcher is removed from sustained interaction with the subject (Burgess 2000).

The idea of taking a role oversimplifies the situation, for Junker (1960) argues that while it is made to appear that the four roles can be sharply distinguished and that the fieldworker will find himself cast in one and only one position, with its opportunities and limitations as indicated, ‘the practising field worker may well find his position and activities
shifting through time from one to another of these theoretical points, even as he continues observing the same human organisation' (Junker 1960, p.38). Several writers agree that the extent of participation may alter as the study progresses (Schwartz & Schwartz 1969, Jorgensen 1989, Adler & Adler 1998, Burgess 2000, Darlington & Scott 2002, Patton 2002, Luders 2004). Furthermore, the performance of multiple roles offers the distinct advantage of providing access to different perspectives (Jorgensen 1989) and sensory accounts of phenomena as they occur in real-world settings (LeCompte et al. 1993).

Another classification is portrayed by Gans (1971) in terms of the fieldworker's emotional relationships to the subjects: total-participant, the fieldworker who is completely involved emotionally in a social situation and, who, only after it is over becomes a researcher again and researcher-participant, who participates in a social situation, but is personally only partially involved, so that (s)he can function as a researcher. Methodologically, the test is to do justice to both perspectives, i.e. a participant observer shares as intimately as possible in the life and activities of the setting under study in order to develop an insider's view of what is happening, the emic perspective, while describing it to, and for, outsiders.

The researcher chose the role of researcher-observer in order to capture a comprehensive account of the ventilated patients' pain behaviours in the immediate phase post cardiac surgery, which required a detached, neutral and unobtrusive position. The researcher was mindful of LeCompte et al.'s. (1993) viewpoint that concentrating on observation reduces the ability to participate well, while participating fully in events can interfere with the scope and depth of observations. In order to achieve minimal involvement in the setting, the researcher situated herself at the left-hand side of the patient, out of the direct vision of the critical care nurse participant. The researcher's objective was to focus on the naturally occurring pain behaviours of ventilated patients' pain behaviours in the immediate phase post cardiac surgery and record the behaviours as they occurred, without seeking any clarification of any of the behaviours observed. The derived meanings of the pain behaviours will be triangulated with the think aloud data protocols of the critical care nurse participants.

**3.8.2 Data Collection Phase: Researcher Observation**

The researcher visited the ward daily to identify potential patient participants in liaison with the ward manager. Each potential patient participant who met the inclusion criteria was then approached the evening prior to their elective cardiac surgery before arrangements were made for the observation to take place. Patients were given written (see Appendix VI) and verbal information about the study and were advised that they could decline involvement without explanation and with no penalty to their medical or nursing care. Each patient completed a demographic data sheet, which is presented in Appendix VII, and signed a consent form (see Appendix VIII) prior to becoming involved in the study. No patient declined to participate. The day and time was agreed with each potential patient, i.e. the six hours immediately on their arrival to the critical care unit from the operating theatre. Subsequently the researcher visited the critical care unit to discuss the potential patient with the critical care nurse manager.
The morning of surgery, the researcher checked in again with the manager of the critical care unit to clarify the approximate time for the patient’s arrival to the critical care unit. The researcher returned to the critical care unit to await the patient participant pending admission. The manager of the critical care unit ascertained with the consultant anaesthetist and cardiothoracic surgeon the patient’s haemodynamic status in theatre before the researcher commenced the observation period. During the observation period, the researcher was on the left-hand side of the patient, ensuring that the activity and interactions of one patient formed the focus of each observation session. In addition, the researcher was also attentive of the nurse participant who was talking aloud during this observation period. During data collection, the researcher carried a small portable tape-recorder in her pocket, and wore a voice-activated microphone on their lapel.

The researcher spent an entire six hours with each ventilated patient in the immediate phase after cardiac surgery to capture their pain behaviours. The investigator was a researcher-observer in a field where members were health professionals like herself. The researcher declared emphatically that she was not a staff member of the unit, nor an educator or assessor on the unit. She was aware that her presence in the field might affect the behaviour of those being observed, especially as the team was aware of her health professional background, which could impact on her data, even though she no longer practiced directly in critical care. According to Silverman (2005), the presumption that any researcher enters a field without past experience or some pre-existing ideas is unrealistic. The researcher entered the field in the knowledge, be it a tacit assumption on her part, that a certain amount of professional reserve would be unavoidable, which was accepted as a necessary course in terms of access.

At the outset, the researcher strived to blend into the setting and particular situations, carefully watching and listening to what transpired, so as to become familiar with the landscape and the insiders’ activities. Glesne & Peshkin (1992) described exemplary entry behaviour, urging researchers to be as unobtrusive and as interesting as wallpaper. The researcher cannot assent that she was treated as part of the furniture by the staff – possibly because of her critical care practitioner background. In addition, the researcher wore a microphone on her lapel, with a pocket tape-recorder, which must be presumed to have altered somewhat the way the data unfolded. The use of mechanical equipment for general observation often makes subjects uncomfortable, resulting in stilted or unnatural behaviour (Le Compte et al. 1993). Overt and covert note-taking during observation frequently gives rise to reactive effects similar to those created by mechanical recording (Strauss et al. 1964). However, the researcher was aware of feeling more accepted as the fieldwork progressed. In this sense, her past experience as a critical care nurse was in no way disadvantageous to her present role as researcher-observer.

Participants may behave in some atypical fashion when they know they are being observed, and the selective perception of the observer may distort the data (Patton 2002). In response to criticism regarding the researcher’s effect on the subject’s behaviour, again it might be said that all forms of research manipulate subjects in situations or use instruments that undoubtedly affect behaviour as much as the observer in the field (Webb et al. 1966, Bogdan 1972). According to Bogdan & Biklen (1998), researchers can never eliminate all of their own effects on subjects or obtain a perfect correspondence between the natural setting
(what they wish to study) and a setting with the researcher present (what they actually study). They recommend that an intimate knowledge of context can help researchers to gain an understanding of their reactivity on subjects.

The possibility of the researcher modifying and influencing the research context, as well as being influenced by it themselves, raises a series of common problems about the influence of the researcher on the researched. The researcher must acknowledge that their research and writing cannot be divorced from their past experiences, values and beliefs. However, so called objectivity and distance vis-a-vis the field setting will usually result in a failure to collect any data that are worth analysing (Loftand & Loftand 1995, Loftand et al. 2006). The past, present and even the future exert their influences on us as observers (Wolcott 1994). The researcher attempted to remain open to the research experience and have her thinking informed by the data, and vice versa, in order to understand the people who inhabit the setting.

Patton (2002) proposes the phrase ‘emphatic neutrality’, suggesting there is a middle ground between becoming too involved which can cloud judgement, and remaining too distant, which can reduce understanding. Neutrality does not mean detachment. Neutrality can actually facilitate rapport and help build a relationship that supports empathy, by disciplining the researcher to be open to the other person and non-judgemental in that openness (Patton 2002), providing the researcher with an empirical basis for describing the perspectives of others. It is important for the researcher not only to be accommodating, but also to be non-threatening in the world of the constructors.

The researcher was constantly aware of attempting to achieve an impression of acceptable incompetence and to adhere to Loftand & Loftand’s (1995) suggestion that for a naturalistic researcher who is a non-threatening, non-judgemental learner, the rewards of information received can be considerable. Furthermore, an understanding of the native language is essential if the researcher is to comprehend the way of life in a social setting (Burgess 1991). Other fieldworkers recommend that researchers genuinely assume a stance of naiveté, one which approximates the relationship of novice to expert (LeCompte et al. 1993). The researcher attempted to play down her knowledge at the bedside, emphasising her neutrality by insisting that it was the nurse participants who had the information and expertness, not the researcher. Revealing competence and knowledge can also set the observer in the role of expert, which might threaten subjects or might make him/her someone who they come to for expert technical advice (Bogdan 1972). The too-familiar landscape demands that the researcher scrutinise the flat terrain for bumps that otherwise may be overlooked. Moreover, in familiar settings, researchers may experience an overwhelming urge to evaluate them, rather than to observe in them (Wolcott 1994).

3.8.3 THE CLOSING PHASE OF OBSERVATION DATA COLLECTION

There comes a time when it is appropriate to leave the field (Loftand & Loftand 1995). The researcher organised her departure from the setting and from the relationships she had built over twelve months. The researcher was always on the alert for signs of tolerance and acceptance. These signs were very subtle: some of the acceptance was evident on the think aloud audiotape which relayed comments by the participants and their colleagues, i.e. ‘you
on candid camera today, oh good for you; ‘be careful, it is all on tape there’; ‘she is doing research on nurses and stuff, pain relief and dealing with patients’; ‘are you going to the academy awards next week with your tapes, you should you know’. From the researcher’s perspective, a feeling that the researcher observation was becoming routine and ordinary increased stealthily over the concluding weeks of the project. Over the course of the fieldwork, the researcher compiled a large database of seminal pain research literature which formed an extensive file, which was bound subsequent to copyright clearance and presented to the unit on completion of the study. In addition, a token to augment a nursing library in the unit was also presented by the researcher to the staff in appreciation for their participation. In addition, the researcher visited with each patient participant prior to their discharge from hospital.

3.8.4 DEVELOPING THE CODING TEMPLATE: OBSERVATION DATA

There is some opposition to simply going out into the field and inducing observations. Mason (2002) discards the proposition that qualitative research can just describe or explore the social world. As Miles & Huberman (1984) indicate, fuzzy research can be a recipe for disaster: the looser the initial design, the less selective the collection of data therefore, everything looks important at the outset to someone waiting for the key constructs or regularities to emerge from the site, and that wait can be a long one. Moreover, such a purely inductive approach can be blind to the need to build cumulative bodies of knowledge (Silverman 2005).

In the field, the observer must, by some means, sort the multifaceted stimuli experienced so that observing becomes not only manageable, but also meaningful. The researcher did not enter the field with a blank slate. The researcher developed an observation coding template (see Appendix III) prior to entry into the field using sensitising concepts from literature and the researcher’s pre-existing knowledge to act as an aide memoir. While the inductive nature of naturalistic inquiry emphasises the importance of being open to whatever one can learn, some way of organising the complexity of the experience is a prerequisite for perception itself (Patton 2002). Subsequent to the development of the observation coding template, the researcher sought the opinion of eight critical care nurses recognised for their cardiothoracic experience (face validity). The eight critical care nurses’ who had a mean of 6.2 years experience in a cardiothoracic critical care unit not in the vicinity of the current study, participated in a one-hour session with the researcher to establish face validity of the observation coding template. Face validity refers to whether the instrument looks as though it is measuring the appropriate construct (Bryman 2004, Polit & Beck 2006). The purpose of the one-hour session was to read the observation coding template and to discuss the content in terms of whether it appeared to reflect the concept the researcher intended to capture, i.e. ventilated patients’ pain behaviours in the immediate phase post cardiac surgery.

The discussion points were integrated as pain behaviours in the revised observation coding template prior to data collection. The changes incorporated the addition of patient-ventilator dysynchrony to include patient chewing on the endotracheal tube and patient fighting the ventilator in order to reflect a pain state. Another addition to be built in was overt attention seeking behaviours to reveal moving head from side to side and tapping bed with
one or two hands in order to echo the patient attempting to communicate their pain state to the nurse. Despite some discussion on the category behavioural general cue, there was a consensus that immobile posture was an essential cue which should be classified as a behavioural general cue.

Prior to data collection, the researcher pretested the coding template while observing two critically ill patients immediately post cardiac surgery not in the immediate environment of the current study. The researcher tape-recorded the field notes at the bedside. Subsequently, the observation coding template was applied to the transcribed text. There were no difficulties experienced with the process and the coding template required no revisions.

3.8.5 Reliability of Observation Coding Template

The reliability of the observation coding template was established using inter-rater reliability and intra-observer reliability. The consistency of the coding between the researcher (code-recode), and the researcher and the independent coder (between-coder), was measured on a sample of 10% of the data. The degree of agreement was calculated using Miles & Huberman's (1994) formula for field notes:

\[
\text{Reliability} = \frac{\text{Number of Agreements}}{\text{Total Number} + \text{Number of Disagreements}}
\]

The first calculation of inter-coder reliability was 80% with intra-coder reliability of 85%. In this instance, the researcher and independent coder discussed the process in-depth to clarify the disparity between both coders. Consequently, the researcher and the independent coder classified a set of uncoded field codes and achieved an inter-coder reliability of 88%. According to Miles & Huberman (1994), the initial inter-coder reliability with the above formula is usually 70%, with a higher code-recode reliability nearer 80%. The second calculation of inter-coder reliability, which was undertaken midway in the data on a coded set of field notes, was 86%, with intra-coder reliability 90%. The third calculation undertaken on a later set of field notes demonstrated inter-coder reliability of 90%, with intra-coder reliability of 93%. It is apparent from the above figures that the inter-coder reliability was very satisfactory throughout the study. The third calculation was in keeping with the view of Miles & Huberman (1994), who indicated that eventually both intra-intercoder agreement should be up in the 90% range, depending on the size and scope of the coding system.

In summary, the researcher’s aim was to observe the ventilated patients’ pain behaviours and to be attentive to the nurse participant thinking aloud, while causing as little disruption as possible. Moreover, the researcher was sensitive to the fact that researcher-as-observer can never be a total researcher. The balance was between spontaneous participation, without missing something as a researcher or jeopardising neutrality, which was a constant struggle. Reflection and introspection is an important component of naturalistic inquiry in order to observe the world as the participants conceive it. In addition, the researcher-observer
has to make judgements about what is worth noting, therefore selection is necessary. The development of the coding template was described here.

The process of analysis involves making sense of the data. This involves preparing the data for analysis, conducting different analyses and moving deeper into drawing meaning from the data, which is discussed in detail in the following section.

3.9 DATA ANALYSIS

This case study will provide a detailed description of each case and patterns within the case, called a within-case analysis, followed by a pattern analysis across the cases, called a cross-case analysis, as well as an interpretation of the meaning of the case.

3.9.1 WITHIN-CASE ANALYSIS

This layered analysis commenced with the individual critical care nurse’s judgement policy, followed by within-case analysis of the individual patient’s pain behaviours. Subsequently, cross-case pattern analysis of the individual critical care nurse’s judgement policy, in the context of the ventilated patient in pain in the immediate phase post cardiac surgery, was undertaken, followed by cross-case analysis of the patients’ pain behaviours. Though a scholarly project may consist of several cases and include cross-case comparisons, the analyst’s first and foremost responsibility consists of doing justice to each individual case, all else depends on that (Patton 2002).

Within-case analysis was undertaken to enable the researcher to scrutinise a single instance to allow for the unique patterns of each case to surface before the researcher progressed to generalised patterns across cases. The primary task of the intrinsic case study is to understand the case, therefore each text was analysed with a sense of correspondence. Two strategic ways that case study researchers reach new meanings about cases are through direct interpretation of the individual instance and through categorical aggregation of instances, until something can be said about them as a class (Stake 1995). The search for meaning in this study was a search for patterns or consistencies, taking things apart and putting them back together again, working toward descriptions and interpretations.

This case study utilised modified analytic induction to engage in within-case analysis and cross-case analysis in order to examine a preformulated hypothesis. Modified analytic induction begins with the analyst’s deduced propositions or theory-derived hypotheses and is a method for verifying theories and propositions based on qualitative data (Robinson 1951, Denzin 1978, Taylor & Bogdan 1984, Bogdan & Biklen 1992). This implies that qualitative analysis is initially deductive and then inductive, where the analyst begins by examining the data in terms of theory-derived sensitising concepts or applying a theoretical framework developed by another scholar. Subsequent to or in conjunction with, this deductive phase of analysis, the researcher examines the data again for undiscovered patterns and emergent understandings, i.e. inductive analysis. In this study, modified analytic induction, which is represented diagrammatically in Figure 3.4, afforded a specific form of inductive analysis which began deductively by formulating a proposition, while the researcher examined a particular case in depth to determine if the facts of the case supported the proposition.
Iterative Process

Proceed until analyst has adequately verified the hypothesis by examining, and re-examining a range of cases in search of generalisation (analytic)

When negative cases are discovered, modify the hypothesis

Actively search for negative cases that refute the hypothesis

If the hypothesis fits, another case is studied

Study a single case in-depth to determine if the facts support the hypothesis

Pre-formulate a hypothesis to explain that phenomenon (based on the data, other research, or the researcher's insight and tacit knowledge)

Develop a rough definition of the phenomenon to be explained

Cross Case Analysis

Within Case Analysis

Figure 3.4: Process Modified Analytic Induction
The researcher developed a tentative proposition prior to entry into the field to explain how critical care nurses make a judgement that the ventilated patient is in pain in the immediate phase post cardiac surgery. The objective was to test the proposition that critical care nurses use a pattern of cues to make a judgement that the ventilated patient is in pain in the immediate phase post cardiac surgery, which was derived from the literature on judgement analysis (policy-capturing studies) and acute post-operative pain, and to modify the proposition to fit in-depth accounts of critical care nurses’ judgement policies linked with researcher accounts of patients’ pain behaviours. The assumption was that the sensitising concepts from the literature, which the researcher brought to the data, and the indigenous concepts created by the participants to make sense of their world, would sensitise the researcher to tangible indicators and processes in the data related to critical care nurses’ judgement policies in the context of the critically ill ventilated patient in pain. Within-case analysis was undertaken, which may support the hypothesis, or the hypothesis may need to be revised. The procedure of trying to find a pattern was facilitated by a series of questions such as what does this mean, what does that mean? The core meanings established through content analysis are frequently called patterns. The process of searching for patterns may be distinguished as pattern analysis, where the term 'pattern' refers to a descriptive finding (Patton 2002). Recognition of patterns is facilitated by categorising the data, by coding it (Stake 2004). The following section will explore coding think aloud data followed by the observation data under similar headings.

3.10 CODING THE THINK ALOUD PROTOCOLS

The researcher’s task was to analyse the think aloud protocols so that the extensive collection of verbalisations were transformed into more meaningful representations of the nurse participants’ judgement behaviours. One of the major concerns raised by the use of protocol analysis is the lack of formal, objective methods for analysing complex verbal material (Joseph & Patel 1990). The steps within the process of the analysis of think aloud data are illustrated in Figure 3.5 and this is described in detail in the following section.

3.10.1 DATA MANAGEMENT AND PREPROCESSING

The protocols, i.e. raw think aloud audiotapes, were transcribed by the researcher into text. Transcribing offers another point of transition between data collection and analysis, as part of data management and preparation. This process afforded the researcher an opportunity to become immersed in the data, a chance to get a feel for the cumulative data as a whole. Subsequent to the initial transcription, the researcher verified the raw think aloud data by listening to the audiotape, while reviewing the transcript word by word. This was a time-consuming process as the noise in the background of each of the tapes was fairly substantial. This noise appeared to be created by the environment, technology, therapeutic interventions and personnel. During the process of transcription, all personal identifiers were removed and a participant code was assigned to protect confidentiality. The resultant transcripts were used in analysis.

Some concern is expressed in the literature relating to how much protocol content is transcribed or omitted. According to Van Someren et al. (1994), all verbalisations in total during the session should be transcribed: the thinking out loud of the subject, the instructions
Figure 3.5: The Process of Analysis of Think Aloud Data
and interruptions by the researcher and also the utterances by the subject which have no bearing on the problem-solving process at all. Some researchers transcribe intonations such as anger, animations, and anxiety. However, the reliability of observations of this type is very low, and people hear different things when listening to the same tape (Van Someren et al. 1994). Silences were represented by the word [pause] and question marks were avoided as it was not easy to be sure if the statements, in some instances, represented a question or a positive remark.

Transcribing each protocol verbatim was a lengthy activity. The key issue for the transcriber who in this study was the researcher, is to avoid unnecessary interpretation. However, the analysis of verbal protocols strongly depends on the interpretation of the researcher. Interpreting think aloud data is difficult and must be done vigilantly for the following reasons: participants may not verbalise everything they think and the task to think aloud may hamper the participant's natural behaviour, that is, the subject may feel obliged to use rational tactics. Crucially, verbal protocols may yield an enormous amount of data, which may be exceptionally difficult to interpret. The transcripts included exact verbalisations by each nurse participant. Each transcript was approximately thirty pages with approximately 9,000 to 12,000 words.

The production of a written transcript requires selection. During transcription, once the temporal information, repetitions, and stress have been used to segment and parse the verbal stream, most of this information is usually eliminated from the transcript, except as is captured by punctuation, which is referred to as preprocessing (Ericsson & Simon 1984). The Think aloud transcripts were read and re-read to get a sense of all of the transcripts. Subsequently, each transcript was re-read individually, on numerous occasions, to apprehend its essential features. This preliminary analysis continued with efforts to understand each transcript as a whole and, then, to develop a consistent approach to segmenting the data. Research on language production and language understanding shows that, in speech, the boundaries of phrases are usually marked by pauses (Ericsson & Simon 1993). These pauses and the linguistic structure were used to segment the think aloud protocols. When the segment is fragmentary, or contains pronouns, the context preceding and following segments may need to be consulted to remove ambiguity; the choice of context used is kept as narrow as possible (Ericsson & Simon 1984). The researcher began the segmentation of protocols by reading a participant's transcript several times. A set of symbols for identifying aspects of the verbal protocols were developed. For instance, 27 identifies the transcript segment, S16 identifies the case number and the pseudonym initial K differentiates the participant from colleagues, i.e. S16/27 K. An example of segmentation is given in Appendix I.

A major problem of this research was to reduce the data to a manageable size, while retaining the richness of the data in order to capture critical care nurses' judgement policies in the context of the ventilated patient in pain. In each case, it was found that segments occurring before and after the segment being encoded provided the most useful and insightful scaffolding to explain the activities which took place at the time of verbalisation, and further enabled the researcher to infer the cognitive processes which corresponded more to the participants' realities.
3.10.2 DATA REDUCTION, CONDENSATION AND COMPLICATION

At the next step, the preprocessed segments of the transcript were studied minutely, line by line, marked with notes to code the data. Coding is the process whereby raw data are systematically transformed and aggregated into units which permit precise description of relevant content characteristics (Holsti 1969). As part of the analytic process, data was coded via content analysis in order to be able to organise, manage, retrieve and make sense of the most meaningful bits of the data. A recent definition for content analysis was proposed by Krippendorff (2004, p.18): content analysis is a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use.

The coding guide was applied to each transcribed text. The units of analysis were pain cues, cue interpretation, and a judgement. In categorizing and encoding the segments, the researcher deliberately interpreted each segment in its context. The context, which was identified as a decision, was located initially. The rationale for choosing a decision was based on the assumption that a judgement was a precursor to a decision. Subsequent to the location of each context unit (decision), the researcher read and re-read the transcript backwards from a decision to locate the initial cue which appeared to instigate a judgement prior to the decision. Once the initial cue was located, the transcript was read onwards to the judgement and subsequent decision. This process continued throughout the entire segmented transcript of each individual nurse participant. The texts were marked up manually with marginal code words. The pain cues were also coded by type, i.e. physiological, mechanical, technical, general, covert, general behavioural, pain descriptor, paraclinical, knowledge or physical cue (see Figure 3.8). During coding, the researcher identified strategies to re-order the data in order to think about the data in different ways. Tesch (1990) observed that data reduction, such as coding, actually involves creating more, not less data.

The data was examined in depth in order to work out what fitted together and in order to look for repeated regularities in the data that would disclose patterns which could be classed into categories. This process was iterative, where the researcher was in constant dialogue with the data and the classification guide to corroborate the meaningfulness and precision of the categories and the placement of data in categories. Colour-coding using a colour highlighting pen was applied to each category. Symbols were applied to pain cue type. During this process, numerous questions were asked: What category does this occurrence indicate? What is actually happening in the data? Some authors conceptualise coding as data complication, where data is coded not only to reduce the data to some general denominator, but rather it can be used to expand, transform, and re-conceptualise data, opening up more diverse analytical possibilities (Coffey & Atkinson 1996).

The coding was frequently interrupted in order to write a memo. The researcher was conscious that analysis does not only emerge from the data but also from the perspectives the researcher holds, i.e. technical knowledge and personal experience. The utilisation of experiential knowledge should not be ignored because of the visual canons governing research (which regard personal experience and data as likely to bias the research), for those canons lead to the squashing of valuable experiential data (Strauss 2003, p.11). The initial notes in the margins were working notes which acted as reminders, such as do not forget this part and ideas that presented themselves during the initial reading of the transcripts, but,
fundamentally, it was thinking on paper, just to see where this piece and that piece would lead. Some memos were speculative, which stimulated the researcher to think about the data to find links with patterns, while the researcher engaged in continual dialogue with the data.

### 3.10.3 Data Transformation

Content analysis continued to search the transcribed text for recurring patterns. The core meanings established through content analysis are frequently called patterns. The process of searching for patterns may be distinguished as pattern analysis (Patton 2002). Once coding was achieved, the data was interrogated and systematically explored to generate meaning. The researcher created a display of the recontextualised data in order to read and think about the data. Data display is defined by Huberman & Miles (1998) as an organised, compressed assembly of information that permits conclusion drawing and/or action taking. The researcher created a display initially to help see patterns, followed by an extended display (see Appendix 1A) to highlight new relationships and explanations within the data. In essence, the codes and categories will be utilised to create pathways through the data which will lead to interpretation, otherwise referred to as data transformation.

### 3.11 Coding Observation Data

The coding of field notes followed a format of data management, data reduction, and data transformation which is discussed in the next section. The steps applied to the analysis of observation data are depicted in Figure 3.6; this is presented in detail in the following section.

#### 3.11.1 Data Management and Preparation

Field notes are the fundamental database for constructing case studies and carrying out pattern cross-case analysis in qualitative research (Patton 2002). Throughout the fieldwork, a process of data logging (that is careful recording) is carried out in various forms (Lofland & Lofland 1995) to register incidents as they unfold before the researcher. The researcher adapted Burgess's (2000) protocol which distinguished between substantive, methodological and analytic field notes. Raw field notes and verbatim transcripts constitute the undigested complexity of reality (Patton 2002). The transcription of the raw, audio-taped field notes was undertaken by the researcher within forty-eight hours of each observation session. Raw field notes must be converted into a write-up, a transcription that is legible to the reader (Miles & Huberman 1994). If tape-recorders are used, transcriptions have to be quickly produced, so that researchers can sift through their notes, reflect on their experiences and pose questions about their data (Burgess 1991). Notable scholars recommend writing up field notes without delay, lest the researcher lose the detail of non-verbal behaviour and emotions of the researcher and the researched. It is not just validity that is at stake here, it is also a matter of living up to the natural creed of being there, in their worlds and accurately telling their stories (Gubrium & Holstein 1997, p.37). The substantive notes are presented in the left-hand column, with the observer’s comments included (see Appendix 1B). The right-hand column was reserved for the coding, notes and a separate sheet for memos at the end of the substantive notes. This was a preliminary phase of the data analysis to ensure that the recording of the field notes was complete.
Figure 3.6: Analysis Observation Data: Diagrammatic Representation
In this study, the substantive notes were tape-recorded during each observation period and transcribed within forty-eight hours by the researcher. Substantive field notes, which are also referred to as descriptive notes, consist of a chronological record of people, situations, events, and conversations in which the researcher participates (Burgess 1991, 2000), in order to capture a slice of life. These substantive notes were largely descriptive, aimed at providing a detailed representation of the various pain incidents in context observed by the researcher including the patients’ pain behaviours within each incident. The goal was to learn firsthand about patients’ pain behaviours in their natural setting in order to obtain an insider’s view (emic), while attempting to maintain an outsider’s perspective. Each of the patient’s pain behaviours for a six-hour shift was recorded chronologically and by incident. An incident refers to a single event with an integrity of its own; it has an observable beginning, i.e. initial patient pain behaviour, and ends in a time continuum, i.e. there is evidence of a decision by the nurse participant. Since field notes will be chronologically arranged, the researcher should also keep records of the approximate times at which various events occur (Lofland & Lofland 1995). During observation, the qualitative case study researcher keeps a good record of events to provide a relatively incontestable description for further analysis and ultimate reporting (Stake 1995).

3.11.2 DATA REDUCTION, CONDENSATION AND COMPLICATION

Content analysis of the transcripts was undertaken to simplify and make sense of the complex field notes. Content analysis involved identifying, coding, categorising and labelling the patterns in the data. In content analysis, two kinds of units deserve distinction: recording, and context units (Krippendorff 2004). The recording units which was a word in this instance, is given its precise shade of meaning by its context. Context units are the passages in which the recording units are set, the contexts, which define their meaning, which in this study was a pain incident. The first reading of many readings through the data word-by-word aimed at developing thorough familiarity with the data in the early stages of the analysis.

The sensitising categories were drawn from the existing literature a priori and developed into a coding template and applied to the transcribed text, which was described earlier. The next step involved scanning the data and, as the reading progressed, jotting down notes, in particular, ideas and diagrams that sketched out relationships noticed in the data. Some other clarification pointers were noted as an aide-memoire to the researcher to reflect on issues at a later time. The notes serve to isolate the initially most striking aspects of the data, which are not only intuitive, but also informed by the metatheories inherent in the researcher’s personal training and background; the explicit theoretical frameworks with which the study was initiated; and constructs made explicit by the participants of the study (LeCompte et al. 1993). The goal of coding was to detect pertinent incidents, collect examples of those incidents, and analyse those incidents in order to discover commonalities, differences, and patterns. Once the data was classified, regularities, variations and singularities in the data were examined. Patterns and regularities were then transformed into categories into which subsequent items were sorted. Patterns help the reader understand the case better (Stake 1995).

The search for patterns enabled the researcher to locate new perspectives on the data and to develop a more integrated understanding of processes and interactions in the case.
Once actual transcripts are available, coding, finding patterns, clustering, and writing stories are all instances of further data reduction and condensation (Huberman & Miles 1998).

3.11.3 DATA TRANSFORMATION

The researcher was in continuous dialogue with the data, noting recurring patterns or gestalts which pulled together many separate pieces of data. The researcher constantly strived to perceive added evidence of the same pattern, i.e. recurring regularities and to remain open to disconfirming evidence when it emerged by using a number of questions such as: Is the pattern elsewhere in the data where it was expected? Are there any counterexamples? The researcher then wrote a short one-page memo of the substantive notes in order to think critically about the data and develop analytic insight. Memos are one of the most useful and powerful sense-making tools at hand (Miles & Huberman 1994).

In addition to keeping systematic substantive notes, methodological field notes were recorded, with the aimed of capturing the researcher's personal reflections of her conduct in the field and, in particular, her role as researcher-observer. Keeping a set of methodological field notes allows the researcher to be reflexive and to engage in some form of self-expression, self-exploration and self-analysis during the research process (Burgess 2000). Naturalistic researchers guard against their own biases by recording detailed field notes that include reflections on their own subjectivity (Lofland & Lofland 1995, Bogdan & Biklen 1998). Discovering one’s biases becomes a continuous process of both recognising and deferring them (Wolcott 1994). The researcher regularly completed a memo summary of the observer's comments and linked these to the substantive notes in order to reflect on the issues raised in context and on how they related to theoretical and methodological issues. These analytical memos may include the preliminary questions that were posed and the hypotheses that are to be developed and tested (Burgess 2000). The writing of analytical memos are seen as separate from the field notes (Glaser & Strauss 1967), which are explanations of connections and relationships among memos (Lofland & Lofland 1995).

The researcher interacted continuously with the data displays to draw meaning from the data. This involved an iterative process of being in dialogue with the data and categories. The process of comparing, contrasting, noting patterns, clustering patterns and following up surprises continued. Another tactic was utilised: that of within-methods triangulation.

3.12 WITHIN-METHOD TRIANGULATION

This study utilised within-methods triangulation at the level of data collection, i.e. the researcher used two different techniques of data collection, but each technique was within the same research tradition. The researcher utilised concurrent think aloud protocols by critical care nurses caring for the ventilated patient in pain and, to complement the critical care nurses’ accounts, the researcher observed patients’ pain behaviours concurrently.

The purpose of combining two data sources was to provide a more holistic, and better, understanding of the phenomenon under study and to guard against a single researcher's biases. This triangulated approach required the researcher to link each individual think aloud data set with an observation data set which was collected concurrently, fitting them together.
like the pieces of a puzzle to obtain a comprehensive understanding of the phenomenon, i.e. how critical care nurses make a judgement that the ventilated patient is in pain in the immediate phase post cardiac surgery. Each data source was coded and analysed separately and then compared to open up complementary perspectives on the research issue (see Figure 3.7) during within-case analysis and cross-case analysis. Triangulation can relate in practical terms to the results of each analysis and place them in relation to each other. Moreover, the role of triangulation is to increase the researcher’s confidence, so that findings may be better imparted to the audience, and to lessen recourse to the assertion of privileged insight (Fielding & Fielding 1986).

The topic of methodological triangulation appears in the context of Denzin’s (1970) discussion of the advantages and restrictions of observational work. Unlike survey research, Denzin (1970, p.216) proposes that ‘the participant observer is not bound in his field work by pre-judgements about the nature of his problem, by rigid data-gathering devices, or by hypotheses’. However, Denzin also remarks that participant observation is not without its own difficulties: the emphasis on the present may obscure pertinent events prior to the observer entering the field; there is a risk of reactivity and the observer may go native, which according to Silverman (2001), is a perennial threat in naturalism. Consequently, Denzin (1970) recommended method triangulation to resolve the difficulties of participant observation and present a complete picture.

However, even when a single analytical model is utilised, it can be intricate to combine data in order to arrive at an overall truth. As Hammersley & Atkinson (1983, p.199) point out, one should not adopt a naively ‘optimistic’ view that aggregation of data from different sources will unproblematically add up to produce a more complete picture. Multiple methods are frequently implemented in the misguided hope that they will reveal the complete picture. However, the complete picture is an illusion which speedily leads to scrappy research based on under-analysed data and an imprecise or theoretically indigestible research problem (Silverman 2005). It is usually far better to rejoice in the partiality of your data and delight in the particular phenomena that it allows you to inspect (Silverman 2001a). Moreover, many take the position that single method studies are no longer justifiable in social sciences, but perhaps heed should be taken of Patton’s recommendation that there is no magic in triangulation. The researcher using different methods should not expect findings generated by different methods to fall into a coherent picture (Patton 2002); they will not and they cannot, for each method yields a different picture and slice of reality (Denzin 1989).

In within-method triangulation, the researcher takes one method and employs multiple strategies within that method to examine data. It is a check on data quality and an attempt to confirm validity (Fielding & Fielding 1986). However, as Webb et al. (1966) propose every means of data-gathering is subject to specific validity threats and the best response is to seek convergence of data from different classes, as well as of different data from the single class; that is, we should use different methods to look at the same situation. Triangulation is now seen less as a validation strategy within qualitative inquiry and more as an approach for justifying and underpinning knowledge by acquiring additional knowledge which is pertinent to this naturalistic case study. Furthermore, the most important advantage using multiple sources of evidence in a case study design is that different realities can be identified (Stake
Figure 3.7: Overview of Data Analysis Protocol
and that converging lines of inquiry can be developed (Yin 2003, 2005), which regularly sends us back to the drawing board (Stake 1995).

The first level of analysis being true to, respecting, and capturing the details of the individual cases being studied, cross-case analysis follows from and depends on the quality of individual case studies (Patton 2002). Sometimes, significant meaning is found in a single instance, but usually, the important meanings will come from repeated reappearance (Stake 1995). Therefore, cross-case analysis is explored in the following section.

3.13 Cross-Case Analysis

The initial focus was on the full understanding of individual cases before those unique cases were aggregated across patterns. Consequently, cross-case analysis was instigated in search of patterns that cut across individual cases in the Think aloud data set and separately, in the observation data set, to ensure that patterns were grounded in the cases and their contexts. Cross-case analysis not only enhances generalisability, but, also deepens understanding and explanation (Miles & Huberman 1994). The visual display, on a case-by-case basis, which was created (see Appendix 1A) will act as a precursor to probe whether different groups of cases appear to share some similarity or dissimilarity and deserve to be considered as instances of the same type of general case. Technically, cross-case analyses are most easily made with displays, matrix or other arrays of the data that allow the researcher to analyse, in a condensed form, the full data set, in order to see literally what is there (Huberman & Miles 1998).

During cross-case analysis, the researcher will isolate those patterns while being sceptical about first impressions and constantly challenging each emerging pattern with other findings in each data set. Where patterns have been identified, our understanding of those patterns is increased by considering the instances and cases that do not fit within the pattern (Patton 1999). Negative analysis is about searching for, and finding, a single case that does not support the proposition and which will warrant reformulating the proposition. According to Taylor & Bogdan (1984), by directing attention to negative cases, modified analytic induction forces the researcher to refine and qualify theories and propositions. The formulated hypothesis is an analytical generalisation, that although stated as universalistic language, is not proposed to account for all critical care nurses' judgement policies, but only for the critical care nurses' judgement policies in this study.

The process which follows an iterative course continues until the analyst has adequately verified the hypothesis in search of analytical generalisation referred to by Yin (2004) as theoretical generalisation. This procedure will be repeated across a series of cases in each data set, referred to as cross-case analysis or pattern analysis. Researchers actively seek to disconfirm emerging hypotheses through negative case analysis, that is, analysis of cases that hold promise for disconfirming emerging hypotheses and that add variability to the sample (Gilgun 1995). The concern of the case study analysis is with the overall pattern of results and the degree to which the observed pattern matches the predicted one (Yin 2003). During each trace of evidence, sampling decisions are made to clarify the key patterns, detect contrasts, and disclose negative occurrences. Comparisons in case study research provide what Yin (1984, 2003) calls analytical generalisation, i.e. cases predict similar results (literal
replication), or contrasting results for predictable reasons that facilitate theory development (theoretical replication). Regardless of the choice of strategies or techniques, a persistent challenge is to produce high-quality analyses, which requires researchers that attend to all the evidence, display and present the evidence separate from any interpretation and show adequate concern for exploring alternative interpretations (Yin 2003).

In summary, the process of data analysis involves making sense out of data. It involves preparing the data for analysis, i.e. think aloud and observation data conducting within-case analysis, negative case analysis and cross-case analysis, moving deeper and deeper into understanding the data and representing the data via displays. In addition, within-method triangulation was utilised as a methodological strategy to lead to a deeper understanding of critical care nurses’ judgement policies in the context of the ventilated patient in pain by combining think aloud data and observation data during within-case and cross-case analysis and making an interpretation of the larger meaning of the data. Furthermore, data analysis was an ongoing process, involving persistent reflection on the data, constant dialogue with the data, asking the analytic questions and the writing of memos throughout the study. There are processes for assessing the quality of a naturalistic case study which are addressed in the final section.

### 3.14 The Criteria Appropriate in a Naturalistic Case Study

There has been considerable controversy about the criteria to utilise for assessing the truth value of qualitative research. Qualitative research has in recent years moved towards preferring such language as ‘trustworthiness’ and ‘authenticity’ (Lincoln & Guba 1985, Patton 2002), as opposed to using the positivist terminology of ‘reliability’, ‘validity’ and ‘objectivity’.

The validity criteria currently thought of as the gold standard for naturalistic inquiry is delineated by the early writings of Lincoln and Guba (1985), who propose a set of criteria under the rubric of trustworthiness (credibility, transferability, dependability and confirmability). Trustworthiness is made up of four criteria, each of which has an equivalent criterion in quantitative research: credibility (which parallels internal validity, i.e. how believable are the findings?); transferability (which parallels external validity, i.e. do the findings apply to other contexts?); dependability (which parallels reliability, i.e. are the findings likely to apply at other times?) and confirmability (which parallels objectivity, i.e. has the investigator allowed his/her values to intrude to a high degree?).

The naturalistic case study researcher, in order to reveal truth value, must demonstrate, that (s)he has represented those multiple accounts of social reality adequately, that is, that the reconstructions that have been arrived at via the inquiry are credible to the constructors of the original multiple realities (Lincoln & Guba 1985). To operationalise the term credibility, they recommend some techniques which are especially relevant to the current study: prolonged engagement in the field and triangulation. Internal validity was established in the present study through extended fieldwork in the natural habitat of the participants. Secondly, triangulation of data sources, i.e. think aloud data and researcher observation data, were linked during within-case analysis and cross-case analysis. In addition, modified analytic induction, otherwise referred to as negative case analysis, was utilised, and served to refine
the hypothesis as more and more information became available during cross-case analysis. The internal validity of a case study, according to Yin (2003), depends primarily on using multiple sources of evidence in a manner that encourages convergent lines of inquiry, and on maintaining a chain of evidence (see Figure 3.3). In this case study, evidence of variance in forms of critical care nurses’ judgements policies was based on explicit procedures for collecting, coding and analysing the data. The naturalistic researcher has an obligation to be methodical in reporting sufficient details of data collection and the processes of analysis to permit others to judge the quality of the resulting product (Patton 1999).

The literature indicates that thick description is necessary to ensure that the findings are transferable between the researcher and the researched. According to Geertz (1973), thick description provides rich accounts of the details of a culture. ‘Rich’ means that the data are detailed and complete enough to provide a full and revealing picture of what is going on in the natural setting. Lincoln & Guba (1985) argue that thick description presents others with a database for producing judgements about the transferability of the findings to other locations. Lincoln & Guba (2002) argue that the transferability of conclusions from one case to another is a function of the fit, between the two and, for judgements about this to be possible, researchers must provide thick descriptions of their cases. The think aloud data verbatim transcripts and the descriptive and detailed transcribed field notes produced rich data about the interpretations of the participants most knowledgeable about the case for the reader.

Goetz & LeCompte (1984) place a similar emphasis on the importance of clear and detailed description as a means of allowing decisions about the applicability of findings from one study are applicable to other situations. Specifically, they argue that qualitative studies gain their potential for applicability to other situations by providing what they call comparability and translatability. The former term refers to the degree to which components of a study – including the units of analysis, concepts generated, population characteristics, and settings – are sufficiently well described and defined that other researchers can use the results of the study as a basis for comparison (p.228). Translatability is similar, but refers to a clear description of one’s theoretical stance and research techniques.

Another criterion deals with the problem of knowing whether a study’s findings are generalisable beyond the immediate case study. The external validity problem has been a major barrier in doing case studies. Critics state that single cases offer a poor basis for generalising. How can you generalise from a single case? This is a recurrent question. Case study researchers need to provide the opportunity for vicarious experience to assist the reader in making naturalistic generalisations. Naturalistic generalisations are conclusions arrived at through personal engagement in life’s affairs or by vicarious experience so well constructed that the person feels as if it happened to them (Stake & Trumbull 1982, Stake 1995, 2002).

According to Yin (2003), such critics are implicitly contrasting the situation with survey research, in which a sample (if selected correctly) readily generalises to a larger universe. This parallel with samples and universes is erroneous when dealing with case studies as survey research relies on statistical generalisation, but case studies rely on analytical generalisation. According to Yin (1984, 2004) in analytical generalisation, the researcher is striving to generalise a particular set of results to some broader theory, otherwise referred to as theoretical generalisation. The implication is that a theory must be
tested by replicating the findings in a second, or even third, case where the theory has predicted that the same results should transpire. This replication logic is the same that underlies the use of experiments (Yin 2003). In this case study the formulated hypothesis will be analytical generalisation, that although stated as universalistic language, is not proposed to account for all critical care nurses’ judgement policies, but only for the critical care nurses’ judgement policies in this study.

In case study research, the tactic of using a case study protocol (data collection) and the development of a case study database (Yin 2003) allows researchers to replicate an earlier case study. Nevertheless, internal reliability (the degree to which a study can be replicated) is a difficult criterion to meet in qualitative research. As LeCompte & Goetz (1982) identify, it is impossible to freeze a social setting and the circumstances of an initial study to make it replicable in the sense in which the term ‘replicable’ is typically utilised. However, the key emphasis in case study research is on doing the same case over again, not on replicating the results of one case by doing another case study. In this case study, the researcher recorded the data collection procedures in detail in order to produce a coherent and illuminating description of, and perspective on, a phenomenon. According to Yin (2003), the goal of reliability is to minimise the errors and biases in a study.

The criteria referred to as confirmability (Lincoln & Guba 1985) is concerned with ensuring that, while appreciating that complete objectivity is impossible in social research, the researcher has demonstrated that they have not overtly allowed personal values or theoretical inclinations to influence the conduct of the research and the findings deriving from it. In this study, the researcher recorded detailed field notes which included reflections on her own subjectivity. The goal recommended by Bogdan & Biklen (1998) is to become more reflective and more conscious of how who you are may shape and enrich what you do, not to eliminate it. This researcher was open to being shaped by the experience and learning from the data. Another concern frequently raised about naturalistic inquiry is that the presence of the researcher may influence the inquiry: this is known as reactivity. Eliminating the actual influence of the researcher is impossible (Hammersley & Atkinson 1983) and the goal in a qualitative study is not to eliminate this influence, but to understand it and to use it productively (Wolcott 1994, Maxwell 1996). The process of reflecting critically on oneself coming to know oneself as learner and researcher within the processes of the research itself is an appropriate approach (Guba & Lincoln 1981, Lincoln & Guba 2003) which can be achieved by completing a reflective journal; this tool was utilised by the researcher, separate from the field notes.

In summary, case study research has often been criticised on the grounds that the findings are not generalisable, i.e. external validity. A different approach to the general relevance of case study findings was put forward by Stake (1976) and is referred to as naturalistic generalisation or what Lincoln & Guba (1985) called transferability. This implies that the readers of case study reports must determine whether the findings are applicable to other cases than those studied by the researcher. However, the aforementioned authors place the onus on the original researcher to provide thick description in order to allow the reader to assess the degree of similarity between the case researched and those to which the findings are to be applied.
Goetz & LeCompte (1984) place a similar emphasis on the importance of clear and detailed description. The maintenance of a chain of evidence recommended by Yin (2003) is another process for establishing internal validity and within-method triangulation in order to promote converging lines of inquiry. Furthermore, a case study tactic such as developing a case study data base could facilitate doing the same case over again with the goal of minimising biases in a study. Self-reflection through a reflective diary also creates an open and honest narrative that will reverberate with readers.

In conclusion, this chapter presents the naturalistic case study as an all encompassing research strategy undertaken to seek advanced understanding of the case. Moreover, an intrinsic case study was not undertaken primarily because the case represents other cases but because in all its particularity and ordinariness, this case is itself of interest i.e. how critical care nurses make a judgement that the ventilated patient is in pain in the immediate phase post cardiac surgery. The strong point of case studies argues Stake (1976) is that they provide vicarious experience in the form of complete and meticulous knowledge of the particular. The naturalistic case study researcher approach their studies with a basic set of philosophical assumptions which express their understanding of knowledge that guide and influence their inquiry.

In addition, the purpose of this naturalistic case study was to collect two sources of evidence to provide a view of reality that was important to the study participants rather than the researcher. This case study utilised modified analytic induction to engage in within-case analysis and cross-case analysis in order to examine a preformulated hypotheses i.e. critical care nurses use a pattern of cues to make a judgement that the ventilated patient is in pain in the immediate phase post cardiac surgery. Recognition of patterns is facilitated by categorising the data which was described in detail and illustrated with displays. The criteria utilised for assessing the truth value of this naturalistic case study was operationalised in various ways such as within-method triangulation, maintaining a chain of evidence, providing rich accounts so that the reader feels as if it happened to themselves otherwise referred to as 'naturalistic generalisation' and a reflective journal in order for the researcher to know the self as learner and researcher within the case study itself. The next chapter will present the within-case analysis followed by another chapter on cross-case analysis findings.
CHAPTER FOUR: DATA ANALYSIS

4.0 INTRODUCTION

This chapter presents the data analysis of thirty individual cases. The specific aim of this study was to examine the cue characteristics of each individual critical care nurse’s judgement policy, i.e. which cues were most salient (weight) for the critical care nurse and how the cues were combined in their use reflecting the critical care nurse’s judgement policy in the context of the ventilated patient in the immediate phase post cardiac surgery. The analysis was guided by the theoretical model, namely the ‘Lens Model’. Moreover, the single system within the Lens Model framework guided the analysis in order to capture the similarities of the judgement policies across thirty critical care nurses. The researcher was interested in the judgment process and, according to Hammond (1996), the Lens Model is suitable for this intention because of its emphasis on the participant’s use of multiple fallible cues. In addition, a secondary aim of the study was to describe how the ventilated patient in the immediate phase post cardiac surgery conveyed their pain state to the critical care nurse. Therefore, another embedded unit of analyses, i.e. thirty ventilated patients pain behaviours, are described systematically. Each case example represented below is comprised of two main elements namely: one pain incident which portrays the critical care nurse’s cue characteristics and a corresponding pain incident which reflects the pain behaviour cues conveyed by the patient. It is noteworthy that within each case one pain incident related to repositioning the ventilated patient evolved within one hour post cardiac surgery post routine chest X-ray. The second pain incident concerned the ventilated patient who was resting five hours post cardiac surgery. Besides, for the purposes of this chapter due to word limitation, examples of one pain incident is portrayed. Nonetheless, data triangulation of both pain incidents linking the individual critical care nurse’s cue characteristics and the individual patient’s pain behaviours (cues) are presented. The analysis of cases are described in each section with a miniature scenario setting the scene for both main data-sets, i.e. critical care nurse cue characteristics and patient pain behaviour cues.

4.1 CASE ONE

4.1.1 PAIN INCIDENT: REST: CRITICAL CARE NURSE CUE CHARACTERISTICS

The scenario offered in this section occurred at 19.30 hours while the ventilated patient was at rest, and had been ventilated five hours post cardiac surgery. It appeared that the initial first-order cue utilised in this pain incident by the critical care nurse was physiological, i.e. ‘MAP 79 is beginning to climb’ (see Figure 4.1), combined with another physiological cue ‘respiratory rate 20’ and three behavioural general cues; ‘moving quite a bit’, ‘trying to talk via the ETTube’ and ‘obeys all verbal commands’ to make an intermediate judgement, i.e. ‘M is awake’. Moreover, the next think aloud quotation seems to illustrate that four of the aforesaid first-order cues are also shared to infer other patient states, for example ‘she is anxious’, ‘she is uncomfortable’, ‘she is fighting the ventilator’ highlighting the ambiguity surrounding some first-order cues:
The mean pressure is 79 which is beginning to climb.

Now she is starting to wake up a bit again, so I'd say she is uncomfortable enough, also anxious.

She is moving quite a bit there, so she is awake and uncomfortable there.

I want to help with the pain.

Respiratory rate 20, some respiratory effort, so she is waking up a little bit.

But she is also anxious, plus she is fighting the ventilator, chewing on the tube.

She is also sore I would say.

She is trying to talk via the ETTube, she is awake.

Trying to tell me she is uncomfortable with tube.

She is moving quite a bit there, so she is awake and uncomfortable there.

I want to help with the pain.

Respiratory rate 20, some respiratory effort, so she is waking up a little bit.

But she is also anxious, plus she is fighting the ventilator, chewing on the tube.

She is also sore I would say.

She is trying to talk via the ETTube, she is awake.

Trying to tell me she is uncomfortable with tube.

She is also sore I would say.

She is trying to sit up in the bed, uneasy in bed.

She is shaking her head from side to side. Just uneasy and anxious.

Uncomfortable and awake, plus fighting the ventilator.

She is fidgety plucking the bedclothes, very uneasy.

She is very anxious.

She is sore also I would say.

She is anxious.

Simultaneously, another four behavioural general first-order cues used by the critical care nurse are combined to construct an intermediate judgement, namely, ‘she is anxious’. Two of these first-order cues ‘restless’ and ‘shaking head from side to side’ overlap which is evident in the subsequent think aloud excerpt:

She is certainly getting a bit restless there, okay. Relax there.

She seems anxious and uncomfortable there, and fighting the ventilator.

She is shaking her head from side to side, just uneasy and anxious.

Uncomfortable and awake, plus fighting the ventilator.

She is trying to sit up in the bed, uneasy in bed.

She is fidgety plucking the bedclothes, very uneasy.

She is very anxious.

She is sore also I would say.

She is anxious.

It appears that the critical care nurse used and aggregated seven first-order cues of which five are pain descriptor cues, i.e. ‘pain location pointing chest’, ‘mouth sore’, ‘throat sore’, ‘ETTube is annoying’ and ‘patient self-report of pain’, with one knowledge cue ‘knowing the patient’ and another physical cue ‘sore old injury’ to make an intermediate judgement, i.e. ‘she is sore’. Each of these cues seem to contribute to the patient’s discomfort and in particular ‘ETTube is annoying’ is also implicated in heightening the patient’s anxiety and altering the patient’s haemodynamic status. The cue ‘knowing the patient’ is identified by the critical care nurse as being important in her understanding of how the patient expressed her pain with particular emphasis on facial expression and distress. It is interesting to note that the physical first-order cue ‘sore old injury’ used by the critical care nurse indicating an old injury had the potential to exacerbate the patient’s discomfort which is offered in the next think aloud passage:

M, you are pointing there, have you a pain in your chest, you are nodding your head.

Try and open your mouth a little bit and I will wet it for you, is your mouth sore, okay, causing some discomfort there.

Is your throat sore, yes, your throat is sore too, complaining of sore throat.

That tube is annoying you, it is uncomfortable I know M, chewing on the tube there.

Just relax, M, she is agitated with the tube, MAP is also starting to climb.

I would say she is sore, I think she needs some morphine.

M are you sore, you are sore, nodding your head, okay.

She may also be uncomfortable due to her old injuries, serious hip injury in the past.

I know her by now, I know her inside out now, last five hours or so.
379 S/1 MO: I know her now and how she expresses her pain, how she grimaces, becomes distressed on the ventilator with chewing on the tube
380 S/1 MO: You are sore M, yes you are sore, she knows exactly how sore she is
381 S/1 MO: She said she was sore and that is fine by me because I know her now
382 S/1 MO: She is sore.

The above think aloud passage suggests that the critical care nurse applied much effort acquiring additional cues which were perhaps not directly observable. The aforementioned strategy could also be linked to the nurse's individual knowledge of the patient gained over time while in direct contact with the ventilated patient in the immediate phase post cardiac surgery. In addition, the pain descriptor cue 'patient self-report pain' was closely linked with the knowledge cue 'knowing the patient' alongside other pain descriptor cues secured by the critical care nurse with the patient.

A further five first-order cues used by the critical care nurse and aggregated into an intermediate judgement, i.e. 'she is haemodynamically more stable', comprised of three physiological first-order cues, specifically, 'heart rate 90', 'temperature central 37.1c' and 'MAP response to previous analgesic', alongside one mechanical cue 'nitroglycerin 1'. Each of these aforesaid cues seem to be interlinked. The first-order physiological cue 'MAP response to previous analgesic' seems to set in motion a reasoning strategy on behalf of the critical care nurse which is reflected in the following think aloud extract:

386 S/1 MO: 'When the intensivist comes around I wonder would fentanyl rather than morphine be any better for pain control, maybe not
387 S/1 MO: Well that sedative I gave her certainly dropped the pressure
388 S/1 MO: But she was quite awake
389 S/1 MO: She was nodding her head confirming she was uncomfortable, and she seemed to have pain, she grimaced too
391 S/1 MO: Well, MAP 60, it was sensitive, that time the MAP response was related to low volume and sedative rather than morphine, especially when her CVP was low
392 S/1 MO: So MAP response to previous analgesic, she was warning
393 S/1 MO: I think it was definitely the sedative that dropped the blood pressure
394 S/1 MO: She was also low in volume and she was also uneasy
396 S/1 MO: So it was definitely not the morphine option that caused the MAP response'.

It appears from the above think aloud extract that the critical care nurse analysed her use of the first-order physiological cue 'MAP response to previous analgesic' in depth, which also seems to be related to her knowledge of the patient's overall haemodynamic response. Moreover, it seems to suggest that the process used by the critical care nurse to reach a judgement is far from straightforward due to the complexity of the patient situation and the simultaneous presentation of cues, some of which are directly observable and some acquired by the critical care nurse while caring for the patient. In order to reduce this complexity it appears a strategy was undertaken by the critical care nurse whereby five intermediate judgements cited previously formed second-order cues in the construction of a final judgement which is evident in the following think aloud passage:

401 S/1 MO: 'She is definitely in pain.
402 S/1 MO: All right M, I'm giving you something for pain now
In summary, the above pain incident presented an exemplar of the critical care nurse’s judgement policy. The picture offered is not an orderly scenario but a complex and uncertain situation as a result of the patient’s evolving unstable haemodynamic state. Therefore, the critical care nurse is required in these multifaceted circumstances to make a judgement of the ventilated patient’s pain state from a compilation of ambiguous cues in this pain incident. It could be said that ‘knowing the patient’ used by the critical care nurse as a first-order cue was helpful in securing additional pain descriptor cues, thereby reducing some of the complexity for the nurse. It seems that the strategy employed by the critical care nurse is a two tier approach (see Figure 4.1) where several first-order cues are utilised and integrated into intermediate judgements. Accordingly, the intermediate judgements became second-order cues. Subsequently, the critical care nurse formulated her final judgement based on these second-order cues of the ventilated patient’s pain state in the immediate phase post cardiac surgery, i.e. ‘she is in pain’. The next section presents the pain behaviours conveyed by the patient which are characterised in Table 4.1b.

4.1.2 PAIN INCIDENT: REST: PATIENT PAIN BEHAVIOUR CUES

This pain incident occurred at 19.30 hours while the ventilated patient who was five hours post coronary artery bypass graft (CABG) surgery was resting in the critical care unit. The vasodilator support infusing at that point in time was nitroglycerin 1. The physiological cues recorded were as follows: ‘mean arterial blood pressure 79’ which was within normal parameters, increase in ‘heart rate of 90’ with a baseline parameter of 74 and an increase in ‘respiratory rate of 20’ from a set rate of 10 on the ventilator. In addition, the patient demonstrated two overt motor pain behaviour cues ‘grimace’ and ‘pointing to chest’. Regarding the latter cue, the patient participant showed evidence of pointing towards the midline chest area which seemed to act as a precursor to the critical care nurse’s inquiry concerning that specific pain location. Besides, the patient provided a ‘self-report of pain’ by nodding her head as a consequence of the critical care nurse’s questioning about soreness, sore mouth, sore throat and being uncomfortable with the ETTube. Further, one behavioural general cue ‘restlessness’ in conjunction with two patient ventilator dysynchrony cues ‘chewing on ETTube’ and ‘distress on the ventilator’ were also made known by this ventilated patient.

In summary, the ventilated patient in this pain incident exhibited two altered physiological cues along with two overt motor pain behaviour cues. Furthermore, the ventilated patient provided a verbal subjective pain behaviour cue ‘patient self-report pain’. Finally, one behavioural general cue and two patient ventilator dysynchrony cues were shown by the ventilated patient in this rest period five hours post CABG surgery in the critical care unit (see
Table 4.1b). The next section portrays the linking of both data-sets, i.e. critical care nurse's cue characteristics and the patient's pain behaviour cues.

4.1.3 DATA TRIANGULATION

The cues verbalised by the critical care nurse participant were matched with each pain behaviour observed by the researcher in each pain incident. All pain behaviours matched in both pain incidents.

Overall summary: the findings of case one suggested that the critical care nurse, in order to make a judgement of the ventilated patient's pain state at rest, utilised several first-order cues, i.e. physiological, behavioural general, pain descriptor, mechanical, physical and a knowledge cue displayed diagrammatically in Appendix IA. The initial first-order cue setting this process in motion was a physiological cue ‘MAP 79 beginning to climb’. It was also apparent that a few first-order cues had several possible meanings in particular the physiological and behavioural general cues evident in the think aloud extracts presented. Moreover, four first-order pain descriptor cues did not overlap with other first-order cues. Subsequently, the first-order cues were combined and formed five intermediate judgements. The five intermediate judgements were then used as second-order cues and integrated into a final judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery, i.e. ‘she is in pain’. The pain behaviours observed by the researcher indicated that the ventilated patient communicated pain behaviours to the critical care nurse. Moreover, all pain cues verbalised by this critical care nurse while caring for the ventilated patient in pain in the immediate phase post cardiac surgery matched with the pain behaviours recorded by the researcher in the field.

The findings of case two are depicted in the following section with a minute picture, setting the landscape for both central data-sets, i.e. critical care nurse cue characteristics and patient pain behaviour cues.

4.2 CASE TWO

4.2.1 PAIN INCIDENT: REST: CRITICAL CARE NURSE CUE CHARACTERISTICS

The following pain incident evolved while the patient was undergoing an electrocardiogram at 18.00 hours, five hours post cardiac surgery in the critical care unit. The original first-order cue that seemed to set this pain incident underway was a paraclinical cue ‘heart check ECG’. This cue was utilised by the critical care nurse along with a range of seven additional first-order cues specifically: one behavioural general cue ‘chewing on ETTube’; one physiological cue ‘breathing pattern shallow rate 18’; one knowledge cue ‘knowing the patient’; one overt motor pain behaviour cue ‘grimace’; and three pain descriptor cues ‘patient self-report pain’, ‘ETTube uncomfortable’ with ‘pain location’. It appears that no more than three of these eight first-order cues, i.e. ‘grimace’, ‘patient self-report pain’ and ‘pain location’, did not overlap with any other cue employed in making the following current intermediate judgement ‘she is sore’ and supplementary intermediate judgements by the critical care nurse which will be offered.
**Patient Pain Behaviour Cues**

This ‘pain incident’ commenced at 19.30 hours while the ventilated patient who was back from theatre approximately five hours was at rest. The following pain cues were recorded:

<table>
<thead>
<tr>
<th>Cue</th>
<th>Context (Vasodilators / Inotropes)</th>
<th>Category</th>
<th>Prior to Pain Incident</th>
<th>Baseline Parameters</th>
<th>Current Parameters</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean arterial blood pressure (MAP)</td>
<td>Nitroglycerin 1</td>
<td>Physiological</td>
<td>68</td>
<td>70 – 80</td>
<td>79</td>
<td>Normal MAP</td>
</tr>
<tr>
<td>Heart Rate</td>
<td></td>
<td></td>
<td>81</td>
<td>74</td>
<td>90</td>
<td>Increased heart rate</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td></td>
<td></td>
<td>14</td>
<td>10</td>
<td>20</td>
<td>Change</td>
</tr>
<tr>
<td>Grimace</td>
<td></td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Pointing to chest area</td>
<td></td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td>Nods her head in response to questions by the critical care nurse about the location of pain i.e. chest area</td>
</tr>
<tr>
<td>Restlessness</td>
<td></td>
<td>Behavioural General Cue</td>
<td></td>
<td></td>
<td></td>
<td>Attempting to raise her head from the pillow continuously. Moving both arms repeatedly and left leg up towards her abdomen, brings her head from side to side</td>
</tr>
<tr>
<td>Chewing in ET Tube</td>
<td></td>
<td>Patient Ventilator Dysynchrony</td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Distress on the ventilator</td>
<td></td>
<td>Patient Ventilator Dysynchrony</td>
<td></td>
<td></td>
<td></td>
<td>Change (Fighting the ventilator)</td>
</tr>
<tr>
<td>Patient self-report pain</td>
<td></td>
<td>Verbal Subjective Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td>Nods her head in response to questions by the critical care nurse about soreness: regarding sore mouth?; sore throat?; uncomfortable ET Tube.</td>
</tr>
</tbody>
</table>
shortly. Besides, it seems that the critical care nurse pursued additional purposeful information which stemmed from her knowledge of the patient in order to make this intermediate judgement which is presented in the next think aloud abstract:

457 S/2 A: 'She felt me pulling off the electrodes, has arrhythmias, hands going towards chest
458 S/2 A: She is chewing on the ETTube, not tolerating the tube, distressed on the ventilator
459 S/2 A: Her breathing pattern is shallow rate 18, distressed on ventilator, bothered, not comfortable,
460 white x-ray due to volume overload and a low urinary output
461 S/2 A: I know her, everything with Mrs O appears to be pointing towards pain presently
462 S/2 A: She is anxious, distressed and not happy on the ventilator, also awake
463 S/2 A: So I would say she has pain
464 S/2 A: She grimaced when I took off the electrodes
465 S/2 A: Are you in pain O, yes, she nods her head
466 S/2 A: Okay, just relax, is that tube making you very anxious, okay O, don’t be sad, also
467 uncomfortable, yes, okay
468 S/2 A: Are you very sore there at chest surgery site, Okay, O.
469 S/2 A: She is sore'.

Moreover, three first-order behavioural general cues were used and integrated into an
added intermediate judgement ‘she is anxious at the moment’. Each of these cues ‘restlessness’,
‘moving both arms and legs’ with ‘attempting to self-extubate’ were also used by the critical
care nurse in conjunction with previously mentioned cues to make additional first-order
judgements for instance ‘O is awake’, ‘she is fighting the ventilator’ and ‘she is sore’.

It appears that a series of first-order cues (see Figure 4.2) were utilised and combined by
the critical care nurse to make the following intermediate judgement ‘she is reasonably stable
haemodynamically’. It seems that not only were cues interlinked but one of the physiological
cues ‘heart rate 92’ was also used alongside other first-order cues to make further intermediate
judgements such as ‘she is anxious at the moment’, ‘she is sore’ and ‘O is awake’. Furthermore,
the intermediate judgement ‘she is distressed on the ventilator’ consisted of first-order cues, for
example ‘restlessness’, ‘chewing on the tube’, ‘breathing pattern shallow rate 18’ with ‘knowing
the patient’, which were used and aggregated by the critical care nurse into supplementary first-
order judgements described previously. Subsequently, the critical care nurse utilised five
intermediate judgements as second-order cues to make a final judgement which is indicated in
the following think aloud passage:

503 S/2 A: ‘She is anxious at the moment
504 S/2 A: O is awake
505 S/2 A: She is reasonably stable haemodynamically
506 S/2 A: O is sore
507 S/2 A: She is distressed on the ventilator.
508 S/2 A: So O is in pain
509 S/2 A: I have just administered 2mgs morphine which should ease her pain’.

The above pain incident seems to indicate that the critical care nurse employed a strategy
in order to make a clinical judgement that the ventilated patient was in pain in the immediate
phase post cardiac surgery. This strategy involved the utilisation and integration of several first-
order cues with many potential interpretations into intermediate judgements. The process
appears to evolve due to the ambiguity of several first-order cues, some of which were conveyed by the patient with additional data sought by the critical care nurse. It is noteworthy that one first-order cue ‘knowing the patient’ verbalised by the critical care nurse was utilised as a precursor to seeking further first-order pain descriptor cues which revealed the intermediate judgement ‘she is sore’. Subsequent to this process the critical care nurse applied the five intermediate judgements as second-order cues to formulate a final judgement of the patient’s pain state in the immediate phase post cardiac surgery, i.e. ‘O is in pain’. The subsequent section reveals the pain behaviours exhibited by the patient.

4.2.2 Pain Incident: Rest; Patient Pain Behaviour Cues

This pain incident ensued during an electrocardiogram (ECG) recording at approximately 18.00 hours; five hours post the ventilated patient participant’s return to the critical care unit. The inotropic and vasodilator support on that occasion adrenaline 2 with nitroglycerin 1. The ventilated patient demonstrated two altered physiological cues, i.e. rise in ‘heart rate of 92’ above baseline of 72 and an increased ‘respiratory rate of 18’ from a baseline set at 10, while another physiological cue maintained normal parameters ‘MAP 70’. One overt motor pain behaviour cue ‘grimace’ with two behavioural general cues ‘restlessness’ and ‘tearing’ were observable. Additionally, two patient ventilator dysynchrony cues were also revealed by the ventilated patient namely ‘chewing on ETTube’ and ‘distress on the ventilator’ (see Table 4.2b). Moreover, one verbal subjective pain behaviour cue ‘patient self-report pain’ owing to the critical care nurse participant’s questions was indicated by the ventilated patient via nodding her head confirming the presence of pain and pain locations, i.e. ETTube and chest incision.

In summary, the ventilated patient while undergoing an electrocardiogram five hours post return to the critical care unit exhibited two altered physiological cues. Furthermore, two behavioural general cues, one overt motor pain behaviour cue and two patient ventilator dysynchrony cues were recorded. Ultimately, one verbal subjective pain behaviour cue ‘patient self-report pain’ was provided by the ventilated patient via nodding her head substantiating the presence of pain in response to the critical care nurse’s questions about pain and pain location. The following part represents linking the critical care nurse cue characteristics and the patient’s pain behaviours.

4.2.3 Data Triangulation

The first-order cues articulated by the critical care nurse were coordinated with each pain behaviour observed by the researcher in both pain incidents. All pain behaviours matched excluding the ‘pain incident at rest’, whereby the researcher observed a behavioural general cue ‘tearing’. The subsequent think aloud quotation verbalised by the critical care nurse participant seems to present some indication of ‘tearing’:

493 S/2 A: "...She grimaced when I took off the electrodes
494 S/2 A: Are you in pain O, yes, she nods her head
495 S/2 A: Okay, just relax, is that tube making you very anxious, okay O, don’t be sad, also uncomfortable, yes, okay... "

97
PATIENT PAIN BEHAVIOUR CUES

This ‘pain incident’ commenced at 18.00 hours while the ventilated patient who was back from theatre approximately five hours was undergoing an electrocardiogram (ECG). The following pain cues were recorded:

<table>
<thead>
<tr>
<th>Cue</th>
<th>Context (Vasodilators / Inotropes)</th>
<th>Category</th>
<th>Prior to Pain Incident</th>
<th>Baseline Parameters</th>
<th>Current Parameters</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean arterial blood pressure (MAP)</td>
<td>Adrenaline 2 Nitroglycerin 1</td>
<td>Physiological</td>
<td>73</td>
<td>75-80</td>
<td>70</td>
<td>No change</td>
</tr>
<tr>
<td>Heart Rate</td>
<td></td>
<td>Physiological</td>
<td>80</td>
<td>72</td>
<td>92</td>
<td>Increased heart rate</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td></td>
<td>Physiological</td>
<td>12</td>
<td>10</td>
<td>18</td>
<td>Increased respiratory rate</td>
</tr>
<tr>
<td>Grimace</td>
<td></td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Restlessness</td>
<td></td>
<td>Behavioural General Cue</td>
<td></td>
<td></td>
<td></td>
<td>Moving both arms repetitively, moving both legs up and down, bring right hand towards the ET Tube</td>
</tr>
<tr>
<td>Chewing on ET Tube</td>
<td></td>
<td>Patient Ventilator Dysynchrony</td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Distress on the ventilator</td>
<td></td>
<td>Patient Ventilator Dysynchrony</td>
<td></td>
<td></td>
<td></td>
<td>Change (Fighting the ventilator)</td>
</tr>
<tr>
<td>Tearing</td>
<td></td>
<td>Behavioural General Cue</td>
<td></td>
<td></td>
<td></td>
<td>Tears both eyes</td>
</tr>
<tr>
<td>Patient self-report pain</td>
<td></td>
<td>Verbal Subjective Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td>Nodding her head (yes) in response to critical care nurses questions: is that tube uncomfortable?; are you in pain?; are you sore at the chest surgery there?</td>
</tr>
</tbody>
</table>
The above quotation which makes reference to 'don’t be sad' could be interpreted as ‘tearing’ which was recorded by the researcher at that particular point in time. However, it can only be assumed in this instance and is not indicative of concrete evidence.

Overall summary: the findings seem to indicate that the critical care nurse employed a strategy in order to make a judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery during an ECG check. The initial first-order cue selected and setting this scenario in action was a paraclinical cue ‘ECG check’. The remaining first-order cues used were comprised of behavioural general, physiological, mechanical, overt motor pain behaviour and pain descriptor cues in conjunction with one knowledge cue. Consequently, the critical care nurse integrated the first-order cues into five intermediate judgements reflected in the think aloud extracts presented. Hence, the intermediate judgements were converted into second-order cues which were then used and pooled into a final judgement of the ventilated patient’s pain state i.e. ‘so O is in pain’. Meanwhile, the patient expressed a pattern of pain behaviours to the critical care nurse. Moreover, the critical care nurse verbalised the cues transmitted by the ventilated patient excluding one behavioural general cue ‘tearing’.

The findings of case three are shown in the following part with a small portrait locating the backdrop for both main data-sets i.e. critical care nurse cue characteristics and patient pain behaviour cues.

4.3 CASE THREE

4.3.1 PAIN INCIDENT: REPOSITIONING POST CHEST X-RAY: CRITICAL CARE NURSE CUE CHARACTERISTICS

The scene here developed as the ventilated patient who had been in the critical care unit for thirty-five minutes, since 12 noon to be exact, following cardiac surgery was repositioned following a routine chest x-ray. The preliminary first-order cue that initiated this pain incident was physiological ‘MAP 100 (shooting up)’ which was used by the critical care nurse with a series of seven other first-order cues. These first-order cues comprised of one technical cue ‘turned for x-ray’; two mechanical cues ‘fentanyl 1mg in theatre’, ‘no spinal morphine in theatre’; one behavioural general cue ‘no response to verbal stimuli’; another physiological cue ‘MAP response to analgesia and sedative’; and two overt motor pain behaviour cues, i.e. ‘he is rigid there’ and ‘grimace when turned’. These eight first-order cues were integrated to form an intermediate judgement ‘so he is sore’. It seems from the subsequent think aloud extract that the two aforesaid physiological cues are also implicated in additional intermediate judgement strategies employed by the critical care nurse. Moreover, it could be construed that the situation is complex and uncertain as the critical care nurse consistently sought added information from the patient and integrated first-order cues, i.e. ‘grimace when turned’ and ‘rigid there’, which were seemingly noted earlier and verbalised later. Besides, it could be interpreted that ‘MAP 100 shooting up’ had some influence on another intermediate judgement, cited presently, i.e.
‘haemodynamically he is unstable’, revealing the urgency of the situation for the critical care nurse:

37 S/3: ‘MAP 100 shooting up, uncomfortable there, MAP high at twenty five to two, hypertensive
38 S/3: They want the mean between 70 and 80 because he bled in theatre, MAP 100 not helping that bleeding, so my concern is now that MAP shooting up, also very sick heart… bleeding
39 S/3: So I think I might give him morphine or will I wait
47 S/3: Are you sore, no response
48 S/3: Rest your hands down by your sides, very anxious there
49 S/3: When we turned him, he was expressing soreness on his face
103 S/3: He had fentanyl 1mg in theatre, so he could be in pain as it is short acting
104 S/3: Also he didn’t have spinal morphine in theatre either so he could be sore
105 S/3: And he grimaced when turned
106 S/3: He was rigid there, like a board during the turn, so he must be in pain
108 S/3: Have you any pain sir, are you sore, no response, not awake enough to be appropriate
110 S/3: I will watch his response to the analgesia and sedative, best way at the moment, MAP so high, I see no other explanation for the high MAP
129 S/3: I am just going to reduce down the GTN and Nipride, because his MAP has dropped dramatically, now 60.
130 S/3: So he must have been sore
132 S/3: Morphine and Midazolam did the trick, but he is also on Nipride and GTN as vasodilators
133 S/3: Also he is very anxious, so drop in MAP in response to morphine is not definitive here’.

It is of note that the physiological cue ‘MAP response to analgesia and sedative’ is revisited and analysed in-depth by the critical care nurse based on the ventilated patient’s haemodynamic response reflecting a thorough understanding of the patient on the part of the critical care nurse.

A sequence of five first-order cues were utilised by the critical care nurse and combined into another intermediate judgement, i.e. ‘haemodynamically he is unstable’. These first-order cues included one paraclinical cue ‘oozy in theatre’; two mechanical cues as ‘nipride 5’, ‘nitroglycerin 15’; one technical cue ‘chest drainage 100 last quarter’; and three physiological cues ‘temperature central 35’, ‘temperature peripheral 25’ and ‘heart rate 115’ (see Appendix 1A, case three). Furthermore, in the following think aloud passage the physiological cue ‘heart rate 115’ is also utilised in supplementary intermediate judgements, for example ‘he is so anxious’, ‘he is not tolerating the ventilator’ and ‘he is sore’, which were referred to above and where the previously cited physiological cue ‘MAP 100 (shooting up) was also implicated:

53 S/3: ‘This man was oozy in theatre, bleeding in theatre, MAP not helping and ACT 150
55 S/3: He is bleeding at present
56 S/3: Started nipride at 5 mean was high, support vasodilator
57 S/3: GTN is at 15, conduit support, MAP too high
58 S/3: His central temperature is 35 and peripheral 25, so cold
59 S/3: He is also very shivery and shaky
60 S/3: The heart rate is 115, sinus tachycardia, low in volume with a CVP of only 5mmhg
61 S/3: A, I’ll keep your arms down in under the covers, by your side there, relax A, still agitated and uncomfortable, also very shivery
62 S/3: That’s my ventilator alarm, he is biting the tube, fighting the ventilator which is pushing up his rate also and his MAP
66 S/3: So haemodynamically he is unstable’.
It could also be inferred from the above think aloud passage that physiological cues such as 'heart rate 115' and 'MAP 100 (shooting up)' have many probable meanings in a context where the patient, despite repeated efforts on the part of the critical care nurse, was unable to communicate his pain state. Moreover, the urgency of the situation in which the critical care nurse must make a clinical judgement of the ventilated patient's pain state in the immediate phase post cardiac surgery in order to reduce the deleterious impact on the patient is revealed.

Three first-order behavioural general cues were utilised and combined by the critical care nurse into another intermediate judgement 'he is so anxious' including two of the above mentioned physiological first-order cues, i.e. 'heart rate 115' and 'MAP 100 (shooting up)'. The think aloud citation below seems to indicate that the first-order cues accessible to the critical care nurse have many possible interpretations:

92 S/3 J: 'Rest the arm down, now I will fix this probe because it is disconnected, he is restless there
93 S/3 J: As he is agitated, MAP is up in 100's, heart rate is fast in the 100's also, must be uncomfortable
and not happy on the ventilator
95 S/3 J: He is also so fidgety for all of the same reasons, plucking at the bedclothes because he is anxious
and uncomfortable, plus his MAP is up and distressed on the ventilator
96 S/3 J: He is very uneasy, bothered and distressed
97 S/3 J: My oxygen probe has fallen off because he is shaking and shivery and moving around a bit
98 S/3 J: He is too anxious for comfort
99 S/3 J: He is so anxious'.

It appears the critical care nurse utilised five first-order judgements and integrated these into a final judgement to reflect the ventilated patient's pain state which is demonstrated in the next think aloud quotation:

140 S/3 J: 'He is sore even though he is unable to tell me plus
141 S/3 J: Haemodynamically he is unstable
142 S/3 J: A is not awake
143 S/3 J: He is so anxious
144 S/3 J: A is not tolerating the ventilator
145 S/3 J: Therefore he is in acute pain'.

The above scenario highlights the complexity of the situation to which the critical care nurse must make a clinical judgement of the ventilated patient's pain state based on several first-order cues, many of which have numerous plausible meanings. In addition, the first-order cues appear simultaneously rather than sequentially. Subsequently, the critical care nurse seems to reduce this complexity and uncertainty by creating a two tier judgement process where first-order cues are utilised and combined into intermediate judgements. Accordingly, these intermediate judgements of which there are five in this pain incident operated as second-order cues to enable the critical care nurse to make a final judgement of the ventilated patient's pain state in the immediate phase post cardiac surgery, i.e. 'he is in acute pain'. The next piece presents the findings relative to the patient's pain behaviours.
4.3.2 Pain Incident: Repositioning post Chest X-ray: Patient Pain Behaviour Cues

This pain incident came to pass at 12.35 hours as the ventilated patient returned from theatre at 12 noon to the critical care unit post coronary artery bypass surgery (CABG) grafts by four. On this occasion the patient was turned subsequent to a routine chest x-ray. The vasodilator support infusing on this occasion was nipride 5 and nitroglycerin 15. The patient exhibited the following three physiological cues which altered rapidly from their respective baselines: ‘heart rate 115’ from a baseline of 75; ‘mean arterial blood pressure (MAP) 100’ from a base of 70 to 80, along with ‘respiratory rate 14’ from a base rate set on the ventilator of 10. In addition, two overt motor pain behaviour cues ‘grimace’ and ‘guarded movement’ were revealed by the ventilated patient in conjunction with one behavioural general cue ‘restlessness’ together with two patient ventilator dysynchrony cues ‘chewing on ETTube’ and ‘distress on the ventilator’. Moreover no verbal subjective pain behaviour cue, i.e. ‘patient self-report pain’, was demonstrated by the ventilated patient in this pain incident either spontaneously or in response to the critical care nurse’s probing concerning pain and soreness.

In summary, the ventilated patient thirty-five minutes post arrival to the critical care unit post CABG surgery during repositioning post routine chest x-ray showed signs of three altered physiological cues (see Table 4.3a). Additionally, two overt motor pain behaviour cues were recorded. Furthermore, one behavioural general cue and two patient ventilator dysynchrony cues were evident. The next piece illustrates the findings associated with connecting the critical care nurse cue characteristics and the patient’s pain behaviour cues.

4.3.3 Data Triangulation

The patient pain behaviour cues observed by the researcher matched with each first-order cue verbalised by the critical care nurse within the judgement process during both pain incidents with one exception. In this case which was previously presented in its entire context, the following physiological cue ‘respiratory rate 14’ was not verbalised explicitly by the critical care nurse. The next think aloud segment presents the critical care nurse’s verbalisation which may provide covert evidence of the aforementioned physiological cue:

```
60 S/3 J: "...the heart rate is 115, sinus tachycardia, low in volume with a CVP of only 5mmhg, some ectopics
61 S/3 J: A, I'll keep your arms in under the covers, by your side there, relax, A, still agitated, uncomfortable and shivery
62 S/3 J: That's my ventilator alarm, he is biting the tube, fighting the ventilator which is pushing up his rate also and his MAP..."
```

However, reference in the above think aloud extract to ‘pushing up his rate’ may imply an increase in respiratory rate, which draws attention to some of the difficulties surrounding the analysis of incomplete think aloud protocols.

Overall summary: the findings in this case indicated that the critical care nurse adopted a particular strategy in order to make a judgement of the ventilated patient’s pain state in the
PATIENT PAIN BEHAVIOUR CUES

The patient returned from theatre at 12 noon hours following coronary artery grafts by four (inclusive left internal mammary artery). This 'pain incident' commenced at 12.35 hours while the ventilated patient was being repositioned subsequent to a routine chest x-ray. The following pain cues were recorded:

TABLE 4.3A CASE THREE: PAIN INCIDENT

<table>
<thead>
<tr>
<th>Cue</th>
<th>Context (Vasodilators / Inotropes)</th>
<th>Category</th>
<th>Prior to Pain Incident</th>
<th>Baseline Parameters</th>
<th>Current Parameters</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean arterial blood pressure (MAP)</td>
<td>Nipride 5 Nitroglycerin 15</td>
<td>Physiological</td>
<td>65</td>
<td>70-80</td>
<td>100</td>
<td>Increased MAP</td>
</tr>
<tr>
<td>Heart Rate</td>
<td></td>
<td>Physiological</td>
<td>90</td>
<td>75</td>
<td>115</td>
<td>Increased heart rate</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td></td>
<td>Physiological</td>
<td>10</td>
<td>10</td>
<td>14</td>
<td>Increased respiratory rate</td>
</tr>
<tr>
<td>Grimace</td>
<td></td>
<td>Overt Motor Pain</td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Guarded movement</td>
<td></td>
<td>Overt Motor Pain</td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Restlessness</td>
<td></td>
<td>Behavioural</td>
<td></td>
<td></td>
<td></td>
<td>Moving both her hands repetitively post turn</td>
</tr>
<tr>
<td>Chewing in ET Tube</td>
<td></td>
<td>Patient Ventilator</td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Distress on the ventilator</td>
<td></td>
<td>Patient Ventilator</td>
<td></td>
<td></td>
<td></td>
<td>Change (Fighting the ventilator)</td>
</tr>
<tr>
<td>Patient self-report pain</td>
<td></td>
<td>Verbal</td>
<td></td>
<td></td>
<td></td>
<td>No response to questions by the critical care nurse: are you sore?; are you in pain?</td>
</tr>
</tbody>
</table>
immediate phase post cardiac surgery. The preliminary cue that initiated this strategy was physiological, namely ‘MAP 100 shooting up’. The aforesaid physiological cue was selected along with several first-order cues (see Figure 4.3), specifically: additional physiological cues, technical, mechanical, behavioural general, overt motor pain behaviour, pain descriptor cues and one covert behaviour with one paraclinical cue. These first-order cues were used and combined into five intermediate judgements (see Figure 4.3). Subsequently, the five intermediate judgements were selected as second-order cues which were used and integrated into a final judgement, i.e. ‘he is in acute pain’. Moreover, the patient exhibited pain behaviours which were recorded by the researcher in the field. Besides, while matching the critical care nurse cue characteristics and the patient’s pain behaviours, it appeared one physiological cue was not articulated overtly by the critical care nurse.

The findings of case four are portrayed in the next section with an initial sentence positioning the landscape for both main data-sets i.e. critical care nurse cue characteristics and patient pain behaviour cues.

4.4 CASE FOUR

4.4.1 PAIN INCIDENT: REPOSITIONING POST CHEST X-RAY: CRITICAL CARE NURSE CUE CHARACTERISTICS

The scene for this pain incident occurred at 13.40 hours, forty minutes after the arrival of the ventilated patient post cardiac surgery in the critical care unit. The first-order cue which seemed to initiate this ‘time one pain incident’ was physiological ‘MAP 93 acute rise’. The critical care nurse utilised and combined a number of other first-order cues (see Figure 4.4) in conjunction with the aforesaid physiological cue to infer an intermediate judgement ‘he is uncomfortable’. The other first-order cues are as follows: one technical cue ‘turned for chest x-ray’; two overt motor pain behaviour cues ‘grimace when turned’ with ‘resisting movement there’; two mechanical cues ‘no spinal morphine in theatre’ and ‘fentanyl 1 mg in theatre’; another two physiological cues ‘heart rate 100’ with ‘MAP 60 post morphine’; and one pain descriptor cue ‘patient self-report pain’. It could be interpreted that the critical care nurse attached some importance to the expression ‘acute rise’ alongside the physiological cue ‘MAP 93’. In addition, the three aforementioned physiological first-order cues were also implicated in other first-order judgements reflected in the subsequent think aloud extract:

61 S/4 M: ‘I wonder is he experiencing soreness or waking up or anxious with that MAP 93, which is a little bit too high for him
62 S/4 M: It is an acute rise which to me is significant because it is not just rising over the last forty minutes since his return from OT
63 S/4 J: So M is hypertensive there, just that bit anxious and fighting the ventilator.
64 S/4 M: With the turn he is experiencing discomfort
65 S/4 M: Just turning you M after the x-ray, okay, it is okay, just come with me, he resists me there, very rigid and stiff during turn also scared, now twenty to two, back forty minutes
126 S/4 M: Okay, heart rate is at 100, sinus tachycardia, bit fast from baseline 70
127 S/4 M: He could be sore, but he is very bothered there, and fighting the ventilator
156 S/4 M: He may also be experiencing pain with that acute rise MAP, no spinal morphine in theatre
Figure 4.3


Cues (1st Order Cues)

- MAP 100 (shooting up)
- Turned chest X-ray
- Fentanyl 1mg in theatre
- No spinal morphine in theatre
- Grimace when turned
- He is rigid there
- Response to verbal stimuli
- MAP response to analgesia and sedative
- Oozy in theatre
- Nipride 5
- Nitroglycerin 15
- Chest drainage 100 last quarter
- Temperature central 35°C
- Temperature peripheral 25.0°C
- Heart rate 115
- Eyes closed
- Not obeying verbal commands
- Restlessness
- Fidgety, plucking bed clothes
- Uneasy
- Biting ET tube

Intermediate Judgement (2nd Order Cues)

- Risk for Impaired Comfort
- Altered Hemodynamics
- Level of Wakefulness
- Anxiety
- Patient Ventilator Compliance

Final Judgement

- Risk for Acute Pain

Legend:
- # Physiological cue
- □ Mechanical cue
- △ Technical cue
- * Behavioural (general) cue
- • Pain descriptor cue
- □ Covert behaviour cue
- △ Overt motor pain behaviour cue
- ▲ Knowledge cue
- ≈ Physical cue
- △ Paraclinical cue
157 S/4 M: And just Fentanyl 1 mg in theatre which is short acting
158 S/4 M: He also grimaced when turned
160 S/4 M: J, you’re doing great, J, are you in pain, yes, okay, he said he was in pain
162 S/4 M: He is uncomfortable
193 S/4 M: Okay, now he’s a little bit hypotensive after the morphine, MAP 60, I just wanted to confirm that his MAP could be pain related
194 S/4 M: So he was in pain but
195 S/4 M: I am sure it will pick up, maybe it’s due to the morphine and pain relief, but low in volume also and on 6 GTN at that time so it shows I cannot depend on MAP response to morphine with him’.

The think aloud extract previously cited seems to indicate that the critical care nurse not only utilised a number of cues with several meanings but also incorporated one specific cue ‘grimaced when turned’ observed earlier while seeking confirmation from the patient about his pain which facilitated the aforementioned intermediate judgment. It might be said also that the situation for the critical care nurse was ambiguous and uncertain and that the first-order cue ‘MAP 60 post morphine’ did not clarify some of the uncertainty. It could be interpreted that the critical care nurse utilised the aforesaid physiological cue in order to get a sense of the initial first-order cue ‘MAP 93 acute rise’ as a future reference point with this patient. Concurrently, the critical care nurse made another intermediate judgement ‘he is anxious’ utilising and aggregating four first-order behavioural general cues such as ‘restlessness’, ‘chewing on the tube’, ‘frowning looks distressed’ and ‘fidgety plucking the bedclothes’. These aforesaid cues are presented in the next think aloud citation which seems to point out that some of the cues are also used to infer additional intermediate judgements:

78 S/4 M: ‘He is a bit restless there for comfort, restlessness there
79 S/4 M: J, it is strange for you when you come in here, lying down like that and wires and tubes attached
to you, they’re all part of it and they’ll all be going away bit by bit, so unsettled and uneasy
82 S/4 M: J, Are you okay, J, a little bit
83 S/4 M: J, Is it the pain that’s bothering you, he could be sore but no response there yet
85 S/4 M: He is chewing on the ET Tube, anxious, fighting the ventilator, plus uncomfortable I would say
but only he has the story
87 S/4 M: He has some frown with it all, looks distressed, bothered and anxious, could be pain related
113 S/4 M: J, you’re in intensive care, he is fidgety there plucking at the bedclothes, you’ve a monitor
attached to your finger which you need, so just relax there
115 S/4 M: Very anxious and bothered there, but not awake yet
116 S/4 M: There’s a lot going on, that’s why it’s so noisy and there are a lot of people talking around you,
all right, but you are being minded all the time, just have a little sleep
118 S/4 M: He is anxious’.

It could be inferred from the above think aloud citation that the ventilated patient in the immediate phase post cardiac surgery created many challenges for the critical care nurse who attempted to infer the patient’s state from several cues with many potential meanings. It also seems that the critical care nurse was mindful of the patient’s input within the judgement process. Moreover, some additional first-order cues sought by the critical care nurse were not made available due to the patient’s wakeful state further compounded by his anxious status.

Two first-order behavioural general cues, for instance ‘eyes open drifts off’ and ‘obeys some commands’ with one paraclinical cue ‘fast track process’ were used and combined by the critical care nurse to formulate another intermediate judgement ‘he is not quite awake yet’. At
the same time, several first-order cues were used and integrated by the critical care nurse into one more intermediate judgement, i.e. ‘J is bleeding at present’. The compilation of these first-order cues were as follows: three paraclinical cues ‘CABG by 3 with LIMA’, ‘oozy in theatre’, ‘left ventricular ejection fraction 50%’; one technical cue ‘chest drainage 100 last quarter’; along with two additional physiological cues ‘temperature central 35.2c’ and ‘temperature 27c’; and one mechanical cue ‘GTN 6’. It could be said that each of these aforesaid cues are interlinked incorporating two physiological cues ‘MAP 93 acute rise’ and ‘heart rate 100’ which were relevant in the aforementioned intermediate judgement ‘so he is in pain’ as articulated by the critical care nurse in the following think aloud excerpt:

91 S/4 M: ‘He had CABG by three with a LIMA, so four grafts, problem with RCA in OT
92 S/4 M: He was oozy in theatre, bleeding in theatre, lost a lot of blood and oozy at present
93 S/4 M: 100 last quarter, MAP up also and ACT 158 abnormal result, should be around 125-135
94 S/4 M: Yes, he had a good ventricle, good LV function, good ventricle, ejection fraction 50%
95 S/4 M: He has history of exertional angina, no hypertension
97 S/4 M: So hopefully he should do well and he is able for volume with that ejection fraction
121 S/4 M: GTN running at 6 for graft support but also to control his hypertension
123 S/4 M: I think he probably needs volume, CVP 5mmhg is low, heart rate up, had a diuretic in theatre, but MAP is an issue
125 S/4 M: Because he is draining quite a bit since he came back from theatre
127 S/4 M: Central temperature 35.2 and peripheral 27 so he is cold.
128 S/4 M: ‘J is bleeding at present’.

Furthermore three first-order cues already alluded to earlier, i.e. two physiological cues ‘MAP 93 acute rise’, ‘heart rate 100’ in conjunction with one behavioural general cue ‘chewing on the tube’, were utilised and combined into a further first-order judgement by the critical care nurse ‘he is fighting the ventilator’ providing supplementary evidence of the possibility of several cues having compound meanings. The above think aloud excerpts seem to provide a picture of the complexity and uncertainty of the circumstances to which the critical care nurse is exposed in seeking to formulate a clinical judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery. Consequently, the critical care nurse utilised and combined the aforementioned five intermediate judgements (see Figure 4.4) into a final judgement which is represented in the subsequent think aloud quotation:

181 S/4 M: ‘Okay, so to get a grasp on things, he said he has pain okay
182 S/4 M: He is uncomfortable
183 S/4 M: He is anxious
184 S/4 M: He is not quite awake yet
185 S/4 M: ‘J is bleeding at present, haemodynamically unstable
186 S/4 M: He is fighting the ventilator also
187 S/4 M: So he is in pain at the moment, he told me so’.

It may well be that the pain descriptor cue ‘patient self-report pain’ which was talked about earlier was a significant cue that the nurse relied on amidst much uncertainty and ambiguity revealed in the above think aloud quotation. There is also a suggestion that the utilisation and integration of the intermediate judgements which acted as second-order cues in order to formulate a final judgement were ways for the critical care nurse to get a sense of the ventilated patient’s pain state as his haemodynamic status seemed vulnerable and uncertain.
In summary, the critical care nurse was presented with first-order cues which did not ensue in any orderly fashion, some of which were conveyed by the patient and some secured by the critical care nurse. However, several of these first-order cues were probable which heightened an already complex scenario, i.e. ‘J is bleeding at present’. Moreover, the critical care nurse formulated a judgement based on these probable first-order cues about the patient’s pain state in the immediate phase post cardiac surgery. In order to reduce this uncertainty the first-order cues were used and combined into intermediate judgements which subsequently became second-order cues. It seems the critical care nurse then aggregated these second-order cues of which there were five in this pain incident into a final judgement, i.e. ‘he is in pain at the moment’, reflected earlier in the think aloud extracts. Moreover some credence seems to be attached to the first-order cue ‘patient self-report pain’ by the critical care nurse in this intricate context. The subsequent piece presents the pain behaviours exhibited by the patient in this pain incident.

4.4.2 Pain Incident: Repositioning Post Chest X-ray: Patient Pain Behaviour Cues

This pain incident took place in the critical care unit at 13.40 hours where the ventilated patient had returned from theatre forty minutes earlier following coronary artery bypass grafts (CABG) surgery and was repositioned subsequent to a routine chest x-ray. The vasodilator support running during this time was nitroglycerin 6. The following increases occurred in three physiological cues shown by the patient: ‘mean arterial blood pressure 93’ from a base of 70 to 80; ‘heart rate 100’ from a base of 70; alongside ‘respiratory rate 16’ from a base rate of 10. Furthermore, two overt motor pain behaviour cues ‘grimace’ and ‘guarded movement’ were apparent. Besides, one behavioural general cue ‘restlessness’ and two patient ventilator dysynchrony cues ‘distress on the ventilator’ and ‘chewing on ET Tube’ were displayed by the ventilated patient. Moreover, one verbal subjective pain behaviour cue ‘patient self-report pain’ was articulated by the ventilated patient by way of nodding his head in response to the critical care nurse’s repeat probing about his current pain (see Table 4.4a).

In summary, during repositioning forty minutes post CABG surgery, this ventilated patient exhibited the following pain cues: three altered physiological cues alongside two overt motor pain behaviour cues in conjunction with one behavioural general cue. Two patient ventilator dysynchrony cues were also revealed. Ultimately, the verbal subjective pain behaviour cue ‘patient self-report pain’ was expressed by the ventilated patient in reply to the critical care nurse frequent inquiring about his current pain. The next element presents the findings which emerged as the critical care nurse cue characteristics were matched with the patient’s pain behaviours during fieldwork.

4.4.3 Data Triangulation

The pain behaviours observed by the researcher matched with each cue verbalised by the critical care nurse in each pain incident with the following exception. The physiological cue ‘respiratory rate 16’ was observed by the researcher but not articulated overtly by the critical
**Patient Pain Behaviour Cues**

The patient returned from theatre at 13.00 hours following coronary artery grafts by four (inclusive left internal mammary artery). This 'pain incident' commenced at 13.40 hours while the ventilated patient was being repositioned subsequent to a routine chest x-ray. The following pain cues were recorded:

**Table 4.4a: Case Four: Pain Incident**

<table>
<thead>
<tr>
<th>Cue</th>
<th>Context (Vasodilators / Inotropes)</th>
<th>Category</th>
<th>Prior to Pain Incident</th>
<th>Baseline Parameters</th>
<th>Current Parameters</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean arterial blood pressure (MAP)</td>
<td>Nitroglycerin 6</td>
<td>Physiological</td>
<td>60</td>
<td>70-80</td>
<td>93</td>
<td>Increased MAP</td>
</tr>
<tr>
<td>Heart Rate</td>
<td></td>
<td>Physiological</td>
<td>88</td>
<td>70</td>
<td>100</td>
<td>Increased heart rate</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td></td>
<td>Physiological</td>
<td>10</td>
<td>10</td>
<td>16</td>
<td>Increased respiratory rate</td>
</tr>
<tr>
<td>Grimace</td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Guarded movement</td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Restlessness</td>
<td>Behavioural General Cue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Moved both arms in particular right arm towards chest post turn</td>
</tr>
<tr>
<td>Distress on the ventilator</td>
<td>Patient Ventilator Dysynchrony</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Change (Fighting the ventilator)</td>
</tr>
<tr>
<td>Chewing in ET Tube</td>
<td>Patient Ventilator Dysynchrony</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Patient self-report pain</td>
<td>Verbal Subjective Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No response to initial question by critical care nurse: is it the pain that is bothering you? Nods his head (yes) in response to the critical care nurse's question: Are you in pain?</td>
</tr>
</tbody>
</table>

**Repositioning Post Chest X-Ray**


care nurse. This is illustrated in the next think aloud citation which has already been presented in context above:

83 S/4 "...M: J, is it the pain that's bothering you, he could be sore but there is no response yet
85 S/4 M: He is chewing on the ETTube, anxious, fighting the ventilator, his rate has changed, plus
uncomfortable I would say but only he has the story
87 S/4 M: He has some frown with it all, looks distressed, bothered and anxious, could be pain related..."

The reference to 'his rate has changed' could be interpreted as an increase in respiratory rate. However, it can only be assumed in the aforementioned think aloud segments that the critical care nurse was referring to a change in respiratory rate which could then be construed as matching 'respiratory rate 16' which was observed at that particular point in time by the researcher.

Overall summary: the findings of case four suggest that the critical care nurse formulated a judgement of the ventilated patient's pain state during repositioning within one hour post return to the critical care unit post cardiac surgery based on a pattern of cues which were ordered into two phases. The initial phase commenced with a first-order physiological cue 'MAP 93 acute rise'. Meanwhile, the critical care nurse utilised several additional first-order cues (see Figure 4.4), i.e. physiological, technical, mechanical, behavioural general, paraclinical and overt motor pain behaviour cues. Subsequently, the aforesaid cues were incorporated into five intermediate judgements which were presented earlier. The second phase revealed the utilisation of intermediate judgements as second-order cues which were involved in the creation of the final judgement, i.e. 'so he is in pain at the moment'. Furthermore, the patient communicated a pattern of cues to the critical care nurse in this first pain incident. In addition, the critical care nurse articulated both first-order and second-order cues while one physiological cue was not overtly verbalised as illustrated earlier.

The findings of case six are illustrated in the following section with a miniature depiction of the scene for both core data-sets, i.e. critical care nurse cue characteristics and patient pain behaviour cues.

4.5 CASE SIX

4.5.1 PAIN INCIDENT: REST: CRITICAL CARE NURSE CUE CHARACTERISTICS

This next pain incident occurred at 17.00 hours in the critical care unit in the context of the ventilated patient undergoing an electrocardiogram five hours post cardiac surgery. The 'time four pain incident' commenced with a paraclinical cue 'ECG check'. This first-order cue set in motion the utilisation and integration of several other first-order cues which not only occurred simultaneously but also with many probable meanings creating many challenges for the critical care nurse. Three first-order behavioural general cues, for instance 'cough', 'trying to communicate via ETTube', 'obeys verbal commands', and one physiological cue 'respiratory rate 20' in conjunction with the paraclinical cue 'ECG check' were formulated by the critical
care nurse into an intermediate judgement 'she is awake' as presented in the next think aloud extract:

501 S/6 ES: 'J, we're just going to do an ECG on you, okay, 5 o'clock. It's all very routine following surgery.
502 S/6 ES: She is awake, feeling the electrodes being pulled off there, agitated now also it seems the minute she wakes
517 S/6 ES: Coughing there, do you have phlegm, you want to cough, good cough reflex, well done, that's it, she used to smoke
518 S/6 ES: I know it's sore when you cough, J, also causing her MAP to rise
520 S/6 ES: Respiratory rate has picked up to 20, breathing on her own, very awake
522 S/6 ES: Agitated also and uncomfortable trying to tell me that and her rate speeds up as a result, ready to wean also
524 S/6 ES: I am lip reading here what you are trying to say that the tube is causing discomfort and you feel anxious with the tube, very aware
527 S/6 ES: She is wide awake'.

The aforementioned think aloud extract seems to indicate that three of the first-order cues, i.e. 'cough', 'respiratory rate 20' and 'ECG check', had many possible meanings which directly and indirectly caused the manifestation of supplementary cues in this pain incident.

Five first-order cues were also used and combined by the critical care nurse into the intermediate judgement 'she is anxious'. The set of cues were as follows: four behavioural general cues, i.e. 'moving head from side to side', 'trying to self-extubate', 'restlessness' and 'chewing on the ET Tube' alongside one physiological cue 'MAP 89'. Each of these first-order cues had several probable meanings illustrated in the subsequent think aloud passage and were implicated as such into additional intermediate judgements formulated by the critical care nurse, i.e. 'she is awake', 'she is fighting the ventilator' and 'she is sore':

506 S/6 ES: 'Moving her head from side to side there, anxious there
507 S/6 ES: Open your eyes there and have a good look around, not in the mood for that
508 S/6 ES: Uncomfortable there, trying to attract attention
509 S/6 ES: She is trying to self-extubate there, anxious and agitated, stressed and awake
510 S/6 ES: Uncomfortable with tube, hates that tube
511 S/6 ES: Restlessness there, very uneasy, sore with the tube, plus not compliant with the ventilator, very aware
530 S/6 ES: MAP rising 89, agitated MAP up, also uncomfortable, hypertensive there
536 S/6 ES: She is chewing on the tube, anxious and wants the tube out, tube is so uncomfortable and she is wide awake
537 S/6 ES: Will you try and work with me and we will get that tube out
538 S/6 ES: Also fighting the ventilator
539 S/6 ES: She is anxious'.

Another intermediate judgement 'she is haemodynamically stable at present' was made by the critical care nurse based on four first-order cues as follows: three physiological cues 'heart rate 89', 'temperature central 37°C' with 'temperature peripheral 33.6°C' and one mechanical cue 'nitroglycerin 4'. An additional intermediate judgement 'she is sore' was created by the critical care nurse founded on her utilisation and integration of the following five first-order cues: two pain descriptor cues 'patient self-report pain', 'pain location' along with two overt motor pain behaviour cues 'grimace' and 'pointing to chest drains' with one knowledge cue 'knowing the
patient’. The following think aloud abstract illustrates the aforesaid process which also seems to emphasise how the critical care nurse not only used her knowledge of this patient but also applied her experiential knowledge of other patients to this context as is revealed below:

516 S/6 ES: 'She is pointing to the chest drains, are you sore at the chest drain sites, yes, you are
544 S/6 ES: Are you in pain, okay, you have pain.
545 S/6 ES: I know she is in pain, she tells me every time
546 S/6 ES: She is grimacing there so experiencing pain
547 S/6 ES: Your chest is still a bit sore, is it, okay
548 S/6 ES: I know by her now that she is sore, that tube is uncomfortable and that is the issue
549 S/6 ES: Not happy on the ventilator, needs to be extubated, also very nervous
550 S/6 ES: I know by her haemodynamics also that she is uncomfortable
551 S/6 ES: Another thing I’m really finding out now with patients, and with her now that I have come to know her is that when the patient is extubated, they’re far more comfortable
552 S/6 ES: It just gets rid of one discomfort, even just to be able to do that, it will take away that element of stress which she is experiencing
553 S/6 ES: Is your leg sore, no, is there some discomfort with your leg, yes, okay
555 S/6 ES: She is sore.

It could be interpreted that the first-order cue ‘knowing the patient’ enabled the critical care nurse not only draw on her experiential knowledge of similar patients but also to become very focused on ascertaining additional pain descriptor cues with the patient reducing the uncertainty amidst some of the aforesaid behavioural general cues, for example ‘restlessness’ and physiological cues for instance ‘MAP 89’. Three first-order cues disclosed earlier were used and combined by the critical care nurse to make another intermediate judgement ‘she is fighting the ventilator’, i.e. ‘restlessness’, ‘chewing on the tube’ and ‘knowing the patient’. Each of the abovementioned intermediate judgements which operated as second-order cues were used and integrated by the critical care nurse into a final judgement ‘she is in acute pain’ demonstrated in the next citation:

562 S/6 ES: 'So she is awake
563 S/6 ES: She is anxious
564 S/6 ES: She is haemodynamically stable at present except the mean is rising
565 S/6 ES: She is sore as she told me plus
566 S/6 ES: She is fighting the ventilator
568 S/6 ES: So she is in acute pain which I need to rectify now with morphine'.

In summary, in the above pain incident several first-order cues were articulated by the critical care nurse with many probable meanings. In addition, one first-order cue ‘knowing the patient’ seemed to reduce some of the complexity of the situation for the critical care nurse where her experiential knowledge of this patient was compared and contrasted with similar patients. The strategy employed by the critical care nurse was a two pronged approach whereby first-order cues were used (see Figure 4.5) and integrated into intermediate judgements which consequently performed as second-order cues. Subsequently, second-order cues of which there were five in this pain incident were utilised and combined into a final judgement by the critical care nurse. It could be said that this strategy reduced the complexity for the critical care nurse where cues were simultaneously accessible in a highly unpredictable scenario, i.e. the ventilated
patient in pain in the immediate phase post cardiac surgery. The patient’s pain behaviours are
presented in the following piece.

4.5.2 PAIN INCIDENT: REST: PATIENT PAIN BEHAVIOUR CUES

The subsequent pain incident happened at 17.00 hours as the ventilated patient was
undergoing an electrocardiogram five hours post her arrival in the critical care unit following
CABG surgery. The vasodilator support infusing was nitroglycerin 4. Two observed
physiological cues displayed increases from normal parameters: ‘mean arterial blood pressure
89’ from a base of 70 to 80 and ‘respiratory rate 20’ from a base of 12. One more physiological
cue presented no change, i.e. ‘heart rate 89’ from a base of 74. Meanwhile, two patient ventilator
dysynchrony cues ‘chewing on ETTube’ and ‘distress on the ventilator’ along with one
behavioural general cue ‘restlessness’ were also manifest. The verbal subjective pain behaviour
cue ‘patient self-report pain’ was expressed in various ways (see Table 4.6b) by the ventilated
patient in reply to probing questions about pain and pain locations such as chest region and leg
area on the part of the critical care nurse. Two overt motor pain behaviour cues were also
exhibited, i.e. ‘grimace’ and ‘pointing to chest drains’. One of the aforementioned cues ‘pointing
to chest drains’ initiated by the ventilated patient acted as an antecedent to the critical care nurse’s
searching for a specific pain site (see Table 4.6b) with the ventilated patient.

In summary, this ventilated patient five hours post CABG surgery while undergoing an
electrocardiogram made known the following pain cues: two altered physiological cues together
with one behavioural general cue and two patient ventilator dysynchrony cues. Besides, the
verbal subjective pain behaviour cue ‘patient self-report pain’ was articulated in different ways
by the ventilated patient as a result of questioning by the critical care nurse. Furthermore, two
overt motor pain behaviour cues, i.e. ‘grimace’, and ‘pointing to chest drains’, were apparent.
The data triangulation findings are described in the subsequent piece.

4.5.3 DATA TRIANGULATION

The pain behaviours observed at the bedside by the researcher matched the critical care
nurse’s think aloud verbalisation of pain cues in both pain incidents with one exception. In this
pain incident during repositioning the researcher observed ‘guarded movement’ which was
covently verbalised by the critical care nurse in the following think aloud abstract:

30 S/6 ES: “... I have just turned her there for a pressure areas check after x-ray
31 S/6 ES: I try to turn the patient post surgery immediately when they come back and in three or four
hours later so I am not constantly re-positioning her, because from her stability, from cardiac point of view
as well
32 S/6 ES: So I would assume then that she is uncomfortable with the turn, anyway, she was going against
me...”

It could be interpreted that ‘she was going against me’ implied ‘guarded movement’ which
was observed and recorded by the researcher at that particular time.
**PAIN BEHAVIOUR CUES**

This 'pain incident' commenced at 17.00 hours while the ventilated patient who was back from theatre approximately five hours was undergoing an electrocardiogram. The following pain cues were recorded:

**TABLE 4.6B CASE SIX: PAIN INCIDENT**

<table>
<thead>
<tr>
<th>Cue</th>
<th>Context (Vasodilators / Inotropes)</th>
<th>Category</th>
<th>Prior to Pain Incident</th>
<th>Baseline Parameters</th>
<th>Current Parameters</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean arterial blood pressure (MAP)</td>
<td>Nitroglycerin 4</td>
<td>Physiological</td>
<td>65</td>
<td>70 - 80</td>
<td>89</td>
<td>Increased MAP</td>
</tr>
<tr>
<td>Heart Rate</td>
<td></td>
<td>Physiological</td>
<td>94</td>
<td>74</td>
<td>89</td>
<td>No change</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td></td>
<td>Physiological</td>
<td>14</td>
<td>12</td>
<td>20</td>
<td>Increased respiratory rate</td>
</tr>
<tr>
<td>Grimace</td>
<td></td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Restlessness</td>
<td></td>
<td>Behavioural General Cue</td>
<td></td>
<td></td>
<td></td>
<td>Moving her head vigorously from side to side, brings both hands up towards to ET Tube making several attempts to remove the ET Tube</td>
</tr>
<tr>
<td>Chewing on ET Tube</td>
<td></td>
<td>Patient Ventilator Dysynchrony</td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Distress on the ventilator</td>
<td></td>
<td>Patient Ventilator Dysynchrony</td>
<td></td>
<td></td>
<td></td>
<td>Change (fighting the ventilator)</td>
</tr>
<tr>
<td>Patient self-report pain</td>
<td></td>
<td>Verbal Subjective Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td>Nods her head (yes) in response to questions by the critical care nurse: are you in pain? are you sore in your chest there? is there some discomfort with your leg? Shakes her head (no) to the question asked by the critical care nurse: is your leg sore?</td>
</tr>
<tr>
<td>Pointing to chest drains</td>
<td></td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td>She is moving her right hand towards her chest drains: nods her head (yes) in response to the critical care nurse's question: are you sore at the chest drains there?</td>
</tr>
</tbody>
</table>
Overall summary: the findings suggest that the critical care nurse assumed a policy with a primary and secondary phase in order to make a judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery. The first phase involved a pattern of first-order cues, some with several probable meanings, used and incorporated into a select number of intermediate judgements. The compilation of first-order cues in phase one were as follows: one paraclinical cue, some physiological, behavioural general, mechanical, overt motor pain behaviour, pain descriptor cues and one knowledge cue. The second phase involved the integration of five intermediate judgements (see Figure 4.5) performing as second-order cues into a final judgment of the ventilated patient’s pain state in the immediate phase post cardiac surgery, i.e. ‘she is in acute pain’. Besides, the patient in her natural habitat displayed physiological, behavioural general, overt motor pain behaviour cues, ventilator dysynchrony and verbal subjective pain behaviours in this pain incident. Data triangulation revealed the cues between both data-sets.

The findings of case seven are presented in the next section with a miniature picture locating both core data-sets i.e. critical care nurse cue characteristics and patient pain behaviour cues

4.6 CASE SEVEN

4.6.1 PAIN INCIDENT: REST: CRITICAL CARE NURSE CUE CHARACTERISTICS

The following scenario reflects a pain incident whereby the ventilated patient was at rest five hours following cardiac surgery in the critical care unit. The initial first-order cue in this pain incident was a first-order behavioural general cue ‘eyes closed’ which was used and aggregated by the critical care nurse into an intermediate judgement ‘she is asleep’. Furthermore, two additional first-order behavioural general cues such as ‘not moving’ and ‘not biting the tube’ with one physiological cue ‘respiratory rate 14’ were included in the aforesaid intermediate judgement. The next think aloud excerpt presents a representation of the critical care nurse’s strategy which seems to indicate that each of the first-order cues had many probable meanings:

494 S/7 AL: ‘She is sleeping, her eyes are closed, also comfortable at the moment, time now 7 o’clock
496 S/7 AL: She is not moving as she is sleeping and appears comfortable
519 S/7 AL: Her respiratory rate is 14, sleeping nicely, has some effort there, not as distressed like before on the ventilator
521 S/7 AL: Just nice and comfortable also
522 S/7 AL: She is not biting on the tube, sleeping there
523 S/7 AL: Plus she is synchronising with the ventilator at long last, comfortable at present, appears painfree
524 S/7 AL: She is sound asleep’.

The critical care nurse used and aggregated five first-order cues into an intermediate judgement ‘she is comfortable there’. The first-order cues consisted of two behavioural general cues ‘not fidgety’ and ‘relaxed facial expression’ with two physiological cues ‘MAP 74’ and ‘heart rate 86’ alongside one knowledge cue ‘knowing the patient’. There is evidence in the subsequent think aloud extract that each cue had many possible interpretations for the critical
care nurse resulting in their implication in four other intermediate judgements, i.e. ‘she is haemodynamically stable’, ‘she is synchronising with the ventilator’, ‘she is asleep’ and ‘she is not anxious at present’:  

500 S/7 AL: ‘She is no longer fidgety, therefore she is not in pain at the moment
502 S/7 AL: At risk of becoming uncomfortable, but lovely and settled, not anxious at the moment
504 S/7 AL: Her facial expression is relaxed, comfortable there, not in pain I would say
530 S/7 AL: Mean pressure is normal, not in pain, MAP 74, she is normotensive, normal filling pressures also, plus she is comfortable and not anxious like before
533 S/7 AL: Heart rate is 86 as she is comfortable at the moment, regular sinus rhythm, appears asleep
542 S/7 AL: I know her by now over the last five hours, I know when she is in pain because
543 S/7 AL: She has been able to tell me but it is not always that straightforward with these cardiac patients who are ventilated and in particular agitated
544 S/7 AL: I also know by her demeanour, she does not appear to be in pain at the moment, because she is relaxed, not fighting the ventilator like before and she is asleep.
545 S/7 AL: I take no movement here to mean that she is comfortable and asleep but that is because I know her and the way she communicates her pain to me, as no movement does not always mean no pain
546 S/7 AL: Plus she is no longer frightened or anxious which is good, and her vitals are normal now
548 S/7 AL: But I will not disturb her, I want her to sleep
549 S/7 AL: She is comfortable at the moment but I will give her pain control
550 S/7 AL: I will be constantly be watching her because she is at risk of becoming sore’

It would appear from the aforementioned think aloud extract that the first-order cue ‘knowing the patient’ was utilised by the critical care nurse to interpret the patient’s existing behaviour and make sense of several additional first-order cues with many probable meanings. In addition, the current patient’s contribution in conveying pain descriptor cues was emphasised in light of other cardiac patients. Moreover, the critical care nurse used and combined five intermediate judgements into a final judgement, i.e. ‘she is not in pain at present’, represented in the next think aloud passage:

556 S/7 AL: ‘So to review the story; B is asleep
557 S/7 AL: She is comfortable
558 S/7 AL: She is haemodynamically stable
559 S/7 AL: She is not anxious
560 S/7 AL: She is synchronising with the ventilator
561 S/7 AL: So she is not in pain at present’.

In summary, this pain incident highlights the importance the critical care nurse attached to the first-order cue ‘knowing the patient’, emphasising her understanding of the patient’s current pain behaviour in direct contrast with other cardiac patients. Besides, ‘knowing the patient’ suggests an in-depth understanding of the patient in relation to pain cues typical of this case. Moreover, the critical care nurse used a two-tier approach (see Figure 4.6) where first-order cues were utilised and integrated into intermediate judgements. It could be interpreted that this approach was employed to reduce the complexity of the judgement task as there did not appear to be a dependable first-order cue as each had several likely explanations. Consequently the critical care nurse combined the second-order cues into a final judgement as presented in the above think aloud passage. The pain behaviours exhibited by the patient are represented in the following piece.
4.6.2 PAIN INCIDENT: REST: PATIENT PAIN BEHAVIOUR CUES

The subsequent pain incident happened at 19.00 hours as the ventilated patient was resting five hours post her arrival in the critical care unit following CABG surgery. The vasodilator support infusing at this point in time was nitroglycerin .5. Two observed physiological cues offered no change from normal parameters: ‘mean arterial blood pressure 74’ and ‘heart rate 86’. One additional physiological cue displayed a marginal increase ‘respiratory rate 14’ from a base rate of 12 set on the ventilator. Besides, one behavioural general cue ‘immobile posture’ was evident. However, no verbal subjective pain behaviour cue ‘patient self-report pain’ was articulated spontaneously by the ventilated patient or sought by the critical care nurse at that particular time (see Table 4.7b).

In summary, this ventilated patient five hours post CABG surgery while resting in the critical care unit made known one behavioural general cue ‘immobile posture’ with a marginal increase in one physiological cue. The results of the triangulation of the core data-set are presented in the next section.

4.6.3 DATA TRIANGULATION

The researcher observed the patient’s pain behaviours as the critical care nurse verbalised the patient’s pain cues, which were subsequently placed side by side to compliment each data source in both pain incidents. In the pain incident ‘repositioning’ one overt motor pain behaviour cue ‘grimace’ observed by the researcher but not explicitly verbalised by the critical care nurse is presented in the following extract:

112 S/7 AL: “... Respiratory rate 16, she is beginning to surface
113 S/7 AL: Bit distressed on the ventilator too
114 S/7 AL: Plus she is frightened and sore, sore more so
115 S/7 AL: I can see her there, see her face…”

The above think aloud quotes, i.e. ‘I can see her there, see her face’, seems to imply that the patient exhibited a grimace which the researcher observed and the critical care nurse may have also noticed but did not explicitly articulate in the above think aloud protocol. However, it is a conjecture that this is the case, highlighting the complexity surrounding the interpretation of think aloud data in instances such as this where verbalisations are implicit rather than explicit.

Overall summary: the findings suggest that the critical care nurse utilised a pattern of cues to make a judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery. The initial first-order cues i.e. behavioural general and physiological cues alongside one mechanical cue, one overt motor pain behaviour cue and one knowledge cue, were used and combined into intermediate judgements (see Figure 4.6) performing as second-order cues. Subsequently, the second-order cues were assimilated into a final judgement by the critical care nurse of the ventilated patient’s pain state in the immediate phase post cardiac surgery, i.e. ‘she is comfortable at the moment’. In addition, this patient exhibited one behavioural general cue
This 'pain incident' commenced at 19.00 hours while the ventilated patient who was back from theatre approximately five hours was at rest. The following pain cues were recorded:

### TABLE 4.7B CASE SEVEN: PAIN INCIDENT

<table>
<thead>
<tr>
<th>Cue</th>
<th>Context (Vasodilators / Inotropes)</th>
<th>Category</th>
<th>Prior to Pain Incident</th>
<th>Baseline Parameters</th>
<th>Current Parameters</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean arterial blood pressure (MAP)</td>
<td>Nitroglycerin .5</td>
<td>Physiological</td>
<td>68</td>
<td>70 - 75</td>
<td>74</td>
<td>No change</td>
</tr>
<tr>
<td>Heart Rate</td>
<td></td>
<td>Physiological</td>
<td>89</td>
<td>70</td>
<td>86</td>
<td>No change</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td></td>
<td>Physiological</td>
<td>12</td>
<td>12</td>
<td>14</td>
<td>Increased respiratory rate</td>
</tr>
<tr>
<td>Immobile posture</td>
<td></td>
<td>Behavioural</td>
<td></td>
<td></td>
<td></td>
<td>No movement</td>
</tr>
<tr>
<td>Patient self-report pain</td>
<td></td>
<td>Verbal</td>
<td></td>
<td></td>
<td></td>
<td>Patient self-report not evident spontaneously by the patient at this time and the patient is not questioned by the critical care nurse about her pain at this time</td>
</tr>
</tbody>
</table>
and one altered physiological cue at this point in time. The results of the triangulated data indicated that the critical care nurse’s verbalisation of pain cues were implicit rather than explicit in one instance.

The findings of case thirteen are described in the subsequent section with an initial sentence placing the view for both main data-sets, i.e. critical care nurse cue characteristics and patient pain behaviour cues.

4.7 CASE THIRTEEN

4.7.1 PAIN INCIDENT: REPOSITIONING POST CHEST X-RAY: CRITICAL CARE
NURSE CUE CHARACTERISTICS

The scenario presented here evolved as the ventilated patient was repositioned at 13.15 hours, approximately fifty-five minutes post arrival to the critical care unit following CABG surgery. The preliminary cue that initiated this pain incident was an overt motor pain behaviour cue ‘grimace when turned’ in association with one physiological cue ‘heart rate 107’, one paraclinical cue ‘CABG by 2 with LIMA’ and one behavioural general cue ‘no response to verbal stimuli’. The aforementioned first-order cues were used and combined by the critical care nurse into an intermediate judgement ‘she must be uncomfortable’ which is evident in the next think aloud transcript:

37 S/13 P: ‘A is grimacing there while being turned, so she is experiencing soreness during the turn
38 S/13 P: Sinus tachycardia rate 107, pain related I would think, baseline rate is 60 so bit fast
39 S/13 P: She is also oozy, on support at 5, she could also be aware
49 S/13 P: She has had CABG by 2 with LIMA so that is major surgery with three chest drains, so she will be uncomfortable, no spinal, fentanyl approach
93 S/13 P: A, A, give my hand a squeeze if you’ve got any pain, no response, okay
94 S/13 P: It is difficult to assess her as there is no response to my verbal commands
95 S/13 P: I am going with her physical signs, there was a grimace when she was being turned, plus she did not like the turn... even though I cannot say for sure she has pain but it is all I have with a heart rate that could be due to pain, ooze, and support...
96 S/13 P: She must be uncomfortable’.

It seems from the above think aloud transcript that when few cues were available to the critical care nurse it created a challenge whereby a best estimate is made based on one overt motor pain behaviour cue ‘grimace when turned’ as confirmation was sought from the patient but not forthcoming at that point in time. The wording, i.e. ‘physical signs’, was not elaborated on which seems to indicate that there was more than one sign exhibited by the ventilated patient and conversely noticed by the critical care nurse. In addition, the physiological cue ‘heart rate 107’, had several potential meanings, hence it is implicated into other intermediate judgements such as ‘she is oozy’ and the abovementioned intermediate judgement ‘she must be uncomfortable’.

In addition, six first-order cues were used and aggregated by the critical care nurse into an intermediate judgement ‘she is oozy’. The first-order cues consisted of three physiological cues
MAP 60’, ‘central temperature 35.5c’ and ‘peripheral temperature 26c’ and two mechanical cues ‘GTN .5’ and ‘adrenaline 5’ alongside one technical cue ‘chest drainage 90 last quarter’. It seems that each of these cues were not only inter-connected but were also linked with a former first-order cue ‘heart rate 107’. The following think aloud citation emphasises the strategy employed by the critical care nurse:

43 S/13 P: ‘She is hypotensive with a mean of 60, bit oozy and they want it kept between 70 and 75
44 S/13 P: I reduced her support which she seems to be very sensitive to, plus her filling pressure are low also, she could be sore too
74 S/13 P: Chest drainage last quarter is 90, so she is oozy and has an abnormal ACT and she was oozy in theatre
80 S/13 P: She is on her inotrope of adrenaline 5 and graft support of GTN .5
84 S/13 P: She is so cold peripherally, the probe is not registering properly, 26c and core 35.5c
86 S/13 P: So she is oozy at present’.

Four first-order cues were used and aggregated by the critical nurse into another intermediate judgement ‘she is asleep’ based on three behavioural general cues ‘eyes closed’, ‘no movement’, ‘no response to any commands’ along with one physiological cue ‘pupils pinpoint’. It is noteworthy in the following think aloud excerpt that the critical care nurse’s interpretation on ‘no movement’ as a behavioural general cue seems to stem from her experiential knowledge of other patients:

54 S/13 P: ‘A, hello I’m P and I’m the nurse who is looking after you, you are back from surgery over a half an hour, now 1.15pm
55 S/13 P: Her eyes are closed, sedated there, no response
56 S/13 P: No movement there either, sleeping comfortably
57 S/13 P: Sometimes in my experience patients can be sore and do not move so to me it is not that reliable, I would need more than that
59 S/13 P: Give my hand a big squeeze for me, a big squeeze, nice and tight
60 S/13 P: Give your toes a big wiggle for me
61 S/13 P: Now A, are you comfortable with your breathing there
62 S/13 A: There is no response to any of my commands at the moment, so she is heavily sedated
90 S/13 P: Both her pupils are pinpoint, so heavily sedated, still has fentanyl on board
91 S/13 P: She is asleep’.

The critical care nurse used and integrated three intermediate judgements into a final judgement which is evident below:

101 S/13 P: ‘This lady is uncomfortable
102 S/13 P: Her physiological parameters have altered so she is unstable haemodynamically
103 S/13 P: She is asleep but could be aware underneath
104 S/13 P: So she is in pain
105 S/13 P: I will give her something for pain because she is at risk of being very sore when she wakes up if I don’t try and sort it out from the beginning and a sedative’.

In summary, the critical care nurse pursued a strategy whereby first-order cues were utilised and combined into three intermediate judgements which acted as second-order cues. Consequently, the second-order cues were integrated into a final judgement regarding the ventilated patient’s pain state in the immediate phase post cardiac surgery, i.e. ‘she is in pain’.
The next piece describes the pain behaviour cues exhibited by the ventilated patient in the immediate phase post cardiac surgery.

4.7.2 Pain Incident: Repositioning Post Chest X-ray: Patient Pain Behaviour Cues

This pain incident occurred at 13.15 hours while the ventilated patient was repositioned subsequent to a routine chest x-ray fifty-five minutes on her arrival back to the critical care unit following coronary artery bypass grafts (CABG) surgery by three. The inotropic and vasodilator support infusing at that point were adrenaline 5 Knowl glycerin. Two altered physiological cues were observed which deviated from their respective baselines, i.e. mean arterial blood pressure 60 from a baseline of 70 to 75 and heart rate 107 from a baseline of 60. Another recorded physiological cue respiratory rate 10 maintained normal parameters. In addition, two overt motor pain behaviour cues grimace and guarded movement were evident, while one behavioural general cue immobile posture was noticeable. The verbal subjective pain behaviour cue patient self-report pain was not exhibited or expressed by the ventilated patient in response to probing about current pain by the critical care nurse (see Table 4.13a).

In summary, two altered physiological cues were observed. Furthermore, two overt motor pain behaviour cues along with one behavioural general cue were made known by the ventilated patient. Besides, the verbal subjective pain behaviour cue patient self-report pain was not articulated by this ventilated patient during repositioning post CABG surgery in reply to the critical care nurse inquiring about pain. The results of data triangulation are represented below.

4.7.3 Data Triangulation

The researcher’s observation of the ventilated patient’s pain behaviours matched the think aloud data verbalised by the critical care nurse during the judgement process in each pain incident with a few noteworthy indirect verbalisations. In this pain incident one overt motor pain behaviour cue guarded movement was recorded by the researcher but not verbalised overtly by the critical care nurse. This is presented in the following extract which was illustrated earlier in its entirety:

94 S/13 P: “... it is difficult to assess her as there is no response to my verbal commands
95 S/13 P: I am going with her physical signs, there was a grimace when she was being turned, plus she did not like the turn...”

It could be interpreted from ‘plus she did not like the turn’ that guarded movement could have been the additional physical sign. However, this interpretation is not tangible due to the incompleteness of the think aloud data in this instance. However, it can only be assumed that the critical care nurse was referring to a guarded movement at this point in time.

Overall summary: the findings indicate that the critical care nurse practised a policy in the process of formulating a judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery. This policy included two stages (see Figure 4.7) whereby the initial stage...
PATIENT PAIN BEHAVIOUR CUES

The patient returned from theatre at 12.30 hours following coronary artery grafts by three (inclusive left internal mammary artery). This 'pain incident' commenced at 13.15 hours while the ventilated patient was being repositioned subsequent to a routine chest x-ray. The following pain cues were recorded:

TABLE 4.13A CASE THIRTEEN: PAIN INCIDENT

<table>
<thead>
<tr>
<th>Cue</th>
<th>Context (Vasodilators / Inotropes)</th>
<th>Category</th>
<th>Prior to Pain Incident</th>
<th>Baseline Parameters</th>
<th>Current Parameters</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean arterial blood pressure (MAP)</td>
<td>Nitroglycerin 0.5 Adrenaline 5</td>
<td>Physiological</td>
<td>70</td>
<td>70 - 75</td>
<td>60</td>
<td>Decreased MAP</td>
</tr>
<tr>
<td>Heart Rate</td>
<td></td>
<td>Physiological</td>
<td>90</td>
<td>60</td>
<td>107</td>
<td>Increased heart rate</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td></td>
<td>Physiological</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>No change</td>
</tr>
<tr>
<td>Grimace</td>
<td></td>
<td>Overt Motor Pain</td>
<td>Change</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guarded movement</td>
<td></td>
<td>Overt Motor Pain</td>
<td>Change</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immobile posture</td>
<td></td>
<td>Behavioural</td>
<td>No movement post repositioning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient self-report pain</td>
<td></td>
<td>Verbal Subjective</td>
<td>No response to initial question by critical care nurse: have you any pain? is your breathing uncomfortable?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
involved the utilisation and integration of several first-order cues into three intermediate judgements which then operated as second-order cues. The first-order cues included physiological, behavioural general, mechanical alongside one paraclinical, one technical and one overt motor pain behaviour cue. The subsequent stage represented the assimilation of three second-order cues into a final judgement in order to reflect the patient’s pain state, i.e. ‘she is sore’. Besides, the patient revealed physiological, overt motor and behavioural general pain behaviour cues in this instance which were recorded by the researcher. Moreover, the results of data triangulation made known that some cues were verbalised indirectly rather than directly by the critical care nurse.

The findings of case fourteen are considered in the next section with a minute scene situating both key data-sets i.e. critical care nurse cue characteristics and patient pain behaviour cues.

4.8 CASE FOURTEEN

4.8.1 PAIN INCIDENT: REST: CRITICAL CARE NURSE CUE CHARACTERISTICS

The ventilated patient was at rest in the following scenario five hours post cardiac surgery at 20.00 hours. This pain incident commenced with a behavioural general cue ‘eyelids closed’ alongside one technical cue ‘airway pressure 38cms’, one other behavioural general cue ‘no movement’ with one physiological cue ‘respiratory rate 16’. The critical care nurse used and integrated each of the aforesaid first-order cues into an intermediate judgement revealed in the next think aloud passage. It is striking that each of the cues have several meanings and hence their implication within other intermediate judgements:

421 S/14 C: ‘She appears asleep her eyelids are closed
422 S/14 C: But she may be aware underneath and be uncomfortable
441 S/14 C: Her airway pressures are a bit on the high side at 38cms but I don’t think that’s going to change, she is also asleep and compliant on the ventilator
442 S/14 C: She has mucopurulent secretions, very recent smoker, not biting the tube and she had nebulisers
446 S/14 C: No movement, still asleep there, she looks comfortable
447 S/14 C: I don’t think she is sore at the moment, anyway only she knows
457 S/14 C: She is taking a few breaths there, respirations 16 but not distressed on the ventilator but she could be sore
458 S/14 C: She appears to be asleep’.

Moreover, seven first-order cues were used and aggregated by the critical care nurse into an intermediate judgement ‘she is sore’ which included one overt motor pain behaviour cue ‘no grimace’, one knowledge cue ‘knowing the patient’ alongside five pain descriptor cues ‘patient self-report pain’, ‘pain chest incision’, ‘pain chest drains’, ‘leg pain’ and ‘ETTube uncomfortable’. It seems that the critical care nurse remained very focused in securing pain descriptor cues drawing on her knowledge of the patient along with her experiential knowledge in order to achieve this process which is manifest in the next think aloud passage:
450 S/14 C: ‘She is not grimacing there, not moving, so she is not in any distress at the moment but she will be sore or could be
451 S/14 C: I have come to know her over the last couple of hours ... so even though she looks comfortable and is asleep and she is relaxed on the ventilator, not moving...I am not persuaded that she is not sore... she tends not to move in case of pain...
452 S/14 C: She must be sore because in my experience these patients are usually very sore and when you see how the surgery is carried out in theatre it gives you a very good idea of why they should be sore... I checked and she is sore
453 S/14 C: Knowing her helps because there are many conflicting pointers with her and it helps me to remain determined and get to the root of the issue with her
454 S/14 C: I also find with these patients and in particular this lady just because they appear to be asleep and look comfortable as she does, it does not guarantee that she is pain-free, so I will ask her again just to make sure because to me she should be sore
455 S/14 C: E, are you alright, no, are you sore, yes you are, okay, I will get you fixed up now this minute
456 S/12 C: Is your chest sore there where the surgery was, yes
457 S/12 C: Are you sore at the drains there as well, you are
458 S/12 C: The tube is irritating you as well, tells me the tube is uncomfortable, okay E
459 S/12 C: Are you uncomfortable anywhere else, your leg, uncomfortable, but not too bad
460 S/12 C: It seems she is sore.

Furthermore, seven first-order cues formed the intermediate judgement ‘she is unstable haemodynamically’. The configuration of these first-order cues are as follows: four physiological cues ‘MAP 60’, ‘heart rate 58’, ‘central temperature 37c’, ‘peripheral temperature 31.8c’ along with three mechanical cues ‘adrenaline 3’, ‘nitroglycerin .5’ and ‘dobutamine 3’. The seven aforesaid first-order cues were closely interlinked and seemed to expose not only the complexity of the patient’s status but also revealed a glimpse of the unpredictable context in which the critical care nurse was situated, making clinical judgements based on probable cues which may or may not be made known by the ventilated patient in the immediate phase post cardiac surgery:

431 S/14 C: ‘Low MAP 60 there, she has low filling pressures and she is vasodilating, plus her heart rate dips and hits the mean, she is also support sensitive
432 S/14 C: Support with inotropes is adrenaline 3, GTN.5 for her graft and dobutamine 3, index responding, it was when I was changing over the dobutamine syringe again that her pressure dropped, very sensitive to it
433 S/14 C: She seems to be dropping her rate to 58 simms bradycardia and it is effecting her mean as it seems to drop with the rate
434 S/14 C: She is warming there centrally 37c and peripherally 31.8c so blood helped
435 S/14 C: So she is still unstable haemodynamically’.

Three first-order cues previously cited, i.e. ‘airway pressure 38cms’, ‘respiratory rate 16’ and ‘knowing the patient’, were integrated by the critical care nurse into a supplementary intermediate judgement. Besides, four intermediate judgements were used and combined by the critical care nurse into a final judgement which is presented in the think aloud transcript below:

476 S/14 C: ‘Looking at her there now, she appears asleep
477 S/14 C: She told me where the pain was, so she is sore
478 S/14 C: Haemodynamically she is still unstable
479 S/14 C: She may not be distressed on the ventilator
480 S/14 C: But she is in pain.
481 S/14 C: I have given her morphine which will keep her comfortable for the present’.
In summary, the critical care nurse was faced with a number of first-order cues occurring simultaneously in an unpredictable environment. The task of the critical care nurse was to make sense of this stream of first-order cues in order to reach a final judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery. It appears that several of the first-order cues had many probable meanings while other pain descriptor cues elicited by the critical care nurse, in particular ‘patient self-report pain’, carried some weight in this unpredictable and critical context. Accordingly, the critical care nurse used a two-tier strategy (see Figure 4.8) where first-order cues were used and combined into four intermediate judgements and subsequently incorporated into a final judgement. The pain behaviours exhibited by the patient are presented in the next section.

4.8.2 PAIN INCIDENT: REST: PATIENT PAIN BEHAVIOUR CUES

The subsequent ‘time four pain incident’ developed as the ventilated patient was resting in the critical care unit five hours post CABG surgery at 20.00 hours. The inotropic and vasodilator support running at this juncture were adrenaline 3, dobutamine 3 and nitroglycerin 0.5. Two recorded physiological cues showed some deviation from considered baseline parameters, i.e. ‘mean arterial pressure 60’ from a base of 70 to 80 and ‘heart rate 58’ from a base of 76. However, in context, the aforesaid physiological cue ‘heart rate 58’ seemed to influence ‘mean arterial blood pressure 60’ in this ventilated patient who was known as a ‘sick heart’. An additional recorded physiological cue ‘respiratory rate 16’ demonstrated an increase from a base rate of 10 set on the ventilator. One behavioural general cue ‘immobile posture’ was noticeable. The verbal subjective pain-behaviour cue ‘patient self-report pain’ articulated by the ventilated patient via nodding her head, indicated the presence of pain and pain locations, i.e. leg, chest areas and ETTube (see 4.14b). The aforementioned cues were exhibited by the ventilated patient during this resting period in response to the critical care nurse’s specific probing concerning present pain and its various locations.

In summary, the ventilated patient during a resting period five hours post CABG surgery exhibited the following pain cues: one altered physiological cue with one behavioural general cue (see 4.14b). Moreover, the verbal subjective pain behaviour cue ‘patient self-report pain’ was expressed by the ventilated patient in reply to the critical care nurse’s questioning about current pain and pain location sites. The results of the triangulated data-sets are represented in the following piece.

4.8.3 DATA TRIANGULATION

The researcher matched the recorded pain behaviours with the cues verbalised by the critical care nurse during the judgement process in each pain incident while no omissions were noted.

Overall summary: the findings suggest that the critical care nurse used a pattern of cues in this pain incident in order to make a judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery. The preliminary stage sees the utilisation of first-order cues which included behavioural general, physiological, pain descriptor, one technical, one overt
Figure 4.8

Case 14 — Pain Incident — Rest — Diagrammatic Representation — Judgement Process

Final Judgement

Intermediate Judgement (2nd Order Case)

Level of Habituation

Acute Pain

Healthy Comfort

Altered Hemodynamics

Patient Non-Verbal Compliance

Symbols:
- ■ Physical sign
- □ Overt motor sign
- ✓ Pain descriptor sign
- ◆ Pain descriptor sign
- ▲ Knowledge sign
- △ Physical sign
- □ Psychological sign
- ▲ Technical sign
- ◆ Behavioral sign

Case (1st Order Case)

- Eyes closed
- Arm pressure 30cm
- No movement
- Respiratory rate 16
- No grunting
- Keeping the patient
- Patient call report
- Pain chest incision
- Pain chest pain
- ETTtube uncomfortable
- Leg pain

- MAP 60
- Arterial 3
- NPO
- Hb: 50
- Heart rate 50
- Temperature core 37°C
- Temperature peripheral 33°C
**Patient Pain Behaviour Cues**

The 'pain incident' commenced at 20.00 hours while the ventilated patient who was back from theatre approximately five hours was at rest. The following pain cues were recorded:

**Table 4.14b Case Fourteen: Pain Incident**

<table>
<thead>
<tr>
<th>Cue</th>
<th>Context (Vasodilators / Inotropes)</th>
<th>Category</th>
<th>Prior to Pain Incident</th>
<th>Baseline Parameters</th>
<th>Current Parameters</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean arterial blood pressure (MAP)</td>
<td>Nitroglycerin .5, Dobutamine 3, Adrenaline 3</td>
<td>Physiological</td>
<td>70</td>
<td>70 - 80</td>
<td>60</td>
<td>No change but MAP is low</td>
</tr>
<tr>
<td>Heart Rate</td>
<td></td>
<td>Physiological</td>
<td>75</td>
<td>76</td>
<td>58</td>
<td>Decreased heart rate (impacting on MAP)</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td></td>
<td>Physiological</td>
<td>10</td>
<td>16</td>
<td></td>
<td>Increased respiratory rate</td>
</tr>
<tr>
<td>Immobile posture</td>
<td></td>
<td>Behavioural General Cue</td>
<td>10</td>
<td>16</td>
<td></td>
<td>No movement of upper limbs or torso or lower limbs</td>
</tr>
<tr>
<td>Patient self-report pain</td>
<td></td>
<td>Verbal Subjective Pain Behaviour Cue</td>
<td></td>
<td></td>
<td>Nods her head (yes) in response to questions by the critical care nurse: are you sore? are you sore down your chest there and at the drains there? is the tube uncomfortable? is your leg uncomfortable?</td>
<td></td>
</tr>
</tbody>
</table>
motor pain behaviour cue and one knowledge cue. The first-order cues were assimilated into four intermediate judgements which operated as second order cues. Hence, the second-order cues were combined into a final judgement in order to reflect the patient’s pain state in the immediate phase post cardiac surgery. Meanwhile the patient exhibited physiological, behavioural general and subjective pain behaviour cues in this immediate phase. The results of the data triangulation showed that within both pain incidents, all pain cues were articulated by the critical care nurse while one physiological cue was verbalised indirectly.

The findings of case sixteen are presented in the next section with a miniature scenario setting the scene for both focal data-sets i.e. critical care nurse cue characteristics and patient pain behaviour cues

4.9 CASE SIXTEEN

4.9.1 PAIN INCIDENT: REST: CRITICAL CARE NURSE CUE CHARACTERISTICS

This scene evolved at 17.05 hours based on the ventilated patient who returned from theatre five hours post cardiac surgery and was currently resting in the critical care unit. The pain incident commenced with a physiological cue ‘acute rise MAP 90’. The critical care nurse used and combined a total of eleven first-order cues in order to formulate this intermediate judgement as ‘he is in pain’. The compilation of eleven cues were as follows: three physiological cues ‘acute rise MAP 90’, ‘respiratory pattern altered’ and ‘respiratory rate 18’; one overt motor pain behaviour cue ‘grimace’; one behavioural general cue ‘biting ETTube’, one mechanical cue ‘support requirements’; one knowledge cue ‘knowing the patient’; and four pain descriptor cues ‘patient self-report pain’, ‘pain chest incision’, ‘pain chest drains’ and ‘pain leg’. Moreover, two additional first-order cues ‘heart rate 100’ and ‘tongue moving either side of ETTube’ were also implicated within this intermediate judgement. It is noteworthy to view the strategy the critical care nurse employed during the formulation of the intermediate judgement ‘he is in pain’ which is illustrated in the following think aloud passage:

333 S/16 K: ‘There are occasions when our patients do have or are not showing signs of pain, now 5:05pm
334 S/16 K: They are not waking up, not blinking their eyes, not biting the tube, or indeed going for the chest drains or their endotracheal tube, but what might occur is a rise in blood pressure
336 S/16 K: Now it is very difficult for us to know whether the patient is waking up or in pain these times
337 S/16 K: And there’s no sign of respiratory effort, no fighting the ventilator
338 S/16 K: No facial grimacing, no movement as is in this case with R
345 S/16 K: I wonder if I spoke with him’

The critical care nurse in the above passage seemed to progress through a prototype of first-order cues which were incorporated amid her own experiential knowledge. It also seems that the critical care nurse put into practice this knowledge which is characterised in the following think aloud extract. In addition, confirmation of the critical care nurse’s hunches regarding the ventilated patient’s pain in the immediate phase post cardiac surgery become visible:

350 S/16 K: ‘Hello R, hello R, good man, your operation is all over, you are back in the intensive care unit

119
There you go, there are our first signs 
Blood pressure, a mean of 90, acute rise, experiencing pain I would say, anxious there and awake, you are okay.

There goes his change in respiratory pattern, the breath stacking, his way of communicating his pain and the breath stacking heightens his anxiety, not happy on the ventilator and awake also.

I am counting his respirations, 18 rate, trying to communicate his pain so breathing gets faster, wide awake and frightened also.

He is grimacing so evidence of pain confirmed by his facial expression.

He is biting on the ETTube, uncomfortable now with the tube, only way to communicate as foreign body present, awake, uneasy, not ventilator compliant at present, bit distressed on ventilator.

His support requirements shows that he is more than likely experiencing pain as no adrenaline but GTN at 6 as MAP could be higher if GTN was lower as it is a vasodilator.

Have you pain, yes or no, okay.

Is it in your chest where the surgery is, yes.

Have you discomfort there at the drain sites, are you sore where I touch you there at the drains, okay.

Have you pain anywhere else, have you any leg pain, yes, okay.

I know him for the past five hours, how he conveys his pain or no pain to me, so he is in pain.

The above think aloud extract demonstrated that the critical care nurse approached the simultaneous presentation of first-order cues with many possible meanings in a meticulous and orderly manner. The integration of her experiential knowledge and knowledge of this patient enabled the critical care nurse to not only anticipate the course of events but also to secure pain descriptor cues which concluded in an intermediate judgement and hence a final judgement presented below:

I know him, at present he is sore, awake, and anxious and he is non-compliant with the ventilator.

I also know his vital signs over the last five hours, often on administering morphine sulphate as analgesia the blood pressure starts to come down beautifully, down to normotensive again, so I will see what his response will be. But the problem is that vital signs are not always a reliable index particularly when the patient is anxious as he is now plus he is vasodilating and is on GTN.

He has acute pain which I need to sort out with that blood pressure, so I have given R morphine 2mgs which I can repeat if he needs it.

There we go with the mean pressure, the MAP has responded immediately really, so I can go down on GTN.

This pain incident provides insight into how a critical care nurse made a judgement that the ventilated patient was in pain in the immediate phase post cardiac surgery. This critical care nurse adopted a two stage approach, i.e. primary and secondary, supported by her experiential knowledge and her knowledge of the patient in this case. The primary stage involved the utilisation and aggregation of first-order cues (see Figure 4.9) into five intermediate judgements. The secondary stage included the deployment of intermediate judgements as second-order cues formulated by the critical care nurse into a final judgement, i.e. ‘he is in acute pain’. The next piece considers the results of the pain behaviour cues revealed by the ventilated patient in the immediate phase post cardiac surgery.
Figure 4.9
Case 16 – Pain Incident – Rest – Diagrammatic Representation – Judgement Process

- Acute rise MAP 90
- Respiratory pattern altered
- Respiratory rate 18
- Grimace
- Biting ETube
- Support requirements
- Patient self-report pain
- Pain chest incision
- Pain chest drains
- Pain leg
- Knowing the patient

- Tongue moving either side of ETube
- Obey all verbal commands
- Eyes open

- Heat rate 100
- Temperature 37.0°C central
- Temperature 33.4°C peripheral
- Nitroglycerin 6

Impaired Comfort

Level of Wakefulness

Altered Haemodynamics

Anxiety

Patient Ventilator Compliance

Acute Pain

Phases:

1st Order Cues

2nd Order Cues

Final Judgement
4.9.2 Pain Incident: Rest: Patient Pain Behaviour Cues

The subsequent pain incident happened at 15.05 hours, during a resting phase where this ventilated patient was five hours in the critical care unit post CABG surgery. The vasodilator support infusing at this juncture was nitroglycerin 6. Three physiological cues observed were above their respective baseline parameters, namely, ‘mean arterial blood pressure 90’ from a base of 70 to 75, ‘heart rate 100’ from a base of 78 and ‘respiratory rate 18’ from a base rate of 10 set on the ventilator. Besides, two patient ventilator dysynchrony cues ‘distress on the ventilator’ and ‘chewing on ETTube’ were observable. In addition, one overt motor pain behaviour cue ‘grimace’ was noticeable. The verbal subjective pain behaviour cue ‘patient self-report pain’ expressed by the ventilated patient by nodding his head confirmed the presence of pain and its location, i.e. chest incision, chest drain sites and leg pain. The aforesaid cue was articulated by this ventilated patient as a consequence of the critical care nurse’s probing concerning his current pain and various pain sites.

In summary, three altered physiological cues were exhibited by this ventilated patient during a resting period five hours following CABG surgery. Furthermore, two patient ventilator dysynchrony cues were also evident with one overt motor pain behaviour cue (see Table 4.16b). Finally, the verbal subjective pain behaviour cue ‘patient self-report pain’ was expressed by this ventilated patient relative to pain and pain locations in response to the critical care nurse’s probing about his present pain state. The triangulated data-sets are represented in the following part.

4.9.3 Data Triangulation

The cues observed by the researcher were matched with the cues verbalised by the critical care nurse in each pain incident, whereby no omissions were located. The following think aloud data is complimented with the observation data (in italics) which seems to complete the picture during the formulation of the intermediate judgement ‘so he is in pain’ which was illustrated previously in its entirety:

401 S/16 K: "... Have you pain, yes or no, okay
[Patient nods his head (yes) in response]  
402 S/16 K: Is it in your chest where the surgery is, yes
[Patient nods his head (yes) in response]  
403 S/16 K: Have you discomfort there at the drain sites [Patient nods his head (yes) in response]  
are you sore where I touch you there at the drains, okay [Patient nods his head (yes) in response]  
404 S/16 K: Have you pain anywhere else [Patient shakes his head (no) in response]  
have you any leg pain, okay [Patient nods his head (yes) in response]...".

The above representation of think aloud data and observation data provide a comprehensive picture of the scenario as it unfolded in the natural habitat of the ventilated patient in the immediate phase post cardiac surgery.

Overall summary: the findings indicated that the critical care nurse used a strategy to formulate a judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery.
This ‘pain incident’ commenced at 17.05 hours while the ventilated patient who was back from theatre approximately five hours was at rest. The following pain cues were recorded:

**TABLE 4.16B  CASE SIXTEEN: PAIN INCIDENT**

<table>
<thead>
<tr>
<th>Cue</th>
<th>Context (Vasodilators / Inotropes)</th>
<th>Category</th>
<th>Prior to Pain Incident</th>
<th>Baseline Parameters</th>
<th>Current Parameters</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean arterial blood pressure (MAP)</td>
<td>Nitroglycerin 6</td>
<td>Physiological</td>
<td>70</td>
<td>70-80</td>
<td>90</td>
<td>Increased MAP</td>
</tr>
<tr>
<td>Heart Rate</td>
<td></td>
<td>Physiological</td>
<td>80</td>
<td>78</td>
<td>100</td>
<td>Increased heart rate</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td></td>
<td>Physiological</td>
<td>12</td>
<td>10</td>
<td>18</td>
<td>Increased respiratory rate</td>
</tr>
<tr>
<td>Grimace</td>
<td></td>
<td>Overt Motor Pain Behaviour</td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Chewing on ET Tube</td>
<td></td>
<td>Patient Ventilator Dysynchrony</td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Distress on the ventilator</td>
<td></td>
<td>Patient Ventilator Dysynchrony</td>
<td></td>
<td></td>
<td></td>
<td>Change (Fighting the ventilator)</td>
</tr>
<tr>
<td>Patient self-report pain</td>
<td></td>
<td>Verbal Subjective Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td>Nods his head (yes) in response to questions by the critical care nurse: have you pain?; are you sore in your chest there?; are you sore where I touch there at the drains?; have you a pain in your leg there?</td>
</tr>
</tbody>
</table>
surgery in this pain incident. The policy assumed by the critical care nurse in this instance occurred on two levels. The initial level involved the utilisation and combination of first-order cues into five intermediate judgements (see Figure 4.9). The collection of first-order cues utilised by the critical care nurse to make the intermediate judgements were as follows: one knowledge, one paraclinical, one overt motor pain behaviour and one mechanical cue in conjunction with several physiological, behavioural general and pain descriptor cues. The next level revealed the amalgamation of five intermediate judgements which acted as second-order cues into a final judgement of the patient's pain state. In the field the patient conveyed a pattern of cues which comprised of the following: physiological, ventilator dysynchrony, overt motor and verbal subjective pain behaviour cues in the immediate phase post cardiac surgery. The results of the data triangulation presented a complimentary picture of both data-sets.

The findings of case nineteen are described in the subsequent section with a miniature scene positioning both main data-sets, i.e. critical care nurse cue characteristics and patient pain behaviour cues.

4.10 CASE NINETEEN

4.10.1 PAIN INCIDENT: REST: CRITICAL CARE NURSE CUE CHARACTERISTICS

The circumstances surrounding this scenario at 18.50 hours evolved as the ventilated patient five hours post cardiac surgery in the critical care unit wakened with the critical care nurse by his bedside. The initial cue that set the scene was 'eyes open' along with five first-order cues used and combined by the critical care nurse into an intermediate judgement 'he is awake'. The collection of these cues are as follows: three behavioural general cues 'eyes open', 'obeys all verbal commands' and 'exploring the ET Tube with his tongue' together with two physiological cues 'MAP 86 gradual rise' and 'respiratory rate 20' illustrated in the subsequent think aloud quotation. Both of the aforesaid physiological cues were implicated within another intermediate judgement 'he is sore' which is revealed later:

382 S/19 MR: 'His eyes are open, awake there, following my every move
388 S/19 MR: He has obeyed all verbal commands so he is awake
390 S/19 MR: His MAP 86 is rising slowly gradual rise which means he is awake and also sore, want it to be kept between 70 and 80
391 S/19 MR: F, have you any pain, no pain, that's great, he is able to tell me because he is awake that he has no pain but I am not converted here, I feel he has pain but we will see
395 S/19 MR: He is exploring the ET Tube with his tongue, wondering what the tube is doing there, the tube is probably uncomfortable
415 S/19 MR: His respirations are 20, so he is awake and trying to communicate that he is awake and sore, I think he is also ready for weaning
416 S/19 MR: He is awake'.

It is noteworthy in the above quotation that the critical care nurse seems to diverge from the data provided by the patient relative to his pain. Moreover, four first-order cues were used and aggregated by the critical care nurse into an intermediate judgement 'he is haemodynamically stable'. The compilation of cues were as follows: three physiological cues
heart rate 88’, ‘temperature central 36.9c’, ‘temperature peripheral 32.9c’ and one mechanical cue ‘nitroglycerin 3’ alongside two additional physiological cues cited already, i.e. ‘respiratory rate 20’ and ‘knowing the patient’, as part of supplementary intermediate judgements (see Figure 4.10). Nonetheless, the critical care nurse utilised three pain descriptor cues such as ‘patient self-report pain’ ‘sore chest incision’ and sore chest drain sites’ along with one knowledge cue ‘knowing the patient’ one overt motor pain behaviour cue ‘grimace’ in conjunction with three first-order cues already cited, i.e. ‘MAP 86 gradual rise’, ‘respiratory rate 20’ and ‘exploring the ET Tube with his tongue’ to infer the following intermediate judgement ‘he is uncomfortable’ which is reflected in the next think aloud passage:

426 S/19 MR: ‘F, you are back in the unit five hours now, ten to seven, are you sore, you are
427 S/19 MR: Have you pain, no pain, so he denies pain but he is sore, I asked him earlier about pain and he said no
428 S/19 MR: But I felt he was sore knowing him and his MAP trend, plus the word was sore and not pain
429 S/19 MR: I know him even though he denied pain I knew he was sore, even though he was aware, always calm over the last few hours
430 S/19 MR: His MAP was a reliable indicator which based on my experience is not always a good index post cardiac surgery, but as I got to know him over the hours caring for him I understood his MAP trend which allowed me use it as a pointer of his pain when he was not able to tell me verbally, plus he grimaced which is important as he was at rest and so he grimaced when he moved, so something was going on with him and for me then grimace and his mean were the reliable ones here with him
431 S/19 MR: F, are you sore there, yes along where the surgery is, and down where the drains are, okay, I will get you something for pain, he is sore’.

The above think aloud passage seems to suggest that ‘knowing the patient’ provided the critical care nurse with an understanding of the patient’s pain terminology. Furthermore, ‘knowing the patient’ supported the critical care nurse, in this case select a physiological cue such as ‘MAP 101 still rising’ which had many probable meanings and utilise it as a reliable first-order cue at this time along with one overt motor pain behaviour ‘grimace’. It seems both of the aforesaid cues acted as precursors for the critical care nurse seeking additional pain data regarding location of soreness in order to make an intermediate judgement of this ventilated patient’s pain state amidst several ambiguous first-order cues.

The critical care nurse utilised three intermediate judgements to make a final judgement as ‘he is sore’ which is reflected below:

432 S/19 MR: ‘So he is awake
433 S/19 MR: He is stable haodynamically despite his MAP which is pain related
434 S/19 MR: He denied pain but he said he was sore so
435 S/19 MR: F is sore
436 S/19 MR: I have just given him morphine 2mgs which will help his soreness’.

In summary, the critical care nurse condensed the judgement task into two phases in order to reach a final judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery. The rationale was founded on the sheer quantity of concurrent first-order cues available to the critical care nurse in an unpredictable and critical environment. The first phase concerned the utilisation and compilation of several first-order cues with many probable meanings into three intermediate judgements. The second phase took account of three
intermediate judgements which acted as second-order cues which were then integrated into a final judgement. It would seem that 'knowing the patient', which was a first-order cue utilised by the critical care nurse, directly affected both phases. The following part considers the results of the pain behaviour cues exhibited by this patient.

4.10.2 PAIN INCIDENT: REST: PATIENT PAIN BEHAVIOUR CUES

The subsequent pain incident evolved as the ventilated patient was at rest in the critical care unit five hours approximately post CABG surgery. The vasodilator support running in this instance was nitroglycerin 3. Two physiological cues were observed to be above baseline parameters, namely 'respiratory rate 20' from a rate of 14 and 'mean arterial blood pressure 86' from a base of 70 to 80. Another physiological cue 'heart rate 88' stayed within normal parameters. One overt motor pain behaviour cue 'grimace' was apparent. The verbal subjective pain behaviour cue 'patient self-report pain' was expressed by this ventilated patient subject to the critical care nurse restating pain terminology. Consequently, the ventilated patient responded by nodding his head, thereby confirming not only that soreness was present but also its location in the chest region and aggravating features in response to the critical care nurse’s rewording pain vocabulary (see Table 4.19b).

In summary, two altered physiological cues were evident alongside one overt motor pain behaviour cue. Moreover, the verbal subjective pain behaviour cue ‘patient self-report pain’ was articulated by this ventilated patient as a consequence of the critical care nurse restating pain terms. The data triangulation results are considered in the subsequent piece.

4.10.3 DATA TRIANGULATION

The researcher observed the patient’s pain cues and coordinated these with the critical care nurse’s verbalised cues during individual pain incidents. Both sets of data matched with no exceptions.

Overall summary: the findings suggest that the critical care nurse implemented a policy in order to make a judgement of the ventilated patient's pain state in the immediate phase post cardiac surgery. The policy incorporated the utilisation of several first-order cues, namely behavioural general, physiological, mechanical along with pain descriptor cues and one knowledge cue which were then integrated into three intermediate judgements. Hence the three intermediate judgements which performed as second-order cues were combined to make a final judgement of the ventilated patient's pain in the immediate phase post cardiac surgery, i.e. 'F is sore'. In the field, the patient exhibited physiological, overt motor and subjective pain behaviour cues in this immediate phase. The triangulated data revealed that the critical care nurse verbalised directly pain cues with no exceptions.

The findings of case twenty-two are represented in the subsequent section with a miniature picture locating both core data-sets, i.e. critical care nurse cue characteristics and patient pain behaviour cues.
This 'pain incident' commenced at 18.50 hours while the ventilated patient who was back from theatre approximately five hours was at rest. The following pain cues were recorded:

**Table 4.19B CASE NINETEEN: PAIN INCIDENT**

<table>
<thead>
<tr>
<th>Cue</th>
<th>Context (Vasodilators / Inotropes)</th>
<th>Category</th>
<th>Prior to Pain Incident</th>
<th>Baseline Parameters</th>
<th>Current Parameters</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean arterial blood pressure (MAP)</td>
<td>Nitroglycerin 3</td>
<td>Physiological</td>
<td>79</td>
<td>70-80</td>
<td>86</td>
<td>Increased MAP</td>
</tr>
<tr>
<td>Heart Rate</td>
<td></td>
<td>Physiological</td>
<td>85</td>
<td>84</td>
<td>88</td>
<td>No change</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td></td>
<td>Physiological</td>
<td>14</td>
<td>10</td>
<td>20</td>
<td>Increased respiratory rate</td>
</tr>
<tr>
<td>Grimace</td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Patient self-report pain</td>
<td>Verbal Subjective Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No response to the initial question and subsequent questions by the critical care nurse about pain: have you any pain? (no response). Are you sure you have no pain? (shakes head no pain). Nods his head (yes) in response to questions by the critical care nurse: are you sore?; are you sore down along your chest there?; are you sore when you move? Are you sore where the drains are?</td>
</tr>
</tbody>
</table>
4.11 Case Twenty-Two

4.11.1 Pain Incident: Rest: Critical Care Nurse Cue Characteristics

This scenario at 18.30 hours developed as the ventilated patient five hours post cardiac surgery wakened with the critical care nurse at her bedside. This pain incident commenced with a first-order behavioural general cue ‘moving a bit’ accompanied by two other behavioural general cues ‘eyes open looking around’ and ‘exploring ET Tube’ with one physiological cue ‘respiratory rate 16’. The aforesaid cues were used and combined by the critical care nurse into an intermediate judgement ‘she is awake’ reflected in the next think aloud excerpt:

420 S/22 EY: ‘N, I have to get you to keep your legs straight, alright, it is just that there are loads of drips and drains there, she is wake and calm and co-operative now
428 S/22 EY: Her eyes are open and looking around there, awake with the noisy unit, but no longer apprehensive, that startled look is gone
470 S/22 EY: Her respiratory rate is 16, good effort, awake but not distressed or anxious like earlier, nearly ready for weaning plus back over five hours, now six thirty
475 S/22 EY: She is exploring the ET Tube, she is awake and I can see her tongue moving around the tube wondering what it is
476 S/22 EY: She is awake.

The critical care nurse also used and integrated four first-order cues into an intermediate judgement ‘she is not agitated at present’ consisting of the following: one knowledge cue ‘knowing the patient’; one physiological cue ‘respiratory rate 16’; along with two behavioural general cues ‘eyes open looking around’ and ‘moving a bit’ (see Figure 4.11). Moreover, the critical care nurse utilised and aggregated five first-order cues which comprised of four physiological cues, i.e. ‘MAP 68’, ‘heart rate 92’, ‘central temperature 37.1c’ and ‘temperature peripheral 33.3c’, with one mechanical cue ‘nitroglycerin 1’ into an additional intermediate judgement ‘haemodynamically she is more stable’. The physiological cue ‘heart rate 92’ was also implicated into a subsequent intermediate judgement ‘she is sore’.

Besides, eight additional first-order cues were utilised and integrated by the critical care nurse to make an intermediate judgement ‘she is sore’. The cluster of cues were as follows: two overt motor pain behaviour cues ‘grimace’, ‘pointing to middle chest’; one knowledge cue ‘knowing the patient’; along with five pain descriptor cues ‘ET Tube uncomfortable’, ‘patient self-report pain’, ‘pain location’, ‘pain severity’ and ‘pain pattern’. The strategy employed by the critical care nurse is exemplified in the following think aloud passage:

445 S/22 EY: ‘N, is that tube causing you discomfort there, okay, so back of your throat is sore with the tube
450 S/22 EY: N, are you sore, just nod your head if you are sore, okay
459 S/22 EY: I know her now, she is sore
460 S/22 EY: I have a good handle on her physiological indicators which can be so unreliable in these patients, but sometimes that is all that you have to work with, plus she was very nervous pre-operative and in the initial stages post-operative which impact on these indicators, but most importantly for me, I was able to understand her when she was trying to communicate her pain to me which is very important in ventilated patients, knowing her helps me come to know how she expresses her pain or does not as this was the case with her earlier. It can be very complex at times with these patients as there is so much going on all at once, but once they warm, things start to resolve somewhat which is where she is at right now

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It seems that ‘knowing the patient’ in this case provided the critical care nurse with an in-depth understanding of the patient’s physiological signs and how these signs related with and responded to other states, i.e. ‘she was nervous pre-operative’. Moreover, ‘knowing the patient’ provided the critical care nurse with a comprehensive insight into how this ventilated patient expressed her pain and how it could be applicable to similar patients. In addition, the critical care nurse highlighted the complexity of the context she found herself in and drew on her experiential knowledge with other patients as the patient progressed haemodynamically. Meanwhile, additional first-order pain descriptor cues were obtained by the critical care nurse with the patient. Consequently, the critical care nurse reached a final judgement regarding the ventilated patient’s pain state based on four intermediate judgements as the next think aloud citation seems to suggest, with some credence attached to the pain descriptor cue ‘patient self-report pain’:

466 S/22 EY: ‘So she is awake
467 S/22 EY: She is sore
468 S/22 EY: Haemodynamically even though she is more stable her heart rate is still up in the nineties
469 S/22 EY: She is not agitated at present
470 S/22 EY: And told me she is in pain, so she is in pain
472 S/22 EY: So I will give her something for pain now, morphine 2 at 6.45 pm’.

In summary, the critical care nurse adopted a two-phase approach in order to reach a judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery. The primary phase included the utilisation and combination of first-order cues into intermediate judgements. The secondary phase involved the integration of intermediate judgements operating as second-order cues into a final clinical judgement. It appears that ‘knowing the patient’ was an integral part of this process. Moreover, the critical care nurse attached credibility to the pain descriptor cue ‘patient self-report pain’ amidst several ambiguous first-order cues in an unpredictable environment where a clinical judgement was formulated on the ventilated patient’s pain state in the immediate phase post cardiac surgery. The patient’s pain behaviours are accounted for in the following piece.

4.11.2 PAIN INCIDENT: REST: PATIENT PAIN BEHAVIOUR CUES

This subsequent pain incident took place as the ventilated patient was at rest in the critical care unit approximately five hours post CABG surgery at 18.30 hours. The vasodilator support infusing in this event was nitroglycerin 1. Two physiological cues were observed above their relevant parameters, namely ‘heart rate 92’ from a base rate of 78 and ‘respiratory rate 16’ from a base rate of 10 on the ventilator. A supplementary physiological cue ‘mean arterial blood pressure (MAP) 68’ showed a recovery near to its base rate of 70 to 75 from an earlier trend of ‘MAP 63’ prior to this pain incident (see Table 4.22b). Three overt motor pain behaviour cues, i.e. ‘grimace’, ‘pointing to chest’ and ‘pointing to chest drains’, were observable. Two of the aforesaid cues ‘pointing to chest’ and ‘pointing to chest drains’ were exhibited spontaneously by the ventilated patient and acted as a precursor to the critical care nurse’s probing concerning
PATIENT PAIN BEHAVIOUR CUES

This 'pain incident' commenced at 18.30 hours while the ventilated patient who was back from theatre approximately five hours was at rest. The following pain cues were recorded:

<table>
<thead>
<tr>
<th>Cue</th>
<th>Context (Vasodilators / Inotropes)</th>
<th>Category</th>
<th>Prior to Pain Incident</th>
<th>Baseline Parameters</th>
<th>Current Parameters</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean arterial blood pressure (MAP)</td>
<td>Nitroglycerin I</td>
<td>Physiological</td>
<td>63</td>
<td>70-75</td>
<td>68</td>
<td>MAP near normal</td>
</tr>
<tr>
<td>Heart Rate</td>
<td></td>
<td>Physiological</td>
<td>88</td>
<td>78</td>
<td>92</td>
<td>Increase in heart rate</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td></td>
<td>Physiological</td>
<td>14</td>
<td>10</td>
<td>16</td>
<td>Increased respiratory rate</td>
</tr>
<tr>
<td>Grimace</td>
<td></td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Patient self-report pain</td>
<td></td>
<td>Verbal Subjective Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td>Nods her head (yes) in response to questions by the critical care nurse: are you sore?; is the pain very severe.</td>
</tr>
<tr>
<td>Pointing to chest</td>
<td></td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
<td></td>
<td>Patient is pointing towards her chest. Patient responds to critical care nurse's question: are you sore there in the middle of your chest.</td>
<td></td>
</tr>
<tr>
<td>Pointing towards chest drains</td>
<td></td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
<td></td>
<td>Patient is pointing towards her chest drains. Patient responds to critical care nurse's question nodding her head (yes): are you sore there?</td>
<td></td>
</tr>
</tbody>
</table>
those specific pain locations. Likewise, the verbal subjective pain behaviour cue ‘patient self-report pain’ was expressed by this ventilated patient via nodding her head, thereby confirming the presence of pain and its severity as a consequence of the critical care nurse questioning about her present pain state and pain severity.

In summary, two altered physiological cues were observed with three overt motor pain behaviour cues. Finally, the verbal subjective pain behaviour cue ‘patient self-report pain’ was articulated by this ventilated patient at rest in the critical care unit approximately five hours post her CABG surgery. The triangulated data is considered in the following part.

4.11.3 DATA TRIANGULATION

The researcher observed the patient’s pain behaviour cues which were matched with the critical care nurse’s verbalised cues with no omissions identified in both pain incidents.

Overall summary: the results indicate that the critical care nurse used a pattern of cues to infer the patient’s pain state in the immediate phase post cardiac surgery in this pain incident. The policy implemented by the critical care nurse involved a two tier process, where tier-one incorporated the integration of first-order cues into intermediate judgements. The collection of first-order cues ranged from behavioural general, physiological, overt motor pain behaviour, pain descriptor alongside one mechanical and one knowledge cue. Meanwhile, this tier two approach included the assimilation of intermediate judgements into a final judgement of the patient’s pain state in the immediate phase post cardiac surgery. The pain behaviour cues communicated by the ventilated patient included physiological, overt motor and verbal subjective cues in this immediate phase. The triangulated data indicated no omissions in each data-set.

The findings of case twenty-three are reported in the next section with a miniature picture setting the landscape for both focal data-sets, i.e. critical care nurse cue characteristics and patient pain behaviour cues.

4.12 CASE TWENTY-THREE

4.12.1 PAIN INCIDENT: REPOSITIONING POST CHEST X-RAY: CRITICAL CARE NURSE CUE CHARACTERISTICS

This scenario evolved at 12.35 hours as the ventilated patient thirty-five minutes post cardiac surgery, was repositioned following a routine chest x-ray in the critical care unit. The initial cue that prompted this pain incident was a first-order technical cue ‘tinned chest x-ray’ accompanied by one paraclinical cue ‘CABG by 3 with LIMA’ with one pain descriptor cue ‘patient self-report pain’ and one overt motor pain behaviour cue ‘grimace’. The critical care nurse used and combined the aforesaid cues to make an intermediate judgement such as ‘he appears to be in pain’. The following think aloud citation presents the purposeful approach adopted by the critical care nurse:
The patient is being turned, he just had his chest x-ray, so I am sure he is sore
Anyway he has had three grafts and a LIMA so because it is major heart surgery he will be sore
M, are you in a bit of pain, no, I am not sure because he is not really with it, he came back at 12 noon and it now only 12.35 so wait and see
Sir have you any pain, no, no pain, he may be uncomfortable but he says he is not in pain but I am not certain about that because he is not awake, no spinal either
Are you in pain, M, no, okay
Can you hear me M, it is alright, it is alright, you try and get some rest, if you are in pain you just let me know, we do not want you to be in any pain, he grimaced during the turn
He appears to be in pain even though he denies any pain, I think he is not really awake yet and that is why he denies any pain.

The critical care nurse used two first-order cues which consisted of one behavioural general cue ‘obeys some commands’ and one physiological cue ‘MAP 101’. Three additional cues ‘startled look in his eyes’, ‘fidgety’ and ‘heart rate 97’ were also implicated here but will subsequently be cited within other intermediate judgements, for example ‘he is a bit anxious now’. The next think aloud quotation presents the abovementioned two first-order cues and in particular the many probable meanings afforded the physiological cue ‘MAP 101’:

Hello M, are you awake, can you open your eyes, good, bit startled there, squeeze my hands, no, okay
Can you move your legs, no not yet, can you stick out your tongue, no, so he is obeying some commands, so he beginning to surface but not really with it
I am just watching his blood pressure as the minute he wakens he becomes very high and now we have a mean of 101 and they do not want it to go above 80, was 81 before the turn, restless since turn
You are to rest there sir, don’t move there, just rest, see the minute he wakens up he becomes anxious, I am sure he was sore with the turn too, but the high mean is not helping his bleeding which is causing concern at the moment
M, have you pain, no, I cannot understand that he has no pain when he is surfaced there and his pressure is high with it
He seems to be awake now.

It seems from the aforementioned think aloud quotation that the critical care nurse was relentless in her pursuit in order to detect the source of the physiological cue ‘MAP 101’ which was having an adverse effect on the patient’s haemodynamic status and giving cause for concern. Besides, the critical care nurse utilised and aggregated five first-order cues into an intermediate judgement ‘he is labile haemodynamically’. The collection of cues consisted of the following: one mechanical cue ‘GTN 10’, one paraclinical cue ‘MAP labile theatre’ and three physiological cues ‘heart rate 97’, ‘temperature 35.5c’ and ‘temperature peripheral 28.1c’. The process is represented in the following think aloud quotation:

The GTN is at 10 which is acting as a vasodilator as the mean is so high
He just drained 140 for the last quarter from chest drain, so oozy at present and high ACT
His MAP was labile in theatre, mean pressure was low and also blood loss was large, on aspirin pre-op
His heart rate is a bit fast at 97 for him as he is usually 74 and has been 88 since his return but when he wakens up it seems to speed up and he is also anxious
So far his temperature is still quite low, central 35.3c and peripheral 28.1c so he is cold which we would expect as he is only back thirty five minutes from theatre
So he is labile haemodynamically.
Two additional first-order behavioural general cues ‘restless during turn’ and ‘fidgety’ alongside one covert behaviour cue ‘startled look eyes’ were used and integrated by the critical care nurse into an intermediate judgement ‘he is a bit anxious’ which is shown below:

70 S/23 N: ‘Oh yes his eyes are open there but very startled look in his eyes there, very anxious and apprehensive looking there, the minute he wakes up he just becomes very frightened, awake now and up goes the mean
71 S/23 N: Okay N, take it easy, he was very restless during the turn, not one bit relaxed now, he was fine until we turned him, of course he may be uncomfortable but he told me he had no pain earlier
105 S/23 N: He is fidgety at the moment, very anxious so the minute he wakes up he starts fidgeting
106 S/23 N: He is a bit anxious at present’.

The critical care nurse used and combined four intermediate judgements to make a final judgement, i.e. ‘he is in pain’ which is evident in the think aloud citation below:

117 S/24 N: ‘He appears to be in pain because
118 S/23 N: He seems to be awake now
119 S/23 N: He is labile haemodynamically, his blood pressure is up and he is bleeding
120 S/23 N: It is very difficult as his pressure was high only after he woke up when he was turned and then he became anxious
121 S/23 N: He is a bit anxious now
122 S/23 N: But I have asked him many times is he in pain but he said no, so I will check again
123 S/23 N: M, are you in pain, you are, you are in pain
124 S/23 N: So he responds to being in pain because he is a little more alert than earlier, I knew he had pain with that MAP but he was also anxious and awake too so it is more dependable when he tells me as he is more alert and able to do so
125 S/23 N: So he is in acute pain’.

It is noteworthy in the above citation that the critical care nurse used and combined four intermediate judgements. However, prior to formulating the final judgement the critical care nurse sought out at that time a pain descriptor cue which was not forthcoming despite repeatedly probing the ventilated patient earlier for such relevant information. Consequently, the critical care nurse made a final judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery, i.e. ‘he is in acute pain’. It appeared also that the critical care nurse valued the pain descriptor first-order cue ‘patient self-report pain’ in this case, particularly when the physiological cue, i.e. ‘MAP 101’, had many possible interpretations and had the potential to exacerbate the patient’s already unstable haemodynamic state.

In summary, the critical care nurse reduced the judgement task into two phases, i.e. primary and secondary. The primary phase comprised of first-order cues which were used (see Figure 4.12) and aggregated into intermediate judgements. Hence, the intermediate judgements acted as second-order cues in the secondary phase which were then integrated into a final judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery. It is worth mentioning that prior to integrating the second-order cues into the final judgement the critical care nurse in this case sought a first-order pain descriptor cue with the patient which was not forthcoming earlier. The ventilated patient also conveyed pain behaviour cues which are presented in the following subsection.

This pain incident occurred as the ventilated patient was repositioned subsequent to a routine chest x-ray thirty-five minutes post arrival to the critical care unit following coronary artery bypass graft (CABG) surgery by four. The vasodilator support infusing at this particular time was nitroglycerin 10. Two altered physiological cues above their respective baseline parameters were observed, namely ‘heart rate 97’ from a base of 74 and ‘mean arterial blood pressure 101’ from a base of 80. Meanwhile, another physiological cue ‘respiratory rate 10’ showed no change from a base rate of 10 set on the ventilator. In addition, two behavioural general cues ‘restlessness’ and ‘tearing’ were noticeable. Furthermore, one overt motor pain behaviour cue ‘grimace’ was observable. Moreover, the verbal subjective pain behaviour cue ‘patient self-report pain’ was articulated by this ventilated patient via shaking his head thereby ruling out the presence of pain and then nodding his head soon after confirming the existence of pain. The aforementioned cue was exhibited by this ventilated patient in response to the critical care nurse’s frequent questioning about the existence of pain (see Table 4.23a).

In summary, three altered physiological cues were observed in conjunction with two behavioural general cues and one overt motor pain behaviour cue. The verbal subjective pain behaviour cue ‘patient self-report pain’ was articulated at two different stages by this ventilated patient during repositioning thirty-five minutes post CABG surgery. The results of linking both data-sets are reported in the next piece.

4.12.3 Data Triangulation

The researcher observed the patient’s pain behaviours which were linked and matched with the think aloud protocols articulated by the critical care nurse at that particular time.

Overall summary: the findings suggest that the judgement task is reduced into a primary and secondary phase by the critical care nurse. The primary phase sees the utilisation and integration of several first-order cues such as behavioural general, physiological, overt motor pain behaviour with one mechanical, one covert behaviour and one pain descriptor cue into five intermediate judgements. Consequently, the secondary phases is about the incorporation of intermediate judgements which operated as second-order cues into a final judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery, i.e. ‘he is in acute pain’. Furthermore, this patient conveyed physiological, behavioural general, overt motor and verbal subjective pain behaviour cues in this pain incident. The triangulated data-sets revealed direct verbalisations on the part of the critical care nurse.

The findings of case twenty-four are described in the next section with a miniature scenario situating both central data-sets, i.e. the critical care nurse cue characteristics with the ventilated patient pain behaviour cues.
The patient returned from theatre at 12 noon following coronary artery grafts by four (inclusive left internal mammary artery). This 'pain incident' commenced at 12.35 hours while the ventilated patient was being repositioned subsequent to a routine chest x-ray. The following pain cues were recorded:

### Table 4.23A Case Twenty-Three: Pain Incident

<table>
<thead>
<tr>
<th>Cue</th>
<th>Context (Vasodilators / Inotropes)</th>
<th>Category</th>
<th>Prior to Incident</th>
<th>Baseline Parameters</th>
<th>Current Parameters</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean arterial blood pressure (MAP)</td>
<td>Nitroglycerin 10</td>
<td>Physiological</td>
<td>81</td>
<td>80</td>
<td>101</td>
<td>Increased MAP</td>
</tr>
<tr>
<td>Heart Rate</td>
<td></td>
<td>Physiological</td>
<td>65</td>
<td>74</td>
<td>97</td>
<td>Increased heart rate</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td></td>
<td>Physiological</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>No change in respiratory rate</td>
</tr>
<tr>
<td>Grimace</td>
<td></td>
<td>Overt Motor Pain</td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Tearing</td>
<td></td>
<td>Behavioural General</td>
<td></td>
<td></td>
<td></td>
<td>Tears both eyes</td>
</tr>
<tr>
<td>Restlessness</td>
<td></td>
<td>Behavioural General</td>
<td></td>
<td></td>
<td></td>
<td>Moving both arms; moving his head from side to side vigorously; trying to lift his head off the pillow post turn</td>
</tr>
<tr>
<td>Patient self-report pain</td>
<td></td>
<td>Verbal</td>
<td></td>
<td></td>
<td></td>
<td>Shakes his head (no) to the critical care nurse's initial questions about pain: are you in a bit of pain? Nods his head (yes) in response to the critical care nurse's question about pain later: have you any pain?</td>
</tr>
</tbody>
</table>
4.13 CASE TWENTY-FOUR

4.13.1 PAIN INCIDENT: REST: CRITICAL CARE NURSE CUE CHARACTERISTICS

The following event developed as the ventilated patient five hours post cardiac surgery was attempting to communicate with the critical care nurse. The pain incident was initiated with a first-order behavioural general cue ‘trying to communicate via ETTube’ along with one physiological cue ‘respiratory rate 18’ and one paraclinical cue ‘fast track approach’. The critical care nurse used and combined the aforementioned first-order cues to make an intermediate judgement ‘he is awake’ which is reflected in the next think aloud quotation where each of the cues have a few possible meanings:

360 S/24 CL: ‘You are trying to tell me something P, it is a quarter to eight in the evening and you are back just over five hours
361 S/24 CL: He is very aware and trying to tell me he is uncomfortable
382 S/24 CL: He making a rate of 18, he is on SIMV of ten so he is breathing up a bit, not anxious now, but the tube is annoying him
406 S/24 CL: He is fast track approach, so wean within six hours if possible, no sedative, wake and warm but I have to be careful because of his low ejection fraction of 27%
407 S/26 CL: He is awake.

Two first-order pain descriptor cues, i.e. ETTube uncomfortable’ and ‘patient self-report pain’, and two overt motor pain behaviour cues ‘grimace’ with ‘pointing at chest’ were used and formulated by the critical care nurse into an intermediate judgement ‘he is sore’ which is revealed in the think aloud extract below:

370 S/24 CL: ‘P, P, is there something bothering you, you have a pained expression on your face, he is grimacing there, there is, okay, is it the tube
371 S/24 CL: Is that tube very uncomfortable P, yes it is, so the ETTube is causing considerable discomfort
410 S/24 CL: P, P, how are we doing there, do you have pain, okay you have pain, the patient says he has pain which is fine by me, I go by what he tells me, he knows
411 S/24 CL: You are pointing to your chest, show me again, is it sore there where you had the surgery, okay, we will get on top of it, don’t you worry now
412 S/24 CL: P is telling me he is sore at the surgical site down the chest there, so experiencing pain there, it makes things less complicated for me when he can tell me about his pain now as he is awake
413 S/24 CL: He is sore.

The aforementioned think aloud extract appears to suggest that the pain descriptor cue ‘patient self-report pain’ removed some of the uncertainty for the critical care nurse surrounding the process of making an intermediate judgement of the patient’s pain state in the immediate phase post cardiac surgery. Moreover, three first-order cues already cited ‘heart rate 90’, ‘MAP 70’ and ‘respiratory rate 18’ were used and aggregated by the critical care nurse into an intermediate judgement ‘he is not anxious at present’. Likewise, the critical care nurse used and combined five first-order cues into an additional intermediate judgement ‘haemodynamically he is more stable’ which consisted of four physiological cues and one mechanical cue. The four physiological cues were: ‘MAP 70’, ‘heart rate 90’, ‘temperature central 36.8c’ and ‘temperature peripheral 30.1c’ and the one mechanical cue ‘nitroglycerin 1’. The physiological cue ‘heart rate 90’ appeared to have a few potential meanings which is evident in the next think aloud passage:
Consequently, the critical care nurse combined four intermediate judgements into a final judgement ‘he is in pain now’ which is shown below:

414 S/24 CL: ‘So he is awake
415 S/24 CL: He is sore as he told me
416 S/24 CL: He is more stable haemodynamically
417 S/24 CL: Plus he is not anxious at present
418 S/24 CL: He is in pain now
419 S/24 CL: So I will give him morphine 2 now at eight o clock’.

In summary, the strategy employed by the critical care nurse to formulate a clinical judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery in the context of much uncertainty proceeded in two parts in this case. The first part included the utilisation and combination of several first-order cues with many plausible interpretations into four intermediate judgements. The second part engaged the four intermediate judgements as second-order cues which were used and integrated into a final judgment, i.e. ‘he is in pain now’, by the critical care nurse. The pain behaviours communicated by the patient are reported on in the following piece.

4.13.2 PAIN INCIDENT: REST: PATIENT PAIN BEHAVIOUR CUES

The subsequent pain incident transpired during a resting period while the ventilated patient was five hours in the critical care unit post his CABG surgery. The vasodilator support infusing at this instance was nitroglycerin 1. One physiological cue ‘respiratory rate 18’ showed an alteration from its base parameter of 10 on the ventilator. Another recorded physiological cue ‘heart rate 90’ demonstrated an increase from a base rate of 70 but remained comparable with its rate trend of 90 prior to this pain incident. A supplementary physiological cue ‘mean arterial blood pressure 70’ was within normal parameters. Moreover, three overt motor pain behaviour cues, i.e. ‘grimace’, ‘pointing to ETTube’ and ‘pointing towards chest incision’, were observable. Two of the aforementioned cues ‘pointing to ETTube’ and ‘pointing towards chest’ which the ventilated patient exhibited spontaneously acted as a precursor to the critical care nurse’s questions concerning those specific pain locations. Besides, the verbal subjective pain behaviour cue ‘patient self-report pain’ was expressed by this ventilated patient via nodding his head, thereby confirming the presence of pain in reply to the critical care nurse inquiring about his present pain state.

In summary, two changed physiological cues were observed along with three overt motor pain behaviour cues. Furthermore, the verbal subjective pain behaviour cue ‘patient self-report
pain’ was articulated by this ventilated patient during a resting period in the critical care unit five hours approximately post CABG surgery. The results of the data triangulation are presented in the subsequent segment.

4.13.3 DATA TRIANGULATION

The researcher observed the patient’s pain cues which were linked with the pain cues verbalised by the critical care nurse in each pain incident with no evidence of omissions.

Overall summary: the findings indicated that the critical care nurse formulated a judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery based on several first-order cues. The first-order cues comprised of a selection of behavioural general, physiological, mechanical and pain descriptor cues in conjunction with one paraclinical and one covert motor behaviour cue. These first-order cues were aggregated into four intermediate judgements which operated as second-order cues and hence were then integrated into a final judgement, i.e. ‘he is in pain now’. Moreover, the patient conveyed physiological, overt motor pain behaviour cues and verbal subjective pain cues in the immediate phase post cardiac surgery in the field. In addition, the results of the triangulated data-sets suggested that the cues in the judgement process were verbalised directly by the critical care nurse.

The findings of case twenty-seven are described in the next section with a minute scenario locating the view for both key data-sets, i.e. critical care nurse cue characteristics and patient pain behaviour cues.

4.14 CASE TWENTY-SEVEN

4.14.1 PAIN INCIDENT: REPOSITIONING POST CHEST X-RAY: CRITICAL CARE NURSE CUE CHARACTERISTICS

The situation progressed here at 16.00 hours as the ventilated patient thirty minutes post cardiac surgery wakened and was subsequently repositioned following a routine chest x-ray. This pain incident commenced with a first-order behavioural general cue ‘opening eyes not focused’ along with another behavioural general cue ‘moving hands a bit’ and one physiological cue ‘respiratory rate 18’. It seems apparent that the physiological cue ‘respiratory rate 18’ had many probable meanings and hence was implicated within other additional intermediate judgements. The critical care nurse used and combined three aforesaid cues into an immediate judgement ‘she is awake’ which is reflected in the following think aloud passage:

37 S/27 S: ‘The time is four and her eyes are open there but not focused, she was waking up coming in the door of the unit from OT
44 S/27 S: Her respiratory rate is 18, so she has some respiratory effort, but shallow breaths, apparently she started to breathe on her own actually in theatre
45 S/27 S: She seems uncomfortable there also, airway pressure is alarming, and not far from waking up there and certainly is agitated, but she is only back thirty minutes and is awake too early
49 S/27 S: She is moving her hands a bit there, waking up but also very hassled, restless
50 S/27 S: She is awake but not focused’.

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Moreover, the critical care nurse used and integrated eleven first-order cues to formulate an intermediate judgement ‘she is very unstable haemodynamically’. The compilation of cues were as follows: four physiological cues ‘MAP 60’, ‘heart rate 103’, ‘temperature central 35.4°C’ and ‘temperature peripheral 27°C’; three paraclinical cues ‘slow coming off bypass’, ‘tachycardia coming off bypass – 90 – 100’, ‘left ventricular ejection fraction 25%’; one technical cue ‘chest drainage 100 last quarter’; alongside three mechanical cues ‘dobutamine 10’, ‘adrenaline 6’ and ‘nitroglycerin .1’. The process exemplified in the next think aloud passage seems to give a sense of a complex context in which the critical care nurse formulated an intermediate judgement and where two physiological cues ‘MAP 60’ and ‘heart rate 103’ had several probable meanings:

51 S/27 S: ‘She is hypotensive there with a mean of 60, they want it around 65 to 70, apparently that has been her best blood pressure, PCWP and CVP are 6 mmHg, but she is also very agitated so I am not sure if anxiety is having some effect on the mean pressure, but she is hassled

54 S/27 S: She was fairly stable in theatre but bit slow coming off bypass, but they gave her a bit of intracardiac adrenaline and she seemed to have picked up after that

56 S/27 S: Her inotropic support is adrenaline 6 with a vasodilator dobutamine 10 and nitroglycerin .1 for the LIMA

60 S/27 S: Her heart rate is sinus tachycardia 103 and her rate is usually 70 pre-op, she is on a lot of support, also awake even though not focused, plus agitated there and uncomfortable, plus

66 S/27 S: She had a tachycardia coming off bypass of 90 to 100, so fast rate in theatre from her usual rate of 70

70 S/27 S: Her left ventricular ejection fraction is about 25% so poor left ventricular with a recent MI

76 S/27 S: Her core temperature is 35.4°C and peripheral is 27 so she is cold

83 S/27 S: She is oozy with her chest drainage at 100 for last quarter, also dumped out quite a lot since the turn there following the x-ray

84 S/27 S: She is very unstable haemodynamically’.

In addition, four first-order cues were utilised and aggregated by the critical care nurse into an intermediate judgement ‘she is agitated’ which consisted of three cues already cited as ‘heart rate 103’, ‘moving hands a bit’ and ‘MAP 60’ along with one other first-order behavioural general cue ‘uneasy there’. In addition, three first-order cues, i.e. one technical cue ‘turned chest x-ray’, one covert behavioural cue ‘looks uncomfortable’ with one pain descriptor cue ‘patient self-report pain’, were used and aggregated by the critical care nurse into an intermediate judgement ‘she is sore’ which is represented below in the think aloud extract:

40 S/27 S: ‘L, we are just getting you sorted after your chest x-ray, just take this sheet out, great, just turning her after the chest — ray was taken

41 S/27 S: So I am sure she is experiencing discomfort during this turn

72 S/27 S: She looks uncomfortable, L, are you uncomfortable, you are, okay, I will get you sorted

86 S/27 S: L, are you sore, not really sure there if she is nodding her head, are you in pain, you are, I think she nodded there but she is so hassled it is hard to say for sure

87 S/27 S: I am a bit perplexed myself here as there is a great deal going on with her as she is so sick and I don’t know if she nodded there or not because she is agitated and not really awake

87 S/27 S: So I feel L is sore’.

The above think aloud extract seems to give a sense of the reality of the context and its impact on the critical care nurse who attempted to interpret first-order ambiguous cues in order to make an intermediate judgement of the ventilated patient’s pain state in the immediate phase
post cardiac surgery. Hence, the critical care nurse used and integrated four intermediate judgements into a final judgement as ‘L is uncomfortable in pain’ which is shown below:

91 S/27 S: ‘She is sore because it looked to me that she responded when I asked her
92 S/27 S: She is awake but not focused and it is too early because she is only back thirty minutes
93 S/27 S: Her haemodynamics are grossly altered so she is very unstable haemodynamically with poor left ventricular function
94 S/27 S: So L is uncomfortable in pain
96 S/27 S: I am giving her morphine 2mgs to try to make her comfortable but I will have to watch that pressure’.

In summary, the above pain incident presents a multifaceted and unpredictable context in which the critical care nurse was required to make a clinical judgement of the ventilated patient’s pain (see Figure 4.13) in the immediate phase post cardiac surgery. Therefore, it seems the judgement task is separated into two parts. The initial part sees the critical care nurse in an unpredictable and complicated context use, i.e. having to combine and interpret a large quantity of simultaneously occurring first-order cues with several probable meanings into four intermediate judgements. The second part involved the utilisation of four intermediate judgements which acted as second-order cues and their subsequent integration by the critical care nurse into a final judgement, i.e. ‘so L is uncomfortable in pain’. The results of the pain behaviour cues exhibited by the patient are reported in the subsequent piece.

4.14.2 PAIN INCIDENT: REPOSITIONING POST CHEST X-RAY: PATIENT-PAIN BEHAVIOUR CUES

This pain incident transpired as the ventilated patient was repositioned subsequent to a routine chest x-ray thirty minutes post her arrival to the critical care unit following coronary artery bypass grafts (CABG) by four. The inotropic and vasodilator support running at this particular time were adrenaline 6, dobutamine 10 and nitroglycerin .1. Three recorded physiological cues showed deviations from their respective baseline parameters as follows, ‘respiratory rate 18’ from a base rate of 10 set on the ventilator, ‘heart rate 103’ an increase from a base rate of 70, but placed in context, this rate was fast prior to this pain incident. The third recorded physiological cue ‘mean arterial blood pressure (MAP) 60’ showed a decrease from the baseline of 65 to 70 but not from the trend parameters of MAP 56 prior to this pain incident. In addition, one overt motor pain behaviour cue ‘grimace’ was evident. Furthermore, one behavioural general cue ‘restlessness’ alongside one patient ventilator dysynchrony cue ‘chewing on ETTube’ were noticeable. The verbal subjective pain behaviour cue ‘patient self-report pain’ was exhibited by this ventilated patient via nodding her head confirming the presence of pain as a consequence of the critical care nurse restating pain terms (see Table 4.27a).

In summary, three altered physiological cues were noticeable. In addition, one overt motor pain behaviour cue was observed in conjunction with one behavioural general cue and one patient ventilator dysynchrony cue. Besides, the subjective pain behaviour cue ‘patient self-report pain’ was expressed by this ventilated patient corresponding to the critical care nurse’s
The patient returned from theatre at 15.30 hours following coronary artery grafts by four (inclusive left internal mammary artery). This 'pain incident' commenced at 16.00 hours while the ventilated patient was being repositioned subsequent to a routine chest x-ray. The following pain cues were recorded:

TABLE 4.2.7A  CASE TWENTY-SEVEN: PAIN INCIDENT  REPOSITIONING POST CHEST X-RAY

<table>
<thead>
<tr>
<th>Cue</th>
<th>Context</th>
<th>Category</th>
<th>Prior to Pain Incident</th>
<th>Baseline Parameters</th>
<th>Current Parameters</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean arterial blood pressure (MAP)</td>
<td>Nitroglycerin 1 Dobutamine 10 Adrenaline 6</td>
<td>Physiological</td>
<td>56</td>
<td>65-70</td>
<td>60</td>
<td>Decrease MAP</td>
</tr>
<tr>
<td>Heart Rate</td>
<td></td>
<td>Physiological</td>
<td>90/95</td>
<td>70</td>
<td>103</td>
<td>Increased heart rate (fast coming off-bypass)</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td></td>
<td>Physiological</td>
<td>14</td>
<td>10</td>
<td>18</td>
<td>Increased respiratory rate</td>
</tr>
<tr>
<td>Grimace</td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Restlessness</td>
<td>Behavioural General Cue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Moving both arms repeatedly; moving right leg up towards abdomen post turn</td>
</tr>
<tr>
<td>Chewing in ET Tube</td>
<td>Patient Ventilator Dyssynchrony</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Patient self-report pain</td>
<td>Verbal Subjective Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No response to critical care nurse's question about pain: are you sore? Nods her head (yes) in response to the critical care nurses questions: are you uncomfortable?; are you in pain?</td>
</tr>
</tbody>
</table>
pain terminology during repositioning post CABG surgery. The triangulated data-set findings are reported below.

4.14.3 DATA TRIANGULATION

The researcher observed the patient’s pain behaviours which were matched with the critical care nurse’s verbalisations of the patient’s cues within the judgement process in each pain incident. In this pain incident, one overt motor pain behaviour cue ‘grimace’ recorded by the researcher was absent in the corresponding verbal protocol. Furthermore, one behaviour general cue ‘chewing on ETTube’ was observed by the researcher but not evident in the think aloud data. The explanation for these omissions in the verbal protocols could be that the critical care nurse noticed the aforesaid cues but failed to articulate the cues. Conversely, the critical care nurse may not have been aware of the above mentioned cues, hence the omission in the think aloud data.

Overall summary: the results suggest that the judgement policy of the critical care nurse incorporated two parts. The initial part sees the utilisation and integration of several first-order cues into four intermediate judgements (see Figure 4.13). The first-order cues included paraclinical, behavioural general, physiological, mechanical, covert behaviour, technical and one pain descriptor cue. Hence, the four intermediate judgements performed as second-order cues which were then aggregated into a final judgment of the ventilated patient’s pain state in the immediate phase post cardiac surgery in this pain incident. Besides, the patient conveyed a pattern of cues, namely physiological, overt motor, behavioural general, ventilator dysynchrony and verbal subjective pain behaviour cues in the field. The triangulated data results revealed some omissions on the part of the critical care nurse in the verbal protocols.

The findings of case thirty are portrayed in the following section with a minute scenario situating both main data-sets i.e. critical care nurse cue characteristics and patient pain behaviour cues.

4.15 CASE THIRTY

4.15.1 PAIN INCIDENT: REPOSITIONING POST CHEST X-RAY: CRITICAL CARE NURSE CUE CHARACTERISTICS

The situation evolved here at 13.10 hours as the ventilated patient forty minutes post cardiac surgery was repositioned by the critical care nurse following a routine chest x-ray. The pain incident started with a physiological cue ‘MAP 97 drastic jump’ accompanied by eight first-order cues as follows: another two physiological cues ‘heart rate 105’, ‘MAP response to analgesia’; one technical cue ‘turned chest x-ray’; one behavioural general cue ‘no response to questions on pain’; one overt motor pain behaviour cue ‘guarded movement’; and two paraclinical cues ‘CABG by 4 with LIMA’ and ‘support requirements’. The critical care nurse used and integrated the aforesaid first-order cues into an intermediate judgement ‘he must be sore’ in an unpredictable and complex context which is reflected in the following think aloud
The two physiological cues 'heart rate 105' and 'MAP 97 drastic jump' had many probable meanings:

43 S/30 J: 'It is now 1.10pm, he is back since 12.30pm, there is a drastic jump there on the MAP which is 97, so the mean is very high which could be that he is feeling pain as big jump from what it was coming in the door and he could also be aware underneath
44 S/30 J: They want it kept between 70 and 75, he is hypertensive with no history of high blood pressure
45 S/30 J: I have just turned D so he could be in discomfort there with the turn, you know he was rigid, and looking at his MAP
57 S/30 J: He is in sinus tachycardia, rate 105, which to me is pain related, as his rate was 88 before the turn and 69 pre-op
58 S/30 J: He could also be aware underneath but bit oozy as well
70 S/30 J: He had four CAGB grafts done with LIMA, five grafts in total, so I expect him to be sore because it is major heart surgery and he should also do well because his ejection fraction is moderate at 40%, MI one year ago with angina
93 S/30 J: D, have you any pain, D, have you any pain, no response to my questioning about his pain, D, are you sore at all, no reaction here at all, are you uncomfortable in any way
96 S/30 J: D's support requirements are high so if I reduced the GTN the MAP would be higher so he must be sore, even though there is no response from D yet
97 S/30 J: He must be sore so I will see what his mean will be after the morphine'.

The above think aloud extract provided a glimpse of the reasoning strategies employed by the critical care nurse when several ambiguous first-order cues were available in order to reach a judgement of the ventilated patient's pain state in the immediate phase post cardiac surgery. It also seems that no pain descriptor cues were accessible despite the critical care nurse's frequent questioning of the patient. Furthermore, three first-order cues were used by the critical care nurse to make another intermediate judgement 'he is asleep' which included the following: two behavioural general cues 'eyes closed', 'not obeying verbal commands' with one physiological cue 'respiratory rate 10'. Besides, five first-order cues were utilised and aggregated by the critical care nurse into an intermediate judgement 'he is haemodynamically unstable'. These first-order cues were as follows: one paraclinical cue 'oozy in theatre'; one technical cue 'chest drainage 150 last quarter'; one mechanical cue 'GTN 10'; with two physiological cues 'temperature 35.1°c' and 'temperature peripheral 25.1°c'. Two previously cited first-order cues were also integrated within this intermediate judgement, i.e. 'MAP 97 drastic jump' and 'heart rate 105', by the critical care nurse as exemplified in the next think aloud passage:

61 S/30 J: 'He was oozy in theatre, so lost a bit of blood as bleeding in theatre
63 S/30 J: His chest drainage there is 150 so he is currently oozy with a tachycardia also
64 S/30 J: And a high ACT which is influencing this ooziness, also he could clot so I need to watch for that but draining freely there
68 S/30 J: His GTN is at 10 for graft support but now his mean is very high, I need to get it down or it could affect his grafts and his bleeding
88 S/30 J: His temperature centrally is 35.1°c and peripherally 25.1°c so he is cold at present but he is only back forty minutes
89 S/30 J: He is haemodynamically unstable'.

The above think aloud passage gives a sense of the concern articulated by the critical care nurse in the midst of attempting to make a judgement of the ventilated patient's pain state in the immediate phase post cardiac surgery. The critical care nurse used and incorporated three
intermediate judgements into a final judgement ‘he is in pain after all’ which is shown in the citation below:

101 S/30 J: ‘He must be in pain
102 S/30 J: Even though he is asleep
103 S/30 J: He is haemodynamically unstable with altered vital signs
104 S/30 J: So I feel he is in pain but
105 S/30 J: I am giving morphine 2mgs at 1.20pm as MAP of 97 is too high for haemodynamic safety really because even after the turn it did not settle and I don’t have too much else to work with at the moment, except he was rigid when we turned him
108 S/30 J: His MAP is now 68 so the morphine did the trick so he is in pain as I thought
109 S/30 J: But he is also on GTN 10 and the CVP has dropped since too, so I could not say for certain it was the morphine but it helped, so he is in pain after all’.

The above think aloud citation illustrated some of the analytical tactics employed by the critical care nurse while attempting to reach a judgment of the ventilated patient’s pain state in the immediate phase post cardiac surgery in the context of two evolving unreliable physiological cues ‘MAP 97 drastic jump’ and ‘MAP response to analgesia’ and one overt motor pain behaviour cue ‘guarded movement’ with no accessible pain descriptor cue. Moreover, the physiological cue ‘MAP 97 drastic jump’ could have a deleterious impact it seems on the patient’s already vulnerable haemodynamics. This scenario gives a sense of the urgency of the situation for the critical care nurse who had to interpret ambiguous cues in association with other first-order cues amidst much uncertainty in order to reach a rapid judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery.

In summary, the critical care nurse was required to use, interpret and integrate several simultaneously occurring first-order cues with many probable meanings in order to formulate a final judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery. The process implemented by the critical care nurse to attain this final judgement in an unpredictable and critical context was condensed into two parts (see Figure 4.14). The first part included the utilisation and combination of several ambiguous first-order cues into three intermediate judgements. The second part integrated the intermediate judgements, which acted as second-order cues, into a final judgement ‘so he is in pain after all’. The pain cues conveyed by the patient are reported in the next piece.

4.15.2 Pain Incident: Repositioning post Chest X-ray: Patient-Pain Behaviour Cues

This pain incident developed at 13.10 hours as the ventilated patient was repositioned subsequent to a routine chest x-ray fifty minutes post admission to the critical care unit following coronary artery bypass grafts (CABG) surgery by five. The vasodilator support running at that particular time was nitroglycerin 10. Two recorded physiological cues were observed to be above their considered baseline parameters, namely ‘mean arterial blood pressure 97’, an increase from a base of 70 to 75, and ‘heart rate 105’, an increase from a base rate of 69. A supplementary physiological cue ‘respiratory rate 10’ was within normal parameters. In addition, one overt motor pain behaviour cue ‘guarded movement’ was noticeable. Moreover,

**Cues (1st Order Cues)**
- MAP 97 (drastic jump)
- Turned chest X-ray
- Heart rate 105
- CABG x 4 with LIMA
- No response to questions on pain
- Support requirements
- MAP analgesic response

**Intermediate Judgement (2nd Order Cues)**
- Eyes closed
- Respiratory rate 10
- Not obeying verbal commands

**Final Judgement**
- Map in theatre
- Chest drainage 150 last quarter
- GTN 10
- Temperature 35.1°C central
- Temperature 25.1°C peripheral

**Risk for Impaired Comfort**
- Level of Wakefulness
- Risk for Acute Pain

**Physiological cue**
- Mechanical cue
- Technical cue
- Behavioural (general) cue
- Pain descriptor cue
- Covert behaviour cue
- Overt motor pain behaviour cue
- Knowledge cue
- Physical cue
- Paramedical cue
the verbal subjective pain behaviour cue ‘patient self-report pain’ was not exhibited by this ventilated patient either spontaneously or in response to the critical care nurse’s questioning about his present pain state (see Table 4.30a).

In summary, two altered physiological cues were observed together with one overt motor pain behaviour cue. However, the verbal subjective pain behaviour cue ‘patient self-report pain’ was not expressed by this ventilated patient during repositioning post CABG surgery in this pain incident. The triangulated data-set findings are considered in the following part.

4.15.3 Data Triangulation

The researcher observed the ventilated patient’s pain cues which were linked with the pain cues verbalised by the critical care nurse in both pain incidents. The cues corresponded in all pain incidents. The following think aloud data in ‘pain incident at rest’ is complimented by the observation data (in italics) which provides a more complete picture as the judgement unfolds below:

402 S/30 J: ‘I see him grimacing there so his pain is evident on his face
418 S/30 J: He is pointing to his chest drains, D, are you sore there, just take it easy, I will help you
[Patient nods his head (yes) in response]
420 S/30 J: Are you pointing to the tube there, you are, experiencing a lot of discomfort with the tube it seems
[The patient is pointing at the ET tube and nods his (yes) in response]
425 S/30 J: Do you have pain at the moment there, just there
[Patient nods his head (yes) in response to the critical care nurse identifying the chest incision region]
426 S/30 J: He said he is sore so I believe him, it is the most valid pointer really and he was grimacing, plus it is very useful when he is anxious
427 S/30 J: He is sore’.

Overall summary: the findings indicated that the critical care nurse used a compilation of first-order cues to make intermediate judgements of the ventilated patient’s pain state in the immediate phase post cardiac surgery during suctioning, which included physiological, technical, paraclinical, and mechanical. Consequently, the aforementioned first-order cues were then integrated into three intermediate judgements. Hence, the intermediate judgements operated as second-order cues which were then assimilated into a final judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery during this pain incident, i.e. ‘he is in pain’. Moreover, the ventilated patient exhibited physiological and overt motor pain behaviour cues in this immediate phase. The triangulated data revealed how the process may compliment both data-sets.

4.16 Conclusion

In conclusion, a picture emerged of the judgement process of each individual critical care nurse in the context of the ventilated patient’s pain state in the immediate phase post cardiac surgery. There was a systematic pattern to this judgement process which had two levels. Initially, the judgement task was broken down into three to six intermediate judgements, each of
PATIENT PAIN BEHAVIOUR CUES

The patient returned from theatre at 12.30 hours following coronary artery grafts by five (inclusive left internal mammary artery). This 'pain incident' commenced at 13.10 hours while the ventilated patient was being repositioned subsequent to a routine chest x-ray. The following pain cues were recorded:

<table>
<thead>
<tr>
<th>Cue</th>
<th>Context (Vasodilators / Inotropes)</th>
<th>Category</th>
<th>Prior to Pain Incident</th>
<th>Baseline Parameters</th>
<th>Current Parameters</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean arterial blood pressure (MAP)</td>
<td>Nitroglycerin 10</td>
<td>Physiological</td>
<td>69</td>
<td>70 - 75</td>
<td>97</td>
<td>Increased MAP</td>
</tr>
<tr>
<td>Heart Rate</td>
<td></td>
<td>Physiological</td>
<td>88</td>
<td>69</td>
<td>105</td>
<td>Increased heart rate</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td></td>
<td>Physiological</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>No change</td>
</tr>
<tr>
<td>Guarded movement</td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient self-report pain</td>
<td>Verbal Subjective Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No response to the critical care nurse's question about pain: have you any pain?; are you sore at all?</td>
</tr>
</tbody>
</table>

**TABLE 4.30A CASE THIRTY: PAIN INCIDENT REPOSITIONING POST CHEST X-RAY**
which involved judgements based on different first-order cues. At this level the critical care nurse selected and utilised several first-order cues. The first-order cues varied from behavioural general, physiological, technical, mechanical, paraclinical, covert behaviour, overt motor pain behaviour and pain descriptor cues. However, several of the first-order cues had many probable meanings which were exemplified in each individual critical care nurse’s interpretations of each cue in their think aloud extracts presented earlier (see Appendix 1A). Furthermore, the critical care nurse combined the first-order cues into a small number of intermediate judgements. This process was epitomised in the think aloud citations which indicated that each critical care nurse attempted to make sense of several ambiguous accessible first-order cues in an unpredictable complex context in order to reach a judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery.

Furthermore, a number of first-order cues were integrated into all of the intermediate judgements which seemed to arise from the many probable meanings attached to some of the first-order cues, in particular behavioural general and physiological cues by individual critical care nurses. There was one notable difference here where pain descriptor cues and overt motor pain behaviour cues were identified by a critical care nurse and combined into an intermediate judgement, i.e. ‘(s)he is sore’. In this instance the pain descriptor cue(s) and overt motor pain behaviour cue(s) had a single meaning. However, there were instances where the pain descriptor cues and overt motor pain behaviour cues were inaccessible to the critical care nurse and other available first-order cues were utilised as an option, such as physiological ‘MAP response to analgesia’. The next level saw the critical care nurse utilise and combine a small number of intermediate judgements operating as second-order cues in order to make a final judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery.

This chapter presented fifteen of thirty individual cases incorporating the cue characteristics of each critical care nurse in one pain incident. Furthermore, the pain behaviour cues exhibited by fifteen of thirty individual ventilated patients in the immediate phase post cardiac surgery were also represented in the corresponding pain incident. Besides, the data triangulation was described which engaged both the critical care nurse cue characteristics that materialised from the think aloud data along with the patient pain behaviour cue characteristics that emerged from the researcher observation data in the field. The following chapter will present the findings of thirty cases subsequent to the systematic analysis of each individual case of which examples were provided in this chapter. Furthermore the common aspects and differences between various judgement policies across critical care nurses in the context of the ventilated patient in pain in the immediate phase post CABG surgery will be discussed in the following chapter.
CHAPTER FIVE: FINDINGS

5.0 INTRODUCTION

The findings of this study are presented in this chapter in two main sections. The first section represents one major unit of analysis, i.e. the judgement process of thirty critical care nurses in the context of the ventilated patient in pain in the immediate phase post cardiac surgery. The subsequent section presents the findings pertinent to the pain cues exhibited by the same ventilated patients in the immediate phase post cardiac surgery observed by the researcher during fieldwork. Moreover, both sections are divided into subsections in order to characterise the judgement process in depth which evolved under the guise of two pain incidents. The initial pain incident transpired as the ventilated patient was repositioned following a routine chest x-ray within one hour post cardiac surgery. Another pain incident ensued as the ventilated patient was resting five hours post cardiac surgery. Furthermore, the researcher’s reflections from the field will be a part of the findings. Finally, both data-sets, i.e. critical care nurses’ cue characteristics and the pain cues exhibited by the ventilated patient, were matched and are discussed within the text in order to develop converging lines of inquiry as recommended by Yin (2005). The following section details the findings pertinent to the thirty critical care nurses’ judgement policy during the repositioning of the ventilated patient within one hour post cardiac surgery in the intensive care unit.

5.1 SECTION ONE: PAIN INCIDENT: TURNED POST CHEST X-RAY:
JUDGEMENT PROCESS CRITICAL CARE NURSES

5.1.1 INTRODUCTION

The judgement strategy employed by thirty critical care nurses was reflected in two pain incidents. The first pain incident evolved as the ventilated patient was turned post routine chest x-ray within one hour post cardiac surgery. The subsequent pain incident happened as the same ventilated patient at rest five hours following cardiac surgery. In order to reach a final judgement of the ventilated patient’s pain state during each pain incident a process was revealed which evolved in two stages. The initial stage of the judgement process by thirty critical care nurses involved first-order cue utilisation and integration into intermediate judgements. Consequently, the next stage concerned these intermediate judgements, which operated as second-order cues and which in turn were used as cues and combined into a final judgement. The literature indicates that a policy maker may employ a two-step inference process where the cues for a judgement may be the judgements themselves (Adelman et al. 1975, Cooksey et al. 1986). This section will focus on the judgement process within the first pain incident, i.e. 'turned post chest-x-ray'. Turning was found to be the most painful procedure for critically ill patients (Puntillo et al. 2001).

There were a small number of intermediate judgements formulated by the critical care nurses in the initial stage which are discussed individually. Consequently, based on those intermediate judgements the critical care nurses either formulated the final judgement '(s)he is in acute pain' (eight critical care nurses) or else '(s)he is not in acute pain at present but is at risk
for acute pain’ (twenty-two critical care nurses). Therefore, the findings associated with each contrasting intermediate judgement are discussed prior to each final judgement. Finally, the judgement process is presented along with findings across both contrasting judgements. The intermediate judgement ‘(s)he is haemodynamically unstable’ is presented in the next subsection alongside ‘(s)he is haemodynamically stable’. In addition, both intermediate judgements are discussed together relative to some of the first-order cues.

5.1.2 Intermediate Judgement: ‘(S)he is haemodynamically unstable’

This intermediate judgement ‘(s)he is haemodynamically unstable’ was formulated by twenty-seven of the thirty critical care nurse participants as the ventilated patient was turned post routine chest x-ray within the first hour post cardiac surgery. The number of first-order cues used and combined by each individual critical care nurse varied from seven to thirteen. The remaining three critical care nurses (2, 5, 25) made the intermediate judgement ‘(s)he is haemodynamically stable’ based on between six and eight first-order cues, for example see Figure 5.1 of which two first-order physiological cues ‘normal MAP’ alongside ‘normal heart rate’ were manifest.

There were similarities across all thirty critical care nurses, for instance see Figure 5.2 with respect to the following mechanical cues ‘nitroglycerin and adrenaline’ which made reference to inotropic and vasodilator support infusing at that particular time, alongside two physiological cues, namely ‘peripheral and central temperature’. The aforesaid four first-order cues were deemed fundamental baseline data relevant to the ventilated patient’s current haemodynamic state in the immediate phase post cardiac surgery. Furthermore, additional physiological cues, i.e. ‘increased MAP’, ‘decreased MAP’, ‘normal MAP’ and or ‘increased heart rate’, were interpreted by all critical care nurses (n=30) in the context of inotropic and vasodilator support infusing and the ventilated patient’s temperature readings. This finding is important as the literature indicates that physiological indicators such as increased heart rate and blood pressure lack specificity in the intensive care unit and can be influenced by many medications, pathological conditions and fear (Hamill-Ruth & Marohn 1999).

The important detail in this study is the integration of the ventilated patients’ temperature readings which may well be peculiar to patients undergoing cardiac surgery. The following think aloud extracts provide examples where vasodilator support is taken into context when ‘normal MAP’ parameters are exhibited by the ventilated patient which may mask alterations in physiological cues. It also provides a picture of critical care nurses who have a deep understanding of the patient’s haemodynamic responses early in the postoperative period and are not prepared to accept normal MAP readings without looking at the entire scenario including the impact of vasodilator support and temperature recordings:

102 S/22 EY: ‘...her support requirements, also cold, if the GTN was reduced that MAP of 80 which is what they want would rise significantly further so it is pain related, she is very sensitive to the support...so that MAP reading needs to take her support on board...on lot GTN...

46 S/10 E: ‘...her MAP is 83 which is borderline, just above baseline 70 to 80...her mean is controlled with GTN, very cold too...”
Figure 5.1

Turned Chest X-Ray — Case Analysis — First Order Cues
(Within First Hour Post-Op.) — Altered Haemodynamics

Cues (1st Order Cues) — Intermediate Judgment
(Second Order Cues)

# MAP 70
■ Adrenaline 6
■ Nitroglycerin .1
# Temperature peripheral 30.0°C
# Temperature central 35.4°C
# Heart rate 90

# MAP 78
# Heart rate 80
+ Airway pressure 25cms

Δ Grafts x 2 with LIMA
■ Adrenaline 3
■ Nitroglycerin 1
# Temperature central 35.4°C
# Temperature peripheral 29.5°C
≈ Skin cool

H Heart rate 80
# MAP 70
Δ Fast Track
+ Chest drainage 80 last quarter
# Temperature central 35.2°C
# Temperature peripheral 25.4°C
■ Adrenaline 3
■ Nitroglycerin .5

(5)he is haemodynamically stable

Broken Line = Dissimilar First Order Cue

# Physiological cue
■ Mechanical cue
+ Technical cue
* Behavioural (general) cue
• Pain descriptor cue
□ Covert behaviour cue
○ Overt motor pain behaviour cue
▲ Knowledge cue
≈ Physical cue
△ Paraclinical cue
Figure 5.2

Turned Chest X-Ray – Case Analysis – First Order Cues (Within First Hour Post-Op.) – Altered Haemodynamics

Cases 24 & 26

Cues (1st Order Cues) \( \rightarrow \) Intermediate Judgement (Second Order Cues)

- **MAP 96 (sudden rise)**
- **MAP response to analgesia 64**
- **Support Requirements**
  - Adrenaline 10/4
  - Noradrenaline
  - Nitroglycerin 3/5
  - MAP labelled in theatre
- **Heart rate 103**
- **Temperature 24.3°C central**
- **Temperature 35.5°C central**

- **MAP 89**
- **Blood pressure theatre sagging**
- **Adrenaline 2**
- **Noradrenaline 4**
- **Left ventricular ejection fraction 29%**
- **Nitroglycerin 2**
- **Heart rate 105**
- **Chest drainage 150 last quarter, no air chest drains**
- **Temperature central 35.1°C**
- **Temperature peripheral 24.5°C**

Altered Haemodynamics
- Case 24
- Case 26

(S)he is haemodynamically unstable

**Legend:**
- # Physiological cue
- □ Covert behaviour cue
- ❌ Overt motor pain behaviour cue
- ▲ Knowledge cue
- ★ Behavioural (general) cue
- ≈ Physical cue
- ● Pain descriptor cue
- △ Paramedical cue

**Key:**
- # Support Requirements
- △ Intermediate data
- ▲ Unique information

**Broken Line = Dissimilar First Order Cue**
49 S/10 E: She is on a large amount of support, so may be uncomfortable
50 S/10 E: Because we don’t know if the GTN was turned off she may be hypertensive, so she could be uncomfortable... on GTN 15...

The physiological cue ‘increased mean arterial blood pressure (MAP)’ was evident in nineteen of the twenty-seven cases whereas ‘decreased MAP’ was identified in eight cases. There was a value qualifier applied by the critical care nurse alongside the physiological cue ‘increased MAP’ in nine cases such as ‘shooting up’ or ‘all of a sudden’, illustrated in Figure 5.3, which took on some significance in the context of the ventilated patient’s prior MAP readings and current haemodynamic status. This is illustrated in the following think aloud extracts. Likewise, the aforesaid physiological cue has many probable meanings in each scenario below:

37 S/3 J: “...MAP 100 shooting up, uncomfortable there, MAP high at twenty five to two, hypertensive
38 S/3 J: They want the mean between 70 and 80 because he bled in theatre, MAP 100 not helping that bleeding, so my concern is now that MAP shooting up, also very sick heart... bleeding
39 S/3 J: So I think I might give him morphine or will I wait
47 S/3 J: Are you sore, no response
48 S/3 J: Rest your hands down by your sides, very anxious there...

29 S/6 ES “...her blood pressure has been very stable but now 95 mean, acute rise, they want it 70 and 80... I have just turned her there for pressure area check after x-ray... so I would assume that she is uncomfortable with the turn, plus she was going against me...
33 S/6 ES: For postoperative patients like J who is hooked up and intubated, it is usually an acute rise in blood pressure or they are restless that tells me there are in pain... so she is aware there and anxious... plus that MAP is a problem for her graft and her haemodynamics...”.

Furthermore, in case six above the critical care nurse draws on her experiential knowledge of other similar patients and matches this detail to incoming cues in order to confirm the intermediate judgement, i.e. ‘she is sore’, which will be discussed presently. Meanwhile, an additional physiological cue ‘increased heart rate’ was utilised across twenty four of the twenty-seven cases while a normal heart rate was identified in three cases. However, the aforementioned physiological cue, i.e. ‘increased heart rate’, was also utilised to formulate additional intermediate judgements such as ‘(s)he is anxious’, ‘(s)he is sore’, ‘(s)he is awake’. The following think aloud quotations give a sense of the many potential meanings associated with the physiological cue ‘increased heart rate’ and the difficult circumstances for these critical care nurses who make a judgement based on these probable physiological cues in the context of a critically ill ventilated patient in the immediate phase, i.e. within one hour post cardiac surgery:

60 S/27 S: “...her heart rate is sinus tachycardia 103 and her rate is usually 70 pre-op, she is on a lot of support, also awake even though not focused, plus agitated there and uncomfortable, plus
66 S/27 S: She had a tachycardia coming off bypass of 90 to 100, so fast rate in theatre from her usual rate of 70
70 S/27 S: Her left ventricular ejection fraction is about 25% so poor left ventricular with a recent MI... she is oozing with her chest drainage at 100 for last quarter...”.

84 S/22 EY: “...heart rate is 100 to 102 sinus tachycardia with a P wave that is peaked, no ectopics, baseline 78, low in volume as CVP 2 mmhg
85 S/22 EY: I think that heart rate has to do with the agitation, also uncomfortable and she must be aware underneath...”.

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Figure 5.3

Turned Chest X-Ray – Case Analysis – First Order Cues
(Within First Hour Post-Op.) – Altered Haemodynamics

Cues (1st Order Cues) → Intermediate Judgement
(Second Order Cues)

# MAP 93 (acute rise)
# Heart rate 100
# MAP 60 post morphine
△ Fast Track process
■ Adrenaline 1
■ Nitroglycerine 4
△ CABG x 3 with LIMA
△ Gozy in theatre
△ Chest drainage 100 last quarter
△ Left ventricular ejection fraction 50%
△ CVP 5mmHg
# Temperature central 35.2°C
# Temperature peripheral 27.0°C

→ Altered Haemodynamics Case 4

# MAP 100 (shooting up)
# MAP response to analgesia and sedative
△ Gozy in theatre
■ Nipride 5
■ Nitroglycerine 15
△ Chest drainage 100 last quarter
# Temperature central 35°C
# Temperature peripheral 25.0°C
# Heart rate 115
★ Restlessness
★ Fidgety, plucking bed clothes
★ Uneasy
★ Biting ET tube

(S)he is haemodynamically unstable
In contrast, the following think aloud quotations present additional detail on the physiological cue ‘increased heart rate’ used by some critical care nurses where anxiety was not the issue but haemodynamic instability was also to the forefront:

56 S/15 EI: “...he has a tachycardia of 110 which is related to volume, low volume, base rate 79, but he could be sore and uncomfortable...couldn’t depend on it here with him as pain indicator...more of a volume issue I feel, CVP only 1, MAP very low, volume related...cold...minimal support...”.

75 S/17 AM: “...heart rate 117 sinus tachycardia, so low in volume and he is on lot of support as his rate pre-op was 67. he could be sore maybe or awake underneath...sick heart, MAP dipping...cold...not reliable for soreness in this case...”.

The above quotations related to the physiological cue ‘increased heart rate’ provide a glimpse of reality surrounding some physiological cues interpreted in the context of pre-operative, intra-operative and current readings of each individual patient. In addition, the critical care nurses provided some detail in relation to the reliability of physiological cues as they integrated salient paraclinical and physiological cues in order to reach an intermediate judgement pertinent to the ventilated patients’ haemodynamics. This finding is important in light of other literature which found that physiological indicators alone are unreliable in determining the presence or absence of pain (Young et al. 2006). However, the critical care nurses in the abovementioned quotations provide an all inclusive picture of why this might be the case in the context of haemodynamic instability with their integration of salient cues. In the midst of physiological cues there were additional first-order paraclinical cues used (Figure 5.4) such as ‘blood pressure labile in theatre’, ‘slow coming off bypass’ and ‘tachycardia coming off bypass’ in some individual cases. Each paraclinical cue was relevant to individual patients, i.e. ‘left ventricular ejection fraction 28% ’, while another paraclinical cue ‘CABG by 3 with LIMA’ was utilised across another eleven cases, which seemed to reflect some issue with the actual grafts altering the patient’s haemodynamic status. This is illustrated in the following think aloud citations:

58 S/1 MO: “...she had CABG by 3 with LIMA, one of the grafts gave trouble in theatre, recent MI, now MAP too high ‘acute rise’ and she could burst the graft...”.

91 S/4 M: “...he had CABG by three with LIMA, so four grafts, problem with RCA in theatre...”.
92 S/4 MO: He was oozy in theatre, bleeding in theatre, lost a lot of blood and oozy at present...”.

However, in contrast, it is also evident that some critical care nurses utilised the first-order paraclinical cue ‘CABG by 4 with LIMA’ as indicative that the patient may be experiencing soreness, drawing on their experiential knowledge and applying it to the individual ventilated patient in the context of cardiac surgery exemplified in the above and subsequent think aloud excerpts:

50 S/7 AL: “...now this lady is after undergoing CABG surgery by three with LIMA...”.
51 S/7 AL: “This type of surgery causes soreness, when you see the patients in theatre with their sternum opened with a saw, it certainly gives you an idea of why they may be sore...”.

46 S/14 C: “...she had major surgery, grafts by 3 with LIMA, I would expect her to be sore, in my experience these patients with a wired sternum should be sore, anyway evidence on her face there too, but she is also a sick heart...”.

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Figure 5.4

Turned Chest X-Ray – Case Analysis – First Order Cues
(Within First Hour Post-Op.) – Altered Haemodynamics

Cases 27 & 28

Cues (1st Order Cues)

- MAP 60
- Slow coming off bypass
- Dobutamine 10
- Adrenaline 6
- Nitroglycerin 1
- Heart rate 103
- Tachycardia coming off bypass – 90-100
- Left ventricular ejection fraction 28%
- Temperature central 35.4°C
- Temperature peripheral 27.0°C
- Chest drainage 100 last quarter

- MAP 80
- Blood pressure labile in theatre
- Noradrenaline 10
- Adrenaline 5
- Dobutamine 5
- GTN 1
- Temperature central 34.5°C
- Temperature peripheral 26.5°C
- Chest drainage 120 last quarter
- Heart rate 108

Intermediate Judgment
(Second Order Cues)

Altered Haemodynamics
Case 27

Altered Haemodynamics
Case 28

(S)he is haemodynamically unstable

Broken Line = Dissimilar First Order Cue

- # Physiological cue
- ■ Mechanical cue
- + Technical cue
- # Behavioural (general) cue
- & Pain descriptor cue
- □ Covert behaviour cue
- ◀ Overt motor pain behaviour cue
- △ Knowledge cue
- ≈ Physical cue
- △ Paraclinical cue
Therefore, type of surgery in this instance is given different meanings by critical care nurses in the context of the ventilated patient’s haemodynamic status and comfort level. This finding is somewhat different to the literature where critical care nurses expected a degree of pain intensity to be associated with different surgeries (Guyton-Simmons & Ehrmin 1994, Carroll et al. 1999, Sjostrom et al. 2000). One technical cue ‘chest drainage 100-170 last quarter’ indicating excessive chest drainage was evident across fourteen of the thirty cases, keeping in mind the patients returned from theatre in the preceding thirty minutes and were also turned post routine chest-x-ray. However, it is also fair to say that all of the fourteen patients were judged to be ‘oozy’ by the critical care nurses in question, which indicates that one physiological cue, i.e. ‘increased MAP shooting up’, may cause the patient to bleed or ooziness may be a part of the patient’s surgical trajectory post cardiac surgery. The following think aloud extracts give a sense of how the technical cue ‘chest drainage 100-170 last quarter’ may evolve subsequent to repositioning the ventilated patient or the impact of the physiological cue ‘increased MAP acute rise’ or the influence of other paraclinical cues, i.e. ‘oozy in theatre’ ‘sick intra-operatively’ or ‘aspirin pre-operative’:

56 S/17 AM: "...he was sick intra-operatively, he had mean dips which responded to volume and support... oozy now... sick heart with ejection fraction 27%... MAP dipping...".

49 S/1 MO: "...she was oozy in theatre... that mean pressure cannot be helping either as it is too high

53 S/1 MO: Chest drainage 100 last quarter, excessive there... so she bled when turned which sometimes they dump out..."

62 S/23 N: "...he just drained 140 last quarter from chest drain, so oozy at present and high ACT

68 S/23 N: His MAP was labile in theatre, mean pressure was low and also blood loss was large, on aspirin pre-op..."

The above think aloud extracts demonstrate that the physiological cue ‘increased MAP acute rise’ has not only many possible interpretations but may also influence other first-order cues to manifest which could have a deleterious impact on the ventilated patient’s haemodynamic status in the immediate phase post cardiac surgery. In addition, each altered physiological cue is given meaning as the critical care nurse integrates other relevant first-order cues into the scenario along with her practical knowledge to make sense of the ventilated patient’s fragile haemodynamic status in order to prevent catastrophic consequences. An additional first-order cue ‘MAP response to analgesia’ was identified in five cases. This will be discussed in the context of the patient’s pain state presently.

There were similarities in cue utilisation and integration across critical care nurses during the formulation of the intermediate judgement ‘(s)he is haemodynamically unstable’ with respect to first-order cues of which an example is presented in Figure 5.5 numbering between seven or eight first-order cues. Moreover, five of the first-order cues comprised of four physiological cues (‘increased heart rate’, ‘increased MAP’, ‘peripheral and central temperature’) and two mechanical cues (‘adrenaline and nitroglycerin’) which could account for this similarity. Conversely, four of the aforementioned first-order cues occurred across all cases. On the other hand, the greater the number of first-order cues used by the critical care nurse (with the exception of physiological ‘peripheral and central temperature’ and one mechanical cue
Figure 5.5

Turned Chest X-Ray – Case Analysis – First Order Cues
(Within First Hour Post-Op.) – Altered Haemodynamics

Cues (1st Order Cues)

- MAP 48 / MAP 100
- Adrenaline 18
- Chest drainage 170 last quarter
- Temperature 35.2°C central
- Temperature 25.0°C peripheral
- Heart rate 115
- Left ventricular ejection fraction 60%
- Aspirin pre-operative

- MAP 95 (acute rise)
- Adrenaline 2
- Single graft plus LIMA
- Heart rate 105
- Nitroglycerin 2
- Temperature central 35.4°C
- Temperature peripheral 28.3°C
- Chewing ET Tube

- Opens eyes but drifts off
- Fast Track Policy
- MAP 81
- Heart rate 100
- Adrenaline 1
- Nitroglycerin 2
- Temperature peripheral 25.5°C
- Temperature central 35.4°C

- MAP 101 acute rise
- GTN 10
- Chest drainage 140 last quarter
- MAP table theatre
- Heart rate 97
- Temperature 35.3°C central
- Temperature 28.1°C peripheral

Intermediate Judgement
(Second Order Cues)

- He is haemodynamically unstable

Broken Line = Dissimilar First Order Cue

- Physiological cue
- Mechanical cue
- Technical cue
- Behavioral (general) cue
- Pain descriptor cue
- Covert behaviour cue
- Overt motor pain behaviour cue
- Knowledge cue
- Physical cue
- Paracultural cue

Cases 29, 6,
7 & 23
'nitro
 glycerin') in the remaining cases the more dissimilar the first-order cues (see Figure 5.6: cases 9, 11). One explanation for this finding could be each individual patient's current labile haemodynamic status, in particular cardio-respiratory, and the policy adopted by individual critical care nurses i.e. some first-order cues were more important than others such as altered physiological cues necessitating urgent interpretation. The contrasting intermediate judgement 'he is haemodynamically stable' by the three remaining critical care nurses was formulated based on normal physiological first-order cues, two mechanical cues and two technical cues which will be offered presently (see Table 5.6).

The next intermediate judgement formulated by eight of the thirty critical care nurses, i.e. 'he is awake now', is presented below in the context of the final judgement 'he is in acute pain' followed by an approach undertaken by the remaining twenty-two critical care nurse participants with a different intermediate judgement 'he is asleep' in the background of the final judgement 'he is not in acute pain at present but is at risk'.

5.1.3 Intermediate Judgement: 'He is awake now'

The number of first-order cues used and integrated by critical care nurses (n=8) in order to formulate the intermediate judgement 'he is awake now' varied in number from five to nine across the eight cases. Two physiological cues (see Figure 5.7) discussed earlier, i.e. 'increased MAP' and 'increased heart rate', were utilised in seven of the eight cases respectively. The following think aloud abstracts demonstrate how the aforesaid physiological cues can be used and combined with other first-order cues to infer a state and how another state may influence the changes in both physiological cues:

192 S/6 ES: "...when she awakens she becomes very agitated and then up goes her mean, an acute rise, and her heart rate with it, but she is also sore... ."

55 S/23 N: "...I am just watching his blood pressure as the minute he wakes it becomes very high and now ...with a mean of 101 and they do not want it to go above 80, was 81 before the turn...
56 S/23 N: You are to rest there sir...see the minute he wakes up he becomes anxious, I am sure he is sore with the turn too, but that high mean is not helping his bleeding... ."

Another physiological cue 'increased respiratory rate' was noted in five of the eight cases which will be presented in another subsequent intermediate judgement 'he is anxious'. Moreover, one behavioural general cue 'obeys some verbal commands' was utilised by all eight critical care nurses alongside another behavioural general cue 'eyes open' on this occasion. It seems that each critical care nurse adopted a systematic approach towards ascertaining the patient's level of wakefulness which could account for the similarity in cue utilisation within this intermediate judgement. The abovementioned first-order cues were only related to the intermediate judgement 'he seems to be awake now'. Sedation is normally assessed by observing the patient's wakefulness (e.g. eyes open) in response to verbal commands or physical stimuli and not necessarily noxious stimuli (Riker et al. 1999). During fieldwork by the researcher, each critical care nurse was seen to take each ventilated patient through a series of activities to establish their level of wakefulness. Furthermore, the patients in question opened their eyes reactively to command rather than spontaneously which coincides with the literature.
Figure 5.6

Turned Chest X-Ray – Case Analysis – First Order Cues
(Within First Hour Post-Op.) – Altered Haemodynamics

Cases 9 & 11

Cues (1st Order Cues)

- MAP 102 (sudden jump)
- MAP still > 100
- MAP response to analgesia
- Nitroglycerin 10
- Oxygen saturation 93%
- Respiratory pattern shallow
- Chest drainage 180 lost quarter
- Left ventricular ejection fraction 29%
- CVP 15mmHg
- Temperature central 35.2°C
- Temperature peripheral 25.8°C
- Heart rate 90
- Nipride 10
- CABG x 3 with LIMA
- MAP 63 sudden dip
- Adrenaline 2
- Noradrenaline 5
- Nitroglycerin .5
- Heart rate 102
- Oxygen saturation low in theatre
- Chest drainage 110 lost quarter
- Dressings leg wound
- Temperature 35.0°C central
- Temperature 25.0°C peripheral
- Chest expansion equal and bilateral

Intermediate Judgement
(Second Order Cues)

Altered Haemodynamics
Case 9

Altered Haemodynamics
Case 11

Broken Line – Dissimilar First Order Cue

(5) He is haemodynamically unstable
Figure 5.7

Turned Chest X-Ray – Case Analysis – First Order Cues
(Within First Hour Post-Op.) – Level of Wakefulness

Cues (1st Order Cues)

- MAP 95 (acute rise)
- Respiratory rate 16
- Heart rate 105
- Lips moving
- Obey verbal commands
- Eyes open
- Chewing ET Tube
- Restlessness
- Moving both arms a bit

Level of Wakefulness
Case 6

Intermediate Judgement
(Second Order Cues)

Level of Wakefulness
Case 14

Broken Line = Dissimilar First Order Cue

Cases 6, 14, 7 & 27

(S)he is awake.
(Riker et al. 2001). In this instance, confirmation for the cues were confirmed during fieldwork. Moreover, additional behavioural general cues with several probable meanings, i.e. ‘restlessness’ and ‘moving hands under covers’, were identified in a few cases along with ‘fidgety’ in three cases. The remaining first-order cues were dissimilar (see Figure 5.7) in each of the cases, for example two paraclinical cues ‘fast track policy’ and ‘big lady 81kg’. Conversely twenty-two critical care nurses formulated the following contrasting intermediate judgement ‘(s)he is asleep’ which was part of the strategy used in the context of the final judgement ‘(s)he is not in acute pain but is at risk for acute pain’.

5.1.4 Intermediate Judgement: ‘(S)he is asleep’

The number of first-order cues utilised and combined to make the following intermediate judgement ‘(s)he is asleep’ varied in number between three and ten cues. One behavioural general cue, i.e. ‘eyes closed’ was noted by twenty-one critical care nurses while another ‘not obeying any commands’ was evident across twenty cases (see Figure 5.8) for examples of such cases. It is relevant to note that both of the aforesaid cues were used as each individual critical care nurse methodically considered the ventilated patient’s level of wakefulness. Both behavioural general cues are consistent with level of sedation in ventilated critically ill patients (Riker et al. 1999). This process was confirmed during fieldwork as each critical care nurse in question evaluated each ventilated patient’s sedation level which yielded no response at that particular point in time. Besides, while a different behavioural general cue ‘no movement’ was apparent in seventeen cases, it was also evident in another intermediate judgement ‘she is not in pain at present’. In addition, four physiological cues were identified across the twenty-two cases, namely ‘increased MAP’ in ten cases and ‘normal MAP’ in four cases, ‘increased heart rate’ in fourteen cases with ‘normal heart rate’ noted in four cases. Each of the aforesaid physiological cues had many possible meanings which will become evident in intermediate judgements presently. Another physiological cue ‘normal respiratory rate’ was identified within seven cases which will also feature shortly. Moreover, a different behavioural general cue ‘no response to verbal stimuli’ was used by nine critical care nurses also implicated in a subsequent intermediate judgement ‘she is not in pain at present but is at risk for pain shortly’.

There was evidence of one mechanical cue ‘fentanyl 1mg in theatre’ in six cases which also appeared in the intermediate judgement ‘she is not in pain at present’ while one paraclinical cue ‘fast track policy’ was noted in five of the twenty-two cases. The remaining first-order cues utilised varied across each individual critical care nurse, for example technical cues ‘airway pressure 25cms’ and ‘dressing leg wound’; physiological cues ‘pupils pinpoint’ and ‘change in respiratory pattern’ and one mechanical cue ‘no spinal in theatre’. There were no similarities across the twenty-two critical care nurses with respect to their utilisation and integration of all of the first-order cues selected in this instance with the exception of two behavioural general cues ‘eyes open’ and ‘obeys verbal commands’.

To elaborate further on the above findings both of the intermediate judgements were compared to ascertain cue utilisation and integration by critical care nurses. The similarity between the first-order cues in both of the intermediate judgements ‘(s)he is awake’ or ‘(s)he is
Figure 5.8

Turned Chest X-Ray – Case Analysis – First Order Cues
(Within First Hour Post-Op.) – Level of Wakefulness

Cases 25, 8, 13 & 15

Cues (1st Order Cues)

- Turned chest X-ray
- No response to verbal stimuli
- Heart rate 90
- Eyes closed
- No movement
- Not obeying any verbal commands
- Fentanyl 1mg in theatre

Intermediate Judgement (Second Order Cues)

- Heart rate 100
- Heart rate 107
- CABG x 2 with LIMA
- Eyes closed
- No movement
- No response to any commands
- Pupils pin point

- Fentanyl 1.5mg in theatre
- Not restless
- Not biting on ETTube
- Eyes closed
- No movement
- Respiratory rate 10

Level of Wakefulness

Case 25

Case 8

Case 13

Case 15

(Broken Line = Dissimilar First Order Cue)

(S)he is asleep.
asleep’ in this subsection is related to two behavioural general cues, i.e. ‘eyes open’ against ‘eyes closed’ and ‘obeys verbal commands’ versus ‘not obeying any commands’, which is represented in Table 5.6. All critical care nurses undertook a neurological survey with each ventilated patient to ascertain ‘level of wakefulness’ which would account for the consistency across the cases relative to ‘eyes open’ ‘eyes closed’ alongside ‘obeys all commands’ with ‘not obeying any commands’. This finding is noteworthy in light of sedation-agitation scales being an essential component of monitoring the ventilated patient’s wakefulness state (Riker et al. 1999, 2001). In addition, the abovementioned first-order behavioural general cues did not appear to overlap with any other cue nor were they implicated within additional intermediate judgements.

Moreover, ascertaining the ventilated patient’s wakefulness was also associated with the critical care nurse attempting to ascertain pain status. There was similarity across one physiological cue ‘increased heart rate’ which will become visible in subsequent intermediate judgements highlighting the ambiguity of this first-order cue. There was dissimilarity across both intermediate judgements with respect to the behavioural general cue ‘no movement’. In the case of the intermediate judgement ‘(s)he is asleep’ the aforementioned cue predominated in seventeen of the twenty-two cases (see Table 5.6). One explanation put forward for this finding is that all ventilated patients in question in the counterpart judgement who were judged to be ‘awake’ were either agitated, fidgety or restless. Moreover, the majority of critical care nurses who utilised the behavioural general cue ‘no movement’ were sceptical about the reliability of this cue which will become evident in the ensuing intermediate judgement ‘(s)he is not in pain but is at risk of being in pain shortly’. One paraclinical cue ‘fast track policy’ along with one technical cue ‘fentanyl 1mg in OT’ had the same meaning for critical care nurses regardless of their inference, i.e. ‘she is asleep’ versus ‘she is awake’. The following think aloud extract gives a sense of the critical care nurses’ take on these first-order cues:

59 S/5 D: “...had fentanyl in theatre, but quite out of it at present...because he had fentanyl induction he will be sore, short acting...so for fast track which means for extubation in six hours...no sedation if possible...unless a valid reason...plus good ventricle so no reason why this cannot happen...”.

152 S/7 AL: “...she is for fast track policy, aim to get her extubated...need to watch the sedatives...plus she is young, good chest...non-smoker...good LV function which means she should be able for fast tracking...so we will see...she is surfacing now...sore too...fentanyl approach so I expect that...”.

Therefore, the link between perioperative approach, level of wakefulness, soreness, judicious use of sedatives and cardiac status suggest that the critical care nurse draws on her theoretical and practical knowledge while integrating this pattern of cues. Furthermore, there was no response to verbal stimuli on the part of the ventilated patients post cardiac surgery who were deemed to be asleep, which gives credence to the critical care nurses’ concern about background pain despite level of wakefulness, i.e. ‘(s)he is asleep’. The anticipation of pending or actual pain in the context of the patient post cardiac surgery is confirmed by studies in the literature whereby fast-tracked patients were found to be at risk of post-sternotomy pain (Ranucci et al. 1999). The remaining first-order cues such as technical, mechanical, behavioural general and covert behaviour cues used in individual cases were dissimilar across both intermediate judgments (see Table 5.6). The next subsection reveals another intermediate
<table>
<thead>
<tr>
<th>Cue Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
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<td># Physiological Cue</td>
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<td>8</td>
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<td>Normal MAP</td>
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<td>Decreased heart rate</td>
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<td>Normal heart rate</td>
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<td>Increased respiratory rate</td>
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<td>Normal respiratory rate</td>
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<td>Pupils pinpoint</td>
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<td></td>
<td>Change respiratory pattern</td>
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<td>Normal respiratory pattern</td>
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<td>■ Mechanical Cue</td>
<td>Fentanyl 1mg OT</td>
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<td></td>
<td>No spinal morphine OT</td>
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<td>Big lady 81 kg</td>
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<td></td>
<td>Airway pressure high</td>
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<td>★ Behavioural [General] Cue</td>
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<td></td>
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<td>8</td>
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<td>Increased respiratory rate</td>
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<td>Change respiratory pattern</td>
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judgement ‘(s)he is sore’ followed by a contrasting intermediate judgement ‘(s)he is not in pain at present but is at risk of being in pain shortly’.

5.1.5 INTERMEDIATE JUDGEMENT: ‘(S)HE IS SORE’

The intermediate judgement ‘(s)he is sore’ was formulated on the basis of an array of first-order cues utilised and combined by eight of the thirty critical care nurses in this pain incident as the ventilated patient was repositioned which varied from five to fourteen in number. One technical first-order cue ‘turned chest x-ray’ was used in all eight cases alongside two physiological cues identified earlier, i.e. ‘increased heart rate’ and ‘increased MAP’, in eight and seven cases respectively. Furthermore, the initial cue utilised by the critical care nurses during this pain incident reflected an altered physiological cue ‘increased MAP’ or, in the case of a borderline or normal MAP, a technical cue ‘turned chest x-ray’. According to Puntillo et al. (1997) the most frequently noted physiological indicators of pain by critical care nurses were heart rate (30%) and increased blood pressure (26%).

It is noteworthy that four of the eight critical care nurses in this study applied a value qualifier, for example ‘acute rise’ (see Figure 5.9), alongside the physiological cue ‘increased MAP’ which emphasised a marked sudden change in the ventilator patient’s mean arterial blood pressure (MAP) which caused concern and warranted immediate interpretation and urgent attention. Studies report changes in critically ill ventilated patients’ haemodynamics post major surgery such as heart rate and blood pressure during turning (Puntillo et al. 1997, Payen et al. 2001, Young et al. 2006). In this study, some critical care nurses used their practical knowledge of similar patients to differentiate between a typical change in the physiological cue ‘increased MAP’ versus an atypical change ‘all of a sudden’ which was then compared with the patients’ pre-operative baseline, cardiac history and current inotropic support alongside acceptable post-operative parameters recommended by the physician as exemplified in the following extract:

42 S/14 C: “...she is hypertensive now, we are looking for a mean between 70 and 80 ...70 is her usual...and it is around 95 there, all of a sudden, on a lot of inotropes, but it’s not a trend...new...anxious and aware and experiencing pain with the turn...well from my experience it usually is pain...

45 S/14 C: MAP needs urgent attention also sick heart with an ejection fraction 27%...I will check with her to see if she has pain with that MAP...”.

The above approach is consistent with Jacavone & Dostal (1992) who suggested that prior to acknowledging a significant patient response, the critical care nurse must have a sense of the patient’s baseline. Moreover, in the majority of cases as above the altered physiological cue ‘increased MAP all of sudden’ was the precursor to locating the source of pain rapidly with the patient. The significance of the value qualifier applied to the physiological cue ‘increased MAP’ enabled the critical care nurse to use it as a pain cue despite its many probable meanings based on her experience with similar patients. However, it could also be said that the urgency of maintaining the patient’s haemodynamic state was balanced with ascertaining the ventilated patient’s pain state in lieu of the physiological cue ‘increased MAP all of sudden’. In this instance, critical care nurses used a pattern of salient cues from several sources such as pre-operative, intra-operative and the post-operative status of the patient in order to make a
Figure 5.9

Turned Chest X-Ray – Case Analysis – First Order Cues
(Within First Hour Post-Op.) – Impaired Comfort

Cases 6 & 4

Impaired Comfort
Case 6

Impaired Comfort
Case 4

Brooken Line = Dissimilar First Order Cue

# Physiological cue
■ Mechanical cue
+ Technical cue
* Behavioural (general) cue
● Pain descriptor cue
☐ Covert behaviour cue
▲ Overt motor pain behaviour cue
▲ Knowledge cue
△ Physical cue
△ Paraclinical cue

S(he) is sore.
judgement in an unpredictable and fragile situation. This finding is consistent with Jacavone & Dostal (1992) who found that expert critical care nurses see the entire picture rather than just using one element in order to make a judgement otherwise referred to as ‘qualitative distinctions’ which influences their judgement.

However, the situation can be less than straightforward when ventilated patients may exhibit conflicting cues which necessitates that critical care nurses take a proactive stance. This hands-on approach to finding the source of the altered physiological cue rapidly on the part of the critical care nurse is based on her experiential knowledge of similar cases and the importance attached to the term ‘acute rise’ which is illustrated in the following think aloud excerpts with other competing patient states:

57 S/23 N: “...M, have you pain, no, I cannot understand that he has no pain when he is surfacing there and his pressure is high with it... bit anxious too... but 101 acute rise...
121 S/23 N: But I have asked him many times if he is in pain but he said no, so I will check again... are you in pain, you are in pain... I knew it with that MAP... based on my experiences acute rise means I look at pain as the route... unless something is askew with support lines... helps when they are anxious... and cold...”

Another physiological cue ‘increased respiratory rate’ was identified by five of the eight critical care nurses. The following think aloud extracts indicated that the physiological cue ‘increased respiratory rate’ was afforded many interpretations:

44 S/27 S: “...her respiratory rate is 18, so she has some respiratory effort, but shallow breaths, apparently she started to breathe on her own actually in theatre... just on her way over to the unit
45 S/27 S: She seems uncomfortable there also, airway pressure is alarming, and not far from waking up there and certainly is agitated, but she is only back thirty minutes and is awake too early...
56 S/14 C: “...respiratory rate 16, breathing up a bit there, agitated, also aware and uncomfortable, I am sure of it...
64 S/6 ES: “...respiratory rate 16, speeds up because she is busy trying to tell me she is in pain... plus also awake and agitated...”

The utilisation of physiological cues, in particular ‘increased MAP’, ‘increased respiratory rate’ and ‘increased heart rate’, were seen as unreliable pain cues in the context of the ventilated patients in pain in the immediate phase post cardiac surgery who were anxious, awake, fighting the ventilator and haemodynamically unstable. In addition, two behavioural general cues ‘restlessness’ and ‘chewing on ETTube’ were utilised in five and four cases respectively. The subsequent think aloud quotations provide examples and the justification applied to them by the critical care nurses:

85 S/7 AL: “...she is restless there, just that bit uneasy... also fighting the ventilator there...
120 S/7 AL: “...she is chewing on the ETTube, bit distressed there... plus intolerant of the ventilator... uncomfortable with the tube...
64 S/14 C: “...she is a bit restless because she is anxious, and light and more than likely in some discomfort...
83 S/14 C: “...she is chewing on the tube there, so she is agitated and chewing there that is not helping her saturation which are only 94%... I think she is uncomfortable also and awake...”

On the other hand, two overt motor pain behaviour cues ‘grimace’ and ‘guarded movement’ were used by four and five of the eight critical care nurses. This finding is consistent
with the literature whereby ‘grimace’ and ‘guarded movement’ were found to be good indicators of pain reported by critical care nurses and were more heavily rated than vital signs post major surgery (Guyton-Simmons & Ehrmin 1994). In addition, the aforementioned cues operated as precursors on the part of critical care nurses to locate a specific pain descriptor cue ‘patient self-report pain’. The availability of the pain descriptor cue ‘patient self-report pain’ seemed important to each of the eight critical care nurses in formulating the intermediate judgement ‘(s)he is sore’ which is reflected in the following quotations:

124 S/23 N: “...so he responds to being in pain because he is a little more alert than earlier, I knew he had pain with that MAP but he was also anxious and awake too so it is more dependable when he tells me as he is more alert and able to do so, so he is in pain...”.

48 S/29 SB: “...her mean pressure is very labile with one minute I am looking at the monitor like now and it is 48 down in her boots and then up to 100, oozzy, they like the mean between 70 and 80 on her so we are not behaving there...
49 S/29 SB: It is hard to know what is going on, she is on a lot of adrenaline, she could be sore, now awake and CVP is above 15...bleeding too...not anxious...she has a good ventricle ejection 50% so I don’t see that she needs that much adrenaline because her heart is good...just as well she is able to tell me she is in pain...too much going on...just as well...”.

Therefore, it could be interpreted that the critical care nurse placed some value on the pain descriptor cue ‘patient self-report pain’ which is viewed as not only dependable but helpful in the midst of so much uncertainty in the context of the ventilated patient in the immediate phase post cardiac surgery. The pain literature indicates that the single most reliable marker of the existence and intensity of acute pain is the patient’s self-report (AHCPR 1992). This finding is important in light of some studies which found that critical care nurses rely heavily on the patient’s verbal report if the patient is not ventilated (Guyton-Simmons & Mattoon 1991, Tierney 1992, Guyton-Simmons & Ehrmin 1994). In addition, Aslan et al. (2003) reported that 30% of critical care nurses would consider the critically ill patient’s pain statement as the most accurate approach to pain assessment. The point to be made here is that eight critical care nurses in this pain incident qualified why the ‘patient self-report pain’ was a dependable pain descriptor cue particularly in the context of the ventilated patient who was anxious, haemodynamically unstable with poor cardiac reserves and fighting the ventilator. Furthermore, the aforesaid pain descriptor cue operated as a precursor for the location of additional pain descriptor cues on the part of critical care nurses such as ‘pain location’ and ‘pain intensity’. The level of pain reported by the patient must be considered the current standard for assessment of pain in the critically ill (Jacobi et al. 2002). In addition, the ventilated patient’s ability to communicate with the critical care nurse was seen as an essential element in securing supplementary pain descriptor cues. The following subsection presents the counterpart intermediate judgement.

5.1.6 INTERMEDIATE JUDGEMENT: ‘(S)HE IS NOT IN PAIN AT PRESENT BUT IS AT RISK OF BEING IN PAIN SHORTLY’

The cues utilised and combined by the remaining twenty-two critical care nurses numbered between four and twelve first-order cues in order to formulate the above intermediate judgement. One technical cue ‘turned chest x-ray’ was evident in twenty-one cases. It is relevant to consider that the ventilated patient was repositioned following a routine chest x-ray which occurred
within the first hour on arrival to the critical care unit. Moreover, the critical care nurses demonstrated their awareness of pain associated with procedures such as repositioning subsequent to the chest x-ray which is demonstrated in the following think aloud excerpts:

47 S/5 D: "...okay, J, we are taking an x-ray of your chest just to make sure everything is okay...and when we have that done we'll turn you to check everything...

49 S/5 D: Turning is a painful procedure...so he may experience discomfort or soreness...there is always that risk...not able to tell me at the minute but I use it as a red flag...especially when he is not awake enough to tell me any different..."

So it seems the technical cue ‘turned for chest x-ray’ takes on special significance when the ventilated patient is unable to articulate their discomfort and the critical care nurse remains alert to any cause that may exacerbate pain in this scenario. Moreover, procedures such as turning were associated with the greatest pain and discomfort for critically ill patients (Nelson et al. 2001). The difference in this study is that all critical care nurses used the technical cue ‘turned for chest x-ray’ as a pain cue because the procedure was viewed as capable of inflicting pain on the ventilated patient in the immediate phase post cardiac surgery. This detail is relevant in the context of ventilated patients who were unable to provide a pain descriptor cue ‘patient self-report pain’ which is noticeable in the following think aloud extracts where one behavioural general cue ‘no movement’ was apparent in eighteen cases. This cue was deemed unreliable as a pain cue based on the critical care nurse’s experiential knowledge:

57 S/13 P: "...sometimes patients can be sore and do not move so to me it is not reliable, I would need more than that..."

59 S/15 B: "...no movement there, heavily sedated, only back from theatre, more than likely not sore, but not a reliable marker..."

42 S/16 K: "...he is not moving, no movement, so he is not experiencing pain at present, but it is not always a reliable pointer, I will check with him, but he is only back since 11.45am and it is now 12.30pm, and he appears asleep..."

Moreover, the critical care nurses provided additional facets by applying their experiential knowledge of similar patients to the individual case as to why the behavioural general cue ‘no movement’ was unreliable and the role of the ventilated patient in validating their reasons for exhibiting an immobile posture. In the absence of the pain descriptor cue ‘patient self-report pain’ the meaning of and reliability of using the behavioural general cue ‘no movement’ as an indicator of pain according to the critical care nurses is open to misinterpretation which is exemplified in the following think aloud extracts:

94 S/1 MO: "...she is not moving, but that could be because she is too sore to move or just not awake or not in pain, not that useful sometimes I find, because it can mean very different things and only the patient can clarify that for me, but not at the moment..."

While case twenty-eight suggests that:

79 S/28 B: "...there is no movement there with T since the turn, she is asleep and sedated, not long back from surgery also maybe too scared to move, hard to know sometimes, I find with these patients, they are comfortable when they do not move but that is early on unless they are anxious, but it is not always that way as they waken, and only she knows but looks too sleepy to tell me, but during the turn she did resist..."
It is noteworthy in the above think aloud excerpts that both critical care nurses emphasise the ventilated patient’s potential role in this scenario. This finding pertinent to ‘no movement’ provided some detail on the critical care nurses’ view which is important as there is some diversity of findings in the literature with reference to the behavioural general cue ‘no movement’ as a pain indicator. According to Sanders et al. (2001) severe pain causes a behavioural change towards a more immobile posture, while Guyton-Simmons & Ehrmin (1994) found that critical care nurses used ‘no movement’ as indicative of no pain and therefore no pain medication was necessary. In addition, Puntillo et al. (1997) reported that critical care nurses used ‘no movement’ as a behavioural pain indicator frequently (31%) at the initial assessment of the ventilated patients’ pain post surgery. Moreover, the Pain Behaviour Scale (BPS) which has been found to be a valid and reliable tool in the assessment of pain in the unconscious sedated critically ill patient addresses no movement, i.e. absence of movement of upper limbs, as a marker of no response (Aissaoui et al. 2005, Young et al. 2006) which is scored with two additional items and the sum of three means no pain (Payen et al. 2001).

Another additional behavioural general cue ‘no response to verbal stimuli’ was used alongside ‘no movement’ in nineteen cases, indicating that the ventilated patient did not react to the critical care nurse’s questions about pain or was not proactive in providing a self-report emphasising the complexity of the judgement task for some critical care nurses in the absence of a pain descriptor cue:

98 S/20 MC: “...no response to my questions about pain...it is very difficult to assess his pain because he is so drowsy...”.

100 S/11 A: “...no response from him so difficult to assess his pain at present...”.

109 S/25 OL: “...no response, difficult to assess him until he wakes up which is not happening at the moment...”.

This finding was confirmed by the researcher during fieldwork which demonstrated that despite the determined efforts of nineteen critical care nurses, the ventilated patient was unable to provide a ‘self-report of pain’ within one hour post arrival to the critical care unit following cardiac surgery. One explanation for this finding put forward is that the ventilated patients in question were still under the effects of anaesthesia and were judged to be ‘out cold’ by the critical care nurses. Besides, six of the critical care nurses utilised an overt motor pain behaviour cue ‘no grimace’ as an indicator of no pain. However, Prkachin & Craig (1995) warned that the absence of a pain expression display cannot be interpreted as indicative of no pain. Furthermore, according to Prkachin (1992) there are individual disparities in the extent to which facial display will be present throughout events and it is likely for some individuals to tolerate painful events passively. Besides, in this study the overt motor pain behaviour cue ‘no grimace’ was used in conjunction with paraclinical and behavioural general cues, which is evident in the next think aloud extract. In addition, all of the critical care nurses in question attempted to locate a pain descriptor cue ‘patient self-report pain’ which was not forthcoming despite their persistent probing of the ventilated patients’ current pain state:
42 S/8 O: "...no grimace on her face with the turn, so I doubt if she is experiencing pain at the moment...physiological signs are labile...MAP 55 sudden dip with arrhythmias, fast heart rate and left lung not lifting...
44 S/8 O: Better check just in case...M, have you any pain, are you sore, uncomfortable in any way...no response...".

39 S/15 EI: "...in my experience these patients usually experience discomfort when turned so I am sure he will be the same.
41 S/15 EI: Even though he did not grimace there during the turn, so no evidence of pain at the moment even though he had no spinal...fentanyl approach...CABG by 4 with LIMA...should be sore, but out cold...relaxed on the ventilator....
65 S/15 EI: Now just let me make sure, C,C, how are you doing, have you any pain at all...no response to my question about pain yet...".

In addition, the use of facial expression as a pain indicator in critically ill ventilated patients post major surgery associated with nociceptive procedures such as turning is supported in the literature (Payen et al. 2001, Odhner et al. 2003, Young et al. 2006). However, another picture emerged in this study where some critical care nurses attempted to validate overt motor pain behaviours cues, i.e. 'grimace' and 'guarded movement', exhibited by the ventilated patient with a pain descriptor cue 'patient self-report pain' rather than making a best estimate of current pain status. This is demonstrated below:

42 S/28 B: "...she is grimacing there during the turn so it seems that she is experiencing discomfort now.
46 S/28 B: Her MAP is 80 so she could be sore, they want it between 70 and 75 but it was 60 before the turn, also on a lot of support and maybe is awake underneath...have you any pain...no response but she grimaced...nothing else to go on...cannot confirm it with her...there lies the difficulty...but I will go with grimace...but not long back from surgery... 

In addition, the following physiological cues were used and combined by the critical care nurses: 'increased MAP' (twelve cases), 'normal MAP' (four cases), 'increased heart rate' (sixteen cases), 'normal heart rate' and 'respiratory rate' (four cases), which have already been implicated in previously presented intermediate judgements, namely '(s)he is asleep' and 'haemodynamically (s)he is unstable at the minute'. Likewise, 'decreased MAP' was noted in five cases which had many potential explanations for the following critical care nurses.
Furthermore, the value qualifier 'sudden dip' (see Figure 5.10) seemed to be of some importance in this unpredictable scenario:

51 S/15 EI: "...his mean pressure has just dipped now to 50, sudden dip during the turn, so he is hypotensive
52 S/15 EI: He is not bleeding, but low in volume, he could also be sore...".

43 S/13 P: "...she is hypotensive with a mean of 60, dip there, bit oozy and they want it kept between 70 and 75
44 S/13 P: I reduced her support which she seems very sensitive to, plus her filling pressures are low also, she could be sore too...".

36 S/11 A: "...his mean has just dipped there, sudden dip, bit on the low side, hypotensive there, has poor cardiac history...I will just give him a minute or two to settle, just to see will it come up, they want it between 70 and 75...
42 S/11 A: He could be aware underneath, maybe uncomfortable and he is oozy since the turn..."

This approach is consistent with Stannard et al. (1996) and Guyton-Simmons & Ehrmin (1994) who found that expert critical care nurses used a monitoring schema of alterations in physiological parameters with ventilated patients post major surgery who were unable to express their pain verbally. The difference in this study is that the value qualifier 'sudden dip' enabled critical care nurses to rule in and or rule out a pain state without a subjective report of pain from the ventilated patient early in the surgical trajectory. This scenario is exemplified as a contrasting picture emerges with the same physiological cue and value qualifier 'sudden dip' in the following quotations, which highlights the complexity of the judgement process for critical care nurses in the context of the ventilated patient in pain in the first hour post cardiac surgery during repositioning:

51 S/8 O: "...blood pressure is 80/50 with a mean down to 55, its two o clock and my patient is hypotensive
due to arrhythmias, MAP 55
53 S/8 O: My blood pressure seems to drop due to the rhythm, CVP, fine, want mean to be kept 70 to 75, so sudden dip is not pain related...with others it is the same...ectopics are compromising her mean...plus tube in right bronchus...urgent now...
44 S/18 H: "...his MAP is dipping down into the early fifties, mean 54, his filling pressures are low as CVP mmhg, I want to keep it between 70 to 80
45 S/18 H: MAP is not related to pain, it is a support and volume issue, from my experience...HB only 7.6grms/dl and he's asleep...

The aforementioned think aloud citations provide a picture of critical care nurses who were able to integrate a pattern of relevant cues and also atypical cues by applying the value qualifier 'sudden dip' to an ambiguous physiological cue 'decreased MAP' which warranted urgent interpretation and intervention in the absence of a pain descriptor cue highlighting a sophisticated grasp of the ventilated patient's current haemodynamics. Moreover, these critical care nurses did not have an intimate knowledge of the patient in question but were able to zero in on relevant signs based on practical knowledge of similar patients alongside a detailed understanding of the current patient's pattern of responses with the aid of a value qualifier to make sense of one grossly altered physiological cue. This approach could be likened to what Jacavone & Dostal (1992) refer to as a 'clinical pattern' when expert critical care nurses were found to develop a pattern of cues based on their experiences with similar patients which guided
Turned Chest X-Ray – Cross Case Analysis – First Order Cues
(Within First Hour Post-Op.) – Risk for Impaired Comfort

Cases 15, 16 & 3

Cues (1st Order Cues)

- Turned chest X-ray
- No grimace
- No spinal morphine in theatre
- Fentanyl 1.5mg in theatre
- CABG x 4 with LIMA
- Not restless
- Not biting on ET tube
- No response to verbal stimuli
- MAP 50 sudden dip
- Heart rate 110
- No movement
- No movement
- No grimace
- Not biting ET tube
- Turned chest X-ray
- MAP 71
- No response to verbal stimuli
- Eyes closed
- Respiratory 10
- Breathing pattern regular
- Heart rate 80
- Fast track approach
- MAP 100 (shooting up)
- Turned chest X-ray
- Fentanyl 1mg in theatre
- No spinal morphine in theatre
- Grimace when turned
- He is rigid there
- Response to verbal stimuli
- MAP response to analgesia and sedative
- Heart rate 115
- Eyes closed
- Restlessness
- Fidgety, plucking bed clothes
- Biting ET tube

Intermediate Judgement (Second Order Cues)

Risk for Impaired Comfort
Case 15

Risk for
Impaired Comfort
Case 16

Risk for
Impaired Comfort
Case 3

(S)he is not in pain but is at risk of being in pain shortly.

Broken Line = Dissimilar First Order Cue

- Physiological cue
- Mechanical cue
- Technical cue
- Behavioural (general) cue
- Pain descriptor cue
- Covert behaviour cue
- Overt motor pain behaviour cue
- Knowledge cue
- Physical cue
- Parachetial cue
their search for additional cues. This clinical pattern involves the interplay of qualitative distinctions, involvement with the patient, sense of saliency and intuitive judgement (Jacavone & Dostal 1992).

Moreover, critical care nurses were found to use increases in blood pressure as pain indicators with patients who not only denied pain but who also did not report pain (Guyton-Simmons & Ehrmin 1994). Nonetheless, in this study the unreliability of physiological cues such as ‘increased heart rate’, ‘increased MAP’ and in addition ‘increased respiratory rate’ became apparent when the pain descriptor cue ‘patient self-report pain’ was not accessible due perhaps to the ventilated patient’s level of wakefulness within the first hour post surgery. Consequently, the critical care nurses (four cases) utilised one physiological cue ‘MAP response to analgesia’ as a substitute for the pain descriptor cue ‘patient self-report pain’ in the absence of any overt motor pain behaviour cue ‘grimace’ and when ‘increased MAP acute rise’ was present highlighting the significance of the value qualifier ‘acute rise’. The rationale was it seems to locate the source of the physiological cue ‘increased MAP acute rise’ rapidly and reduce further catastrophic events in the ventilated patient’s surgical trajectory while the patient continued to exhibit conflicting cues. The urgency of the scenario is understood and emphasised by the critical care nurses in the following think aloud transcripts:

101 S/9 I: “...there is no response there, hard to assess him, must be sore
116 S/9 I: His MAP is still above 100, it is not as I would like it to be
117 S/9 I: I feel he must be in pain because his blood pressure is so high
119 S/9 I: Even though he appears to be asleep, no movement or anything
121 S/9 I: His MAP response to the morphine I gave him a few minutes ago is 60 so
124 S/9 I: He must have been sore but he’s very sensitive to GTN and paprin, the vasodilators, so I cannot be sure, ...but it is all I have to work with...when there is no response...certainly at risk of pain...

118 S/19 MR: “...have you any pain, are you sore or uncomfortable in any way, no response but I would say he is sore
119 S/19 MR: So I am going to see if it is pain this man has as his mean is still rising at 101, just to see if this morphine works because the mean could cause a graft to blow or the patient to bleed so it is urgent I sort it out
120 S/19 MR: He must be sore...
130 S/19 MR: GTN did not reduce MAP, still hypertensive, no history of hypertension, change in ventilation mode did not decrease MAP either, so haemodynamics were altered, he is labile...he appears fast asleep...he seems to be fighting the ventilator...morphine given IV
136 S/19 MR: Pressure is down, systolic is 120 and mean 80, so MAP shows he must have been sore...so it just shows how wrong you can be thinking he was at risk of pain with so many conflicting messages...”.

The aforementioned quotations provide an explicit picture of the reasoning process which critical care nurses employed in order to make sense of a number of ambiguous physiological, paraclinical and behavioural general cues in a frail scenario in order to make an inference of the ventilated patient’s pain state during repositioning within the first hour post arrival to the critical care unit following cardiac surgery. Moreover, the physiological cue ‘MAP response to analgesia’ was used in the absence of a pain descriptor cue ‘patient self-report pain’ and overt motor pain behaviour cue ‘grimace’. Besides, the aforesaid physiological cue enabled the critical care nurse to integrate a group of salient cues in order to reach the intermediate judgement. Another point worth making in the above four cases is that the ventilated patient was not judged...
to be in an anxious state relative to the gross alteration in the physiological cue ‘increased MAP’. However, the critical care nurses also described the worth of this physiological cue ‘MAP response to analgesia’ by situating this cue in context, i.e. the support infusing, arrhythmias, temperature, vasodilatation and anxiety status of the ventilated patient. This finding is interesting in light of the literature which indicates that expert critical care nurses found ‘patient’s response to analgesia’ a critical indicator in diagnosing pain when no other cue was available if the altered blood pressure and heart rate returned to baseline following a similar intervention (Guyton-Simmons & Ehrmin 1994).

The literature recommends that critically ill patients who cannot communicate their pain should be assessed by physiological indicators, i.e. heart rate, blood pressure and respiratory rate and the change in these parameters post analgesic therapy along with other pain related behaviours (Jacobi et al. 2002). The interesting finding in this study is that the critical care nurses used changes in one of the ventilated patient’s altered physiological parameters ‘MAP response analgesia’ subsequent to an analgesic intervention as an indicator of pain in the absence of a pain descriptor cue ‘patient self-report pain’ rather than a marker to re-assess pain relief. Another approach was taken by the critical care nurse in case three who utilised ‘MAP response to analgesia’ as a supplementary physiological cue in order to provide additional data on the patient’s pain state in the absence of a pain descriptor cue ‘patient self-report pain’ but in the presence of two overt motor pain behaviour cues ‘grimace’ and ‘guarded movement’ and a physiological cue ‘increased MAP shooting up’. Nevertheless, the critical care nurse reasoned why the patient’s ‘MAP response to analgesia’ and a sedative was so remarkable giving further credence that the aforesaid physiological cue may not be indicative of the ventilated patient’s pain state. Nonetheless, it is viewed in the absence of a pain descriptor cue ‘patient self-report pain’ as a useful cue in ruling out one of the sources of the ‘increased MAP’ which seemed to be impacting on the ventilated patient’s already fragile haemodynamic status as illustrated in the subsequent think aloud quotation:

105 S3 J: “...and he grimaced when turned...he was rigid there like a boarded...so he must be in pain
108 S/3 J: Have you any pain sir, are you sore, no response, not awake enough to be appropriate
110 S/3 J: I will watch his response to the analgesia and sedative, best way at the moment, MAP so high, I see no other explanation for the high MAP
129 S/3 J: I am just going to reduce down the GTN and Nipride, because his MAP has dropped dramatically, now 60
130 S/3 J: So he must have been sore
132 S/3 J: Morphine and Midazolam did the trick, but he is also on Nipride and GTN as vasodilators
133 S/3 J: Also he is very anxious, so drop in MAP in response to morphine is not definitive here...”.

In contrast, another critical care nurse (case four) also utilised the abovementioned physiological cue ‘MAP response (60) post morphine’ as confirmatory baseline data with the pain descriptor cue ‘patient verbal report pain’ for future reference regarding the reliability of the aforesaid physiological cue:

193 S/4 M: “...okay, he is a bit hypotensive after that morphine, MAP 60, I just wanted to confirm that his MAP could be related to his pain...so he was in pain but
193 S/4 M: I am sure it will pick up, maybe it’s due to the morphine and pain relief, but low in volume also and on 6 GTN at that time so it shows I cannot depend on MAP responses to morphine with him...”.

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The aforementioned example illustrates that because the critical care nurses have in-depth knowledge of the ventilated patient’s haemodynamics, a trial and error approach can be undertaken to determine the reliability of physiological cues such as ‘increased MAP’ which have the potential to cause untoward impact on the ventilated patient in pain in the immediate phase post cardiac surgery. This trial and error approach is fuelled by the availability of ambiguous physiological first-order cues, the unavailability of a pain descriptor cue and the sheer urgency of reducing the impact of a grossly altered mean arterial blood pressure and the consequential effects on the ventilated patients’ haemodynamic status.

There were additional first-order cues apparent within individual cases, i.e. three behavioural general cues ‘not biting on ETTube’, ‘eyelids not flickering’ and ‘not restless’, while another technical cue ‘dressing wound’ was noted in another case and an overt pain behaviour cue ‘guarded movement’ in another case. One mechanical cue ‘fentanyl 1.5mgs in theatre’ was apparent in ten cases, six of which were similarly represented within the intermediate judgment ‘(s)he is asleep’. Therefore, there was no first-order cue that any critical care nurse referred to as a ‘dependable’ cue in this instance where the intermediate judgement ‘(s)he is not in pain at present but is at risk of being in pain shortly’ was formulated. Nonetheless, within intermediate judgements, for example ‘(s)he is not in pain at present but is at risk of being in pain shortly’, it seems that the more cues the critical care nurses used the more dissimilar the individual cues became (see Figure 5.10 presented earlier). On the other hand, the less cues the critical care nurse used, the more similar the cues (see Figure 5.11). The explanation for this scenario may be related to the fact that two first-order behavioural general cues ‘no movement’ with ‘no response to verbal stimuli’ along with one technical cue ‘turned chest x-ray’ were utilised across the cases in question in conjunction with physiological cues. In addition, cues may have been noticed but not articulated by the critical care nurse. Another explanation could be related to the haemodynamic and wakeful state of the ventilated patient and the inaccessibility of first-order pain cues. However, during field work by the researcher, one overt motor pain behaviour cue ‘grimace’ was exhibited in conjunction with one behavioural general cue ‘chewing on ETTube’ by case twenty-six which was not articulated by the same critical care nurse caring for this ventilated patient. This detail was confirmed during matching of both data-sets through data triangulation. Therefore, the aforementioned cues were omitted by the critical care nurse in this instance.

The intricacies of the findings were explored in greater detail as both intermediate judgements, i.e. ‘(s)he is sore’ versus ‘(s)he is not in pain at present but is at risk of being in pain shortly’, were compared side by side (see Table 5.9). There were some similarities in cue utilisation across both intermediate judgements. There was evidence of one technical cue which occurred across twenty-nine of the thirty cases, i.e. ‘turned chest x-ray’, whereby each critical care nurse anticipated that the ventilated patient should be experiencing pain with repositioning. One explanation for this finding is that pain was assumed to occur during turning and secondly pain could be anticipated as a result of this procedure. This detail was important in light of the findings that several ventilated patients were unable to provide a pain descriptor despite the best efforts of the critical care nurse which was observed by the researcher and communicated by the
Figure 5.11

Turned Chest X-Ray – Case Analysis – First Order Cues
(Within First Hour Post-Op.) – Risk for Impaired Comfort

Cases 28, 17, 26 & 21

Cues (1st Order Cues) ➔ Intermediate Judgement (Second Order Cues)

- Turned chest X-ray
- Grimace (during turn)
- MAP 80
- No response to questions about pain
- Heart rate 108
- No movement

- Turned chest X-ray
- CABG x 3 with LIMA
- No response to verbal stimuli
- Heart rate 117
- No movement

- Turned chest X-ray
- MAP 89
- CABG x 3 with LIMA
- Heart rate 105
- No movement

- Turned chest X-ray
- MAP 105
- No response to verbal stimuli
- No movement

(5) He is not in pain but is at risk of being in pain shortly.
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<thead>
<tr>
<th>Cue Category</th>
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<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
<th>Cue Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
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<td>Increased MAP</td>
<td>8 [*4]</td>
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<td>Pupils pinpoint</td>
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<td>Weight 114kg – big man</td>
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<td>8</td>
<td>+ Technical Cue</td>
<td>Turned chest X-ray</td>
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<td>Startled look in eyes</td>
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<td>8</td>
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<td>Pain intensity</td>
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<td><strong>Overt Motor Pain Behaviour Cue</strong></td>
<td>Grimace</td>
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<td>8</td>
<td>□ Overt Motor Pain Behaviour Cue</td>
<td>Grimace</td>
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<td></td>
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<td></td>
<td></td>
<td>No grimace</td>
<td>6</td>
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</tr>
</tbody>
</table>

*Value qualifier 'acute rise'.

*Value qualifier 'sudden jump', 'sudden dip'.

Table 5.9: First Order Cue Utilisation Across Intermediate Judgements (Second Order Cues) 'One Pain Incident': Turned for Chest X-Ray
critical care nurses. Moreover, a significant increase in pain is associated with the activity of turning patients post cardiac surgery (Milgrom et al. 2004, Yorke et al. 2004). Furthermore, several critical care nurses (sixteen) used a paraclinical cue ‘CABG by 4 with LIMA’ across both intermediate judgements (see Table 5.9) which indicated that the ventilated patient should be experiencing pain with this type of major surgery. However, the aforesaid paraclinical cue was also used with some cases in the context of the ventilated patients’ pre-operative and intra-operative status and the impact of two altered physiological cues, i.e. increased heart rate’ and ‘increased MAP’, on an already fragile surgical trajectory necessitating urgent interpretation and intervention. Besides, a small number of critical care nurses expected that the ventilated patient would experience pain based on two mechanical cues ‘no spinal morphine in theatre’ and ‘fentanyl in theatre Img’ which was based on their practical knowledge of similar patients. The above findings provide a pattern of first-order cues that some critical care nurses used in order to pre-empt a pain state in the absence of a pain descriptor cue ‘patient self-report pain’. Therefore, this primary prevention pattern allowed those critical care nurses to make a judgement of ‘at risk for pain’ along with behavioural general cues such as ‘no movement’, ‘no response to questions about pain’ and ambiguous physiological cues. This pattern evolved with the experiential knowledge of the critical care nurses and their concentrated involvement at the bedside with ventilated patients within the first hour post cardiac surgery.

Furthermore, the physiological cue ‘increased heart rate’ was used by twenty-three of the thirty critical care nurses (see Table 5.9) which had many probable meanings and any alteration in physiological cues were interpreted in the context of two additional first-order cues, namely ‘peripheral and central temperature’ parameters and ‘inotropic and vasodilator’ support. There were several single cues utilised by individual critical care nurses across both intermediate judgements such as covert behaviour, physical, behavioural general, mechanical and paraclinical which are also illustrated in Table 5.9. The presence of one physiological cue ‘increased MAP’ in twenty cases to which the critical care nurse applied a value qualifier (ten cases), for example ‘acute rise’ or ‘no sudden dip’, in delicate haemodynamic circumstances was an initiator of a chain of events in relation to cue selection, utilisation and interpretation across both intermediate judgements. There was a sense of urgency in relation to the interpretation of this physiological cue which was used as a pain cue and acted as a precursor to the location by all critical care nurses in question of a pain descriptor cue ‘patient self-report pain’. Besides, the utilisation of the value qualifier based on experiential knowledge enabled critical care nurses to use and combine a number of salient cues in order to rule in or rule out pain, which was significant in light of no ‘patient self-report of pain’. On the other hand, it was equally significant when ‘decreased MAP’ with a qualifier ‘sudden dip’ was used by critical care nurses to rule out pain and anxiety when sinister haemodynamic events were in progress. The above findings are important as the pain literature has identified alteration in blood pressure and heart rate associated with turning (Puntillo et al. 1997, Payen et al. 2001, Young et al. 2006). However, the application of a word qualifier is noteworthy in this study.

In addition, in the absence of a pain descriptor cue and with the existence of the physiological cue ‘increased MAP sudden rise’ another physiological cue ‘MAP response to
analgesia' was used as a supplementary pain cue across both intermediate judgements with more cases noted in 's/he is not in pain but is at risk of being in pain shortly' (see Table 5.9 presented earlier). The utilisation of the aforesaid physiological cue allowed the critical care nurse to bring together relevant first-order cues with the intention of formulating an intermediate judgement. It is noteworthy that each critical care nurse who utilised the physiological cue 'MAP response to analgesia' qualified its unreliability in the context of the ventilated patient's haemodynamic response, i.e. vasodilatation, arrhythmias, volume status and support requirements. In the above fragile circumstances the critical care nurses drew on their practical knowledge of similar cases with regard to cue utilisation and interpretation, which provided a glimpse of their sophisticated knowledge of the ventilated patient's haemodynamics without an intimate knowledge of the ventilated patient within the first hour post cardiac surgery.

The dissimilar cue utilisation across both intermediate judgements was evident with respect to the following first-order cues: behavioural general cues 'no movement' and 'no response to verbal stimuli (questions about pain)'; physiological cues 'normal respiratory rate', 'decreased MAP sudden dip' and 'pupils pinpoint'; and an overt motor pain behaviour cue 'no grimace', which were integrated across various cases to formulate the intermediate judgement 's/he is not in pain at present but is at risk of being in pain shortly'. In contrast, the subsequent first-order cues used and combined into the intermediate judgement 's/he is sore' were the behavioural general cues 'restlessness', 'fidgety', 'chewing ETTube' and the physiological cue 'increased respiratory rate'; the overt motor pain behaviour cue 'grimace'; the covert behaviour cues 'apprehensive', 'uneasy'; the pain descriptor cues 'patient self-report' 'pain location' and 'pain intensity' diagrammatically presented on Table 5.9. It is noteworthy that some ventilated patients were judged to be agitated, which could account for the utilisation of the following cues: 'restlessness', 'fidgety' and 'increased respiratory rate', which will become apparent in the following subsection. The subsequent intermediate judgement 's/he is anxious' in this pain incident during repositioning is discussed.

**5.1.7 Intermediate Judgement: 'SHE IS ANXIOUS'**

There are nine cases reflected in this discussion, which means that nine of the thirty critical care nurses formulated the intermediate judgement 'she is anxious' based on between five and eight first-order cues (see Figure 5.12). The following three physiological cues already identified in earlier intermediate judgements with many probable meanings were utilised by the critical care nurses in this instance. In seven of the nine cases 'increased MAP' was used while 'increased heart rate' was identified in all nine cases, which is portrayed in Table 5.8, and 'increased respiratory rate' was integrated within four cases. The unreliability of the aforementioned physiological cues is also emphasised by McKinley et al. (2004) in the context of critically ill patients while in contrast Moser et al. (2003) reported that critical care nurses utilised increased heart rate, increased blood pressure and increased respiratory rate as indicators of anxiety. Moreover, two behavioural general cues 'restlessness' and 'fidgety' represented earlier were for a second time expressed by six and four of the critical care nurses respectively. Correspondingly, another behavioural general cue 'chewing on ETTube' was used and
Figure 5.12

Turned Chest X-Ray – Case Analysis – First Order Cues
(Within First Hour Post-Op.) – Anxiety

Cases 4, 14 & 23

Intermediate Judgement
(Second Order Cues)

Cues (1st Order Cues)

# MAP 93 (acute rise)
△ Resisting movement there
# Heart rate 100
* Restlessness
* Chewing on ET tube
☐ Frowning, looks distressed
* Fidgety (plucking bedclothes)

Anxiety
Case 4

* Chewing ET tube
☐ Apprehensive
# Heart rate 100
# MAP 95 (all of a sudden)
* Restless
* Chewing ET tube
☐ Apprehensive
# Heart rate 100
# MAP 101
# Heart rate 97
* Startled look eyes
* Restless during turn
* Fidgety

(S)he is anxious.

Anxiety
Case 14

Anxiety
Case 23

Broken Line = Dissimilar First Order Cue

| # Physiological cue | □ Covert behaviour cue |
| ☐ Mechanical cue    | ☀ Overt motor pain behaviour cue |
| ☐ Technical cue     | ▲ Knowledge cue |
| * Behavioural (general) cue | ≈ Physical cue |
| ☐ Pain descriptor cue | △ Parachronical cue |
### Table 5.7: First Order Cue Utilisation Across Intermediate Judgements (Second Order Cues) ‘One Pain Incident’: Turned for Chest X-Ray

<table>
<thead>
<tr>
<th>Cue Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
<th>Cue Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
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<td></td>
<td></td>
<td>Normal MAP</td>
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<td></td>
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<tr>
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<td>Increased respiratory rate</td>
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<td></td>
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<td>Increased respiratory rate</td>
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<td>Increased heart rate</td>
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<td>Normal respiratory pattern</td>
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<td>Airway pressure high 40cms</td>
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</table>

### Table 5.8: First Order Cue Utilisation Across Intermediate Judgements (Second Order Cues) ‘One Pain Incident’: Turned for Chest X-Ray

<table>
<thead>
<tr>
<th>Cue Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
<th>Cue Category</th>
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<th>Number of Critical Care Nurses Used the First Order Cue</th>
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<td>Increased heart rate</td>
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<tr>
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</tr>
<tr>
<td><strong>Pain Descriptor Cue</strong></td>
<td>ETTube uncomfortable</td>
<td>1</td>
<td>9</td>
<td><strong>Pain Descriptor Cue</strong></td>
<td>ETTube uncomfortable</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

*Value qualifier ‘acute rise’.
integrated with the aforesaid cues by five of the eight critical care nurses to infer the ventilated patient's state of anxiety within the first hour post cardiac surgery (see Table 5.8). Besides, three covert behaviour cues 'apprehensive' 'uneasy' and 'distressed looking' were utilised singly by three individual critical care nurses. There was no first-order cue indicative of anxiety as each cue had many probable meanings emphasised by the critical care nurses earlier and subsequently illustrated in the following think aloud extracts regarding the physiological cue 'increased respiratory rate':

69 S/22 EY: "...her respiratory rate is 15 so some respiratory effort, she is aware underneath and is also trying to communicate her discomfort, very apprehensive also...".

112 S/7 AL: "...respiratory rate 16, she is beginning to surface...bit distressed on the ventilator too..."
114 S/7 AL: Plus she is frightened and sore...

This picture is consistent with the literature where there is evidence that critically ill patients exhibit multiple conflicting cues if pain and anxiety states co-exist which creates many challenges for critical nurses attempting to differentiate between such cues (Stannard et al. 1996). The ensuing intermediate judgements formulated by nine of the thirty critical care nurses presented in the next subsection reflect two dissimilar views based on different first-order cues exhibited by the ventilated patient during repositioning in the immediate phase post cardiac surgery.

**5.1.8 Intermediate Judgement: '(S)he is fighting the ventilator'**

There were four of the thirty critical care nurses who formulated the above intermediate judgement '(s)he is fighting the ventilator' based on three to four first-order cues (see Figure 5.13). It is interesting to note that one first-order behavioural general cue which featured in this subsection, i.e. 'chewing on the ETTube', was utilised by three critical care nurses on this occasion along with a physiological cue identified earlier 'increased heart rate'. Moreover, another behavioural general cue 'restlessness' was used by two of the critical care nurses, 'increased MAP acute rise' used by case four and nineteen while 'increased respiratory rate' was used by case seven. The following think aloud extracts give a sense of the context in which the above intermediate judgement was formulated:

116 S/19 MR: "...I'm afraid he is actually sore, so I am just going to see because I see no other reason for his mean to be so high unless he is in pain and aware underneath or fighting the ventilator ...or the ventilator is not synchronising with the patient..."

135 S/7 AL: "...it can be just one thing that is bothering her...but it is a problem when she is anxious and fighting the ventilator...they are bad partners together...it is a vicious circle...and the ETTube is very uncomfortable...even though she is not really awake she is able to tell me that...".

Therefore, despite the fact that a small number of first-order cues were utilised and combined by four critical care nurses, only two of the first-order cues, i.e. one physiological 'increased heart rate' and one behavioural general 'restlessness', were similar in three of the four cases (see Figure 5.13). However, this finding only demonstrates that no one cue was indicative of 'fighting the ventilator' alone as all of the cues were used in supplementary intermediate judgements. In addition, one ventilated patient showed signs of bronchospasm which could
Figure 5.13

Turned Chest X-Ray — Case Analysis — First Order Cues
(Within First Hour Post-Op.) — Patient Ventilator Compliance

Cues (1st Order Cues) → Intermediate Judgement (Second Order Cues)

# Heart rate 115

* Restlessness

* Fidgety, plucking bed clothes

* Biting ETTube

# Respiratory rate 16

* Restlessness

* Chewing ETTube

# Heart rate 100

# MAP 93 (acute rise)

# Heart rate 100

* Chewing on ETTube

# MAP 97 (sudden rise)

# Change in respiratory pattern

* Airway pressure 40cm

—he is fighting the ventilator

(5)he is fighting the ventilator

Brokan Line — Dissimilar First Order Cue

# Physiological cue
■ Mechanical cue
+ Technical cue
* Behavioural (general) cue
○ Pain descriptor cue

□ Covert behaviour cue
△ Overt motor pain behaviour cue
▲ Knowledge cue
≈ Physical cue
△ Paradoxical cue
account for the dissimilar first-order cues used by the critical care nurse in this instance (see Figure 5.13; case 19). Nonetheless, Payen et al. (2001) included compliance on the ventilator (cough, fight) as part of the assessment of pain with mechanically ventilated patients post major surgery. The impetus for the inclusion of ‘compliance on ventilator’ by the aforesaid researchers on their new Behavioural Pain Scale (BPS) was that intubated patients’ response to a nociceptive stimulus (turning) is associated with a change in compliance with the ventilator (Payen et al. 2001) which has been validated by more recent studies (Aissaoui et al. 2005, Young et al. 2006). However, in this study the behavioural general cue ‘cough’ was not identified during repositioning. Interestingly, anxiety was present in all four patients. Therefore, it could be said that the process of ventilation in an awake patient could have heightened anxiety levels which could have potentiated a pain state while the converse could also be true. In contrast, the following subsection presents another view by some critical care nurses with a different set of first-order cues.

5.1.9 INTERMEDIATE JUDGEMENT: ‘(S)HE IS COMPLIANT ON THE VENTILATOR’

The intermediate judgement ‘(s)he is compliant on the ventilator’ was made by the remaining five critical care nurses based on the utilisation of two to three first-order cues. It is noteworthy that the only similarity across the five cases (see Figure 5.14) was a physiological cue ‘respiratory rate 10’ which was implicated within two intermediate judgements previously discussed, i.e. ‘(s)he is not in pain at present but is at risk of being in pain shortly’ and ‘(s)he is asleep’. The remaining few first-order cues varied between technical and behavioural general cues which is evident in Table 5.7 offered previously. In this study compliance on the ventilator was interpreted by the critical care nurses to mean relaxed on the ventilator which was also linked to the ventilated patient’s level of wakefulness. This appeared to be the case as all five ventilated patients were surveyed neurologically by the critical care nurses and judged to be still under the effects of anaesthesia and deeply sedated as exemplified in the following think aloud quotations:

62 S/15 El: “…more than likely he is not sore also because he is not restless, he is comfortable and settled, relaxed on the ventilator, lovely and asleep...out for the count…”.

86 S/2 A: “…I have just turned O after her X-ray...she may be sore due to the turning...but her breathing pattern is normal...not distressed on the ventilator asleep and comfortable…”.

In addition, in each of the five cases no verbal subjective pain behaviour cue ‘patient self-report pain’ was conveyed by the ventilated patient despite the concerted efforts of the critical care nurses in question which was recorded by the researcher during fieldwork and confirmed in the think aloud transcripts. In the literature, ‘compliance with mechanical ventilation’ was one of the items on the Behavioural Pain Scale (BPS) where a change noted in this parameter was scored and documented as a pain indicator during nociceptive procedures. There was no similarity across both intermediate judgements (see Table 5.7), ‘(s)he is fighting the ventilator’ versus ‘(s)he is compliant with the ventilator’ with respect to physiological, technical and behavioural general cues used and integrated by critical care nurses as few cues were used, and the ventilated patients who were judged to be ‘fighting the ventilator’ were also anxious.
Figure 5.14

Turned Chest X-Ray – Case Analysis – First Order Cues
(Within First Hour Post-Op.) – Patient Ventilator Compliance

Cases 2, 10, 11, 15 & 16

Cues (1st Order Cues)  ➔  Intermediate Judgement
(Second Order Cues)

- Respiratory rate 10
- Breathing pattern normal
- Airway pressure 25cms
- MAP 83
- Respiratory Rate 10
- Respiratory rate 10
- Chest expansion equal and bilateral
- Not restless
- Not biting on ETube
- Respiratory rate 10
- Respiratory 10
- Breathing pattern regular

(S)he is compliant on the ventilator

<table>
<thead>
<tr>
<th>Broken Line</th>
<th>Dissimilar First Order Cue</th>
</tr>
</thead>
<tbody>
<tr>
<td>#</td>
<td>Physiological cue</td>
</tr>
<tr>
<td>■</td>
<td>Mechanical cue</td>
</tr>
<tr>
<td>+</td>
<td>Technical cue</td>
</tr>
<tr>
<td>✯</td>
<td>Behavioural (general) cue</td>
</tr>
<tr>
<td>●</td>
<td>Pain descriptor cue</td>
</tr>
<tr>
<td>□</td>
<td>Covert behaviour cue</td>
</tr>
<tr>
<td>✥</td>
<td>Overt motor pain behaviour cue</td>
</tr>
<tr>
<td>▲</td>
<td>Knowledge cue</td>
</tr>
<tr>
<td>≈</td>
<td>Physical cue</td>
</tr>
<tr>
<td>△</td>
<td>Parad实训ial cue</td>
</tr>
</tbody>
</table>

Patient Ventilator Compliance
Case 2

Patient Ventilator Compliance
Case 10

Patient Ventilator Compliance
Case 11

Patient Ventilator Compliance
Case 15

Patient Ventilator Compliance
Case 16
### Table 5.7: First Order Cue Utilisation Across Intermediate Judgements (Second Order Cues) ‘One Pain Incident’: Turned for Chest X-Ray

<table>
<thead>
<tr>
<th>Cue Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td># Physiological Cue</td>
<td>Increased MAP</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Normal MAP</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Increased respiratory rate</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Normal respiratory rate</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Increased heart rate</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Change respiratory pattern</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Normal respiratory pattern</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td># Technical Cue</td>
<td>Airway pressure high 40cms</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Chewing on ETube</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td># Behavioural</td>
<td>Not biting ETube</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>(General) Cue</td>
<td>Restlessness</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Not restless</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Fidgety</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

### Table 5.8: First Order Cue Utilisation Across Intermediate Judgements (Second Order Cues) ‘One Pain Incident’: Turned for Chest X-Ray

<table>
<thead>
<tr>
<th>Cue Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td># Physiological Cue</td>
<td>Increased MAP</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Increased heart rate</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Increased respiratory rate</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td># Parasitological Cue</td>
<td>Nervous precip</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td># Technical Cue</td>
<td>Airway pressure high 40cms</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td># Behavioural</td>
<td>Restlessness</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>(General) Cue</td>
<td>Fidgety</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Chewing on ETube</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Moving hands quite a bit</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Startled look in eyes</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td># Covert Behaviour Cue</td>
<td>Apprehensive</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Uneasy</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td># Pain Descriptor Cue</td>
<td>Distressed looking</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ETube uncomfortable</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cue Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
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</tr>
</thead>
<tbody>
<tr>
<td># Physiological Cue</td>
<td>Increased MAP</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Increased heart rate</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Increased respiratory rate</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td># Parasitological Cue</td>
<td>Nervous precip</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td># Technical Cue</td>
<td>Airway pressure high 40cms</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td># Behavioural</td>
<td>Restlessness</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>(General) Cue</td>
<td>Fidgety</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Chewing on ETube</td>
<td>1</td>
<td>5</td>
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<tr>
<td></td>
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<td>Apprehensive</td>
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<td>1</td>
<td>5</td>
</tr>
<tr>
<td># Pain Descriptor Cue</td>
<td>Distressed looking</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>ETube uncomfortable</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

*Value qualifier 'acute rise'.
Another interesting point to be made is that there seemed to be a reciprocal relationship between anxiety and 'patient ventilator dysynchrony' which was evident during fieldwork as all four ventilated patients were very agitated and distressed on the ventilator. This was confirmed by the critical care nurses think aloud verbalisations.

The five contrasting intermediate judgements which have been discussed were only one component of the judgement process. The judgement policy employed by thirty critical care nurses was a two-tier approach where the judgement task was decomposed into two phases. In phase one critical care nurses used and combined a large collection of first-order cues which included physiological, paraclinical, behavioural general, mechanical, technical, covert behaviour, overt motor and pain descriptor cues. Hence the compilation of first-order cues were combined into the five intermediate judgements. Subsequently, the critical care nurses used and combined these intermediate judgements which operated as second-order cues into a final judgement of the ventilated patient's pain state during repositioning within the first hour on entrance to the critical care unit post cardiac surgery. The idea of a judgement structure is that concrete data (referred to as first-order cues in this study) are organised into intermediate judgements which are in turn organised into higher level judgements (Mumpower & Stewart 1996). The judgement process for both contrasting final judgements, i.e. (s)he is not in acute pain at present' versus '(s)he is in acute pain', related to the intermediate judgements previously discussed will be explored in depth in the ensuing subsection.

5.1.10 The Judgement Process: '(S)he is not in acute pain at present'

The judgment process was viewed across cue categories which showed some interesting findings during this pain incident, i.e. turned post routine chest x-ray within one hour post cardiac surgery (Figure 5.33A). There were four intermediate judgements formulated by one cohort of critical care nurses (n=22) which comprised of first-order physiological, mechanical, technical, paraclinical, behavioural general and overt motor pain behaviour cues that formed the first level of the judgement process. The second level of the judgement process adopted by critical care nurses involved the utilisation and integration of four intermediate judgements previously presented and discussed into a final judgement which related to the ventilated patient's pain state, i.e. '(s)he is not in acute pain at present'. The interesting finding is that physiological cues overlapped in each of the intermediate judgements with varying degrees of alterations in each such as 'normal MAP', 'increased MAP', 'decreased MAP', 'normal heart rate', 'increased heart rate', 'low peripheral and central temperature', 'pupils pinpoint', 'normal respiratory rate' and 'MAP response analgesia'. Therefore, the only physiological cues used by critical care nurses that remained consistent were 'normal respiratory rate' and 'peripheral and central temperature'. One explanation for this finding is that all ventilated patients were approximately thirty minutes post major cardiac surgery and according to the critical care nurses, were still 'under the effects of anaesthesia' which may account for in some cases 'pupils pinpoint'.

The differences in the remaining physiological cues were peculiar to the intermediate judgement '(s)he is not in pain but is at risk of being in pain'. In this intermediate judgement
"increased MAP" and "decreased MAP" were used by several critical care nurses with value qualifiers such as "acute rise" and "sudden dip" in the majority of cases to rule out pain in the absence of a pain descriptor cue, i.e. "patient self-report pain". In addition, another physiological cue "MAP response to analgesia" was used as a pain cue by some critical care nurses where there was major concern with "increased MAP shooting up", non-appearance of a "patient self-report pain" and an overt motor pain behaviour cue "no grimace". However, the physiological cue "MAP response to analgesia" was interpreted in context pertinent to support requirements, arrhythmias, volume status, temperature readings and cardiac status. In addition, the physiological cue "increased heart rate" or "normal heart rate" was also utilised which was seen to vary across intermediate judgements with many possible interpretations. Moreover, the findings suggest that each critical care nurse used an individual pattern of first-order physiological cues which reflected her experiential knowledge, her theoretical knowledge of pharmacotherapeutics and her deep sense of the ventilated patient's haemodynamic responses. Moreover, this sense of the ventilated patient's haemodynamics was evident during fieldwork where the researcher noted that continuous surveillance at the bedside on the part of the critical care nurse facilitated this process.

There was evidence across intermediate judgements (see Figure 5.33A) of another cue namely mechanical which reflected vasodilator and inotropic support. In all cases critical care nurses interpreted physiological parameters, i.e. MAP readings and heart rate parameters, in the context of vasodilator support and inotropic modalities alongside peripheral and central temperature. This finding is important in that changes in or lack of alterations in particular mean arterial blood pressure (MAP) readings were interpreted in light of vasodilator and inotropic support infusing at that particular point in time. So it was not just about abnormal parameters, it also concerned MAP readings just above baselines or borderline that were controlled by vasodilator support highlighting the sophisticated knowledge some critical care nurses maintained at the bedside despite the ambiguity of physiological cues.

Besides, another two cues "fentanyl 1mg in OT" and "no spinal morphine in OT" labelled as mechanical cues were peculiar to the intermediate judgement "(s)he is not in pain but is at risk of being in pain". Based on the utilisation of the aforesaid cues, the critical care nurses anticipated that the ventilated patients should experience pain. This detail is important as a different set of cues known as paraclinical, i.e. "fast track policy" and "CABG by 4 with LIMA" in conjunction with a technical cue "turned for chest x-ray" formed a pattern of first-order cues, i.e. primary preventative pattern. This primary preventative pattern of pain cues materialised in the absence of a pain descriptor cue "patient self-report pain", one overt motor pain behaviour cue "no grimace" and in the presence of behavioural general cues "no movement" and "no response to questions about pain" and one physiological cue "increased MAP acute rise".

Finally, level of wakefulness was deemed part of the process in ascertaining the ventilated patients' pain state. All critical care nurses utilised two behavioural general cues "not obeying verbal commands" and "eyes closed" to ascertain level of wakefulness. In addition, during fieldwork, a detailed neurological survey was seen to take place during and post repositioning
which was also evident on think aloud transcripts. This allowed critical care nurses to obtain additional data not only on level of wakefulness but also to rule in or rule out pain in the presence of altered physiological first-order cues. Finally, in this pain incident ‘compliance with the ventilator’ was formulated by five critical care nurses on the basis of normal physiological parameters, normal airway pressures on the ventilator (technical cue) and behavioural general cues such as ‘restful’ and ‘not biting on ETTube’. However, each individual critical care nurse utilised and combined a different set of first-order cues. It is noteworthy that the following cue category overt motor pain behaviour cue ‘no grimace’ did not overlap with any other first-order cue within the additional three intermediate judgements. Subsequently, the majority of critical care nurses utilised and combined the four intermediate judgements which operated as second-order cues (see Figure 5.31) into a final judgement ‘(s)he is not in acute pain at present’. The following think aloud extracts are presented as examples provide evidence of this process:

106 S/2 A: “...so to recap O looks comfortable...so not in pain but at risk for it is what I would think...
107 S/2 A: She is still asleep
108 S/2 A: She is haemodynamically stable but that could change quite smartly
111 S/2 A: She is compliant on the ventilator...
114 S/2 A: At the moment it does not appear that O is in acute pain but I will watch her carefully because I don’t want her to be sore...”.

126 S/16 K: “...just to bring it all together lot going on...so need to get my focus...
129 S/16 K: So he still looks comfortable...not in pain at present...
131 S/16 K: There is no sign of him waking up yet...he is sleeping
132 S/16 K: He is very oozy but his vital signs are fine...lot of support though...plus
133 S/16 K: He is synchronising with the ventilator...
136 S/16 K: So he is not in acute pain at present but I will watch him because there is always that risk so we will see...”.

Keeping in mind the number of first-order cues within the various categories and the overlapping of several of these cues, this finding sees the critical care nurse decompose the inference process into a second level in order to reduce the complexity of the judgement task. The terminology ‘so to recap’ and ‘just to bring it all together’ gives a sense of the need for this process strategy. So the critical care nurses developed a physiological pattern, a primary preventative pain pattern and a level of wakefulness pattern which comprised of various first-order cues in the initial stage of this judgement strategy. This process was used to attempt to rule in or rule out pain in the midst of a vulnerable and fragile ventilated patient in the immediate phase post cardiac surgery who exhibited several cues with many possible meanings simultaneously. Furthermore, in this pain incident, no one first-order cue was indicative of the ventilated patient’s pain state. Subsequently, a final judgement was reached ‘(s)he is not in acute pain at present’ by critical care nurses based on between three and four second-order cues. Therefore, consistency across the critical care nurses is revealed at the second level of the judgement process. In contrast, the following subsection presents the counterpart judgement approach which ended with a final judgement ‘(s)he is in acute pain’ which is discussed in depth below.
Figure 5.31

Turned Chest X-Ray (Within First Hour Post-Op.) Case Analysis – Second Order Cues –
Diagrammatic Representation "Judgement Process"

Intermediate Judgements
(2nd Order Cues)

Final Judgement

22 Cases

CASE 1
CASE 2
CASE 3
CASE 10
CASE 11
CASE 15
CASE 16
CASE 19
CASE 28
CASE 5
CASE 30
CASE 20
CASE 24
CASE 9
CASE 18
CASE 21
CASE 25
CASE 26
CASE 8
CASE 13
CASE 17
CASE 12
CASE 1
CASE 3
CASE 2
CASE 10
CASE 11
CASE 15
CASE 16
CASE 19
CASE 28
CASE 5
CASE 30
CASE 20
CASE 24
CASE 9
CASE 18
CASE 21
CASE 25
CASE 26
CASE 8
CASE 13
CASE 17
CASE 12
CASE 1
CASE 3
CASE 2
CASE 10
CASE 11
CASE 15
CASE 16
CASE 19
CASE 28
CASE 5
CASE 30
CASE 20
CASE 24
CASE 9
CASE 18
CASE 21
CASE 25
CASE 26
CASE 8
CASE 13
CASE 17
CASE 12

(S)he is not in pain
but is at risk of being
in pain shortly

(S)he is unstable
hemodynamically

(S)he is stable
hemodynamically

(S)he is asleep

(S)he is compliant
on the ventilator

(S)he is fighting
the ventilator

(S)he is anxious

(S)he is not in acute pain at present

Dissimilar
5.1.11 The Judgement Process: ‘(S)He is in Acute Pain’

This subsection presents an overview of the findings as the cue categories are presented in Figure 5.33B, which represent eight critical care nurses who made a final judgement ‘(s)he is in acute pain’ as the ventilated patient was repositioned within one hour post cardiac surgery. The findings suggest that the judgement strategy of these eight critical care nurses involved a two-level approach. The first level incorporated the utilisation and combination of several first-order cues. This process involved selecting and using physiological cues which overlapped within five intermediate judgements presented earlier (see Figure 5.33B). The physiological cues were as follows: ‘increased heart rate’, ‘increased MAP’, ‘core and peripheral temperature’ and to a lesser extent ‘increased respiratory rate’. Moreover, the alterations in ‘heart rate’ and mean arterial blood pressure were always interpreted by the critical care nurses in the context of temperature readings and two additional mechanical cues which related to vasodilator support and inotropic support. One important finding was the application of a value qualifier by some critical care nurses such as ‘sudden jump’ which facilitated the integration of salient first-order cues in order to rule in pain in the presence of anxiety, marked haemodynamic instability, support requirements and dysynchrony with the ventilator necessitating urgent interpretation and intervention. This scenario was linked to the paraclinical cues ‘sick intra-operatively’, ‘slow to come off bypass’, ‘tachycardia coming off bypass’ and ‘aspirin pre-operative’, which were used by critical care nurses as being pertinent to individual patients.

In addition, one technical cue ‘turned chest x-ray’ was used in all eight cases, which acted as a precursor to locating a pain descriptor cue ‘patient self-report pain’ during repositioning. Moreover, behavioural general cues, i.e. ‘obeying all commands’ and ‘eyes open’, were utilised by all critical care nurses, which reflected the ventilated patient’s level of sedation. This finding is important as level of wakefulness was ascertained via a systematic neurological assessment on the part of the critical care nurse, which was linked indirectly to the pain state, anxiety state and ability of the ventilated patient to synchronise with the ventilator. Additional behavioural general cues were used across intermediate judgements which included ‘restlessness’, ‘fidgety’, ‘chewing on ETTube’ alongside covert behaviour cues ‘looks worried’, ‘uneasy’ and ‘apprehensive’. One physical cue was used by one critical care nurse which indicated that state of pressure areas (red) could exacerbate the ventilated patients’ comfort levels.

One interesting finding was the location of a pain descriptor cue ‘patient self-report pain’ by each critical care nurse with the ventilated patient. This pain descriptor cue highlighted the endotracheal tube as a major source of discomfort for the ventilated patient and appeared to have a domino effect on levels of wakefulness, anxiety levels and physiological parameters including an ‘increase in respiratory rate’ and indirectly on dysynchrony on the ventilator which was also evident during fieldwork. Meanwhile two overt motor pain behaviour cues ‘grimace’ and ‘guarded movement’ identified by four and five critical care nurses respectively were seen as valid pain cues and acted as antecedents to the pain descriptor cue ‘patient self-report pain’. Nonetheless, the most dependable first-order cue identified by all eight critical care nurses was the pain descriptor cue ‘patient self-report pain’ particularly in the context of haemodynamic instability, anxiety and fighting the ventilator.
Therefore, these eight critical care nurses made a judgement of the ventilated patient's pain state based on several first-order cues. However, there were only two first-order cues, i.e. physical and overt motor pain behaviour, which did not overlap with other cues (see Figure 5.33B). The remaining physiological, mechanical, paraclinical, technical, covert behaviour and behavioural general cues overlapped across five intermediate judgements. This finding gives a sense of the complexity of the inference task for the critical care nurses. Therefore, one approach to address this issue was for the critical care nurses to split the judgement activity into two phases. Therefore, phase one involved the utilisation and amalgamation of first-order cues into five intermediate judgements (see Figure 5.33B), which were subsequently integrated into a final judgement of the ventilated patients' pain state. The following think aloud extract provides a picture of this process that demonstrates the assimilation of each of the five intermediate judgements previously discussed which act as second-order cues:

124 S/14 C: "So where are we...there is so much going on...she is uncomfortable
124 S/14 C: She is quite awake and it is just that bit too early
126 S/14 C: She is anxious
127 S/14 C: She was quite hypertensive when she was turned and still is but not before the turn, plus her heart rate is 100 on support...so haemodynamically labile
128 S/14 C: This lady is a sick heart with poor LV function
129 S/14 C: She said she was in pain so that is also important which makes it easier when she is anxious and so sick and can tell me about her pain
130 S/14 C: So she is in acute pain so ...

The complexity of the judgement task is evident in the above think aloud extract which also makes the process visible. In addition, the combination of the critical care nurse's perception of the ventilated patient's pain state, the objective data and the ventilated patient's perception of her own pain state gives a picture of a partnership within this judgement process in a fragile surgical trajectory. The findings were explored further to examine both judgement processes in relation to '(s)he is not in acute pain' versus '(s)he is in acute pain' which is portrayed in the following subsection.

5.1.12 OVERVIEW OF THE JUDGEMENT PROCESS: TURNED POST CHEST X-RAY

The findings that one group of critical care nurses (n=22) formulated a final judgement, i.e. '(s)he is not in acute pain', while another group (n=8) made the following final judgement ' (s)he is in acute pain' is central to this study. The pain literature focuses on the latter outcome. Therefore, it is important to examine the findings in light of both aforementioned judgements by critical care nurses of the pain state of the ventilated patient in the immediate phase post cardiac surgery, i.e. within one hour post cardiac surgery during repositioning.

Across both judgements critical care nurses used a pattern of first-order cues which comprised of physiological, mechanical, technical, paraclinical, behavioural general and overt motor pain behaviour cues. In particular, all critical care nurses completed a neurological survey on all patients, while two physiological parameters 'increased MAP' and 'decreased MAP' along with 'increased heart rate' were interpreted in the context of support infusing and temperature readings of individual patients. Nonetheless, there were differences within each cue category which will be alluded to presently. The major difference across both groups was the use
of one pain descriptor cue ‘patient self-report pain’ which was absent within the judgement ‘(s)he is not in pain at present’ (see Figure 5.33A, B). Furthermore, within the aforesaid intermediate judgement two behavioural general cues ‘no movement’ and ‘no response to questions about pain’ were noticeable (see Table 5.9) which was previously discussed. However, the findings also showed that all critical care nurses in this study viewed the ‘patient self-report pain’ as a valid index of the ventilated patient’s pain state along with one overt motor pain behaviour cue ‘grimace’ which is consistent with the literature (Puntillo et al. 1997, Payen et al. 2001, Aissaoui et al. 2005, Young et al. 2006). However, despite the best efforts of twenty-two critical care nurses, the same ventilated patients were unable to reactively provide a pain descriptor cue. This would explain the omission of the pain descriptor cue in Figure 5.33A. The fieldwork data confirmed the exhaustive efforts of the critical care nurses in attempting to secure a verbal subjective pain report ‘patient self-report pain’ across all ventilated patients regardless of the final judgement.

There were differences in the utilisation of physiological cues across both groups. Both groups, in several cases, applied a value qualifier, ‘acute rise’ or ‘sudden dip’ (see Table 5.9) either to alterations in mean arterial blood pressure parameters. There was a subtle difference between both groups. One group of critical care nurses who formulated the judgement ‘(s)he is not in acute pain at present’ applied the word qualifier ‘acute rise’ in the absence of a pain descriptor cue and overt motor pain behaviour cue in order to ‘rule out’ pain. Hence, one physiological cue such as ‘MAP response to analgesia’ was used as a salient pain cue but realistically interpreted within the ventilated patient’s cardio-respiratory status and support requirements. On the other hand, the application of a value qualifier ‘sudden jump’ in the contrasting judgement ‘(s)he is in acute pain’ on the part of critical care nurses also facilitated the integration of a pattern of salient first-order cues. However, in this instance, the process was used to ‘rule in’ pain in the presence of marked haemodynamic volatility, anxiety, support requirements and dysynchrony with the ventilator, all of which warranted immediate interpretation and intervention. Furthermore, numerous paraclinical cues in the aforementioned judgement such as ‘intra-operative status’, and ‘sick heart’ and technical cues such as ‘chest drainage 170 last quarter’ reflected the instability of the ventilated patients’ haemodynamic status in conjunction with one behavioural general cue ‘nervous pre-operative’ giving a sense of context in the real world of each critical care nurse. Furthermore, it also goes some way to explain why some critical care nurses used additional first-order cues in this scenario. Besides, the critical care nurse must make a judgement of the ventilated patient’s pain state in this real-world which was and is fraught with ambiguity, urgency and unpredictability.

Finally, two covert pain behaviour cue ‘apprehensive’ and ‘uneasy’ were used by some critical care nurses who made the judgement ‘(s)he is in acute pain’, which was not evident in the contrasting judgement. One explanation put forward for this finding is that some ventilated patients were judged to be anxious and fighting the ventilator, which is evident in Figure 5.33B. There was one interesting take in the above judgement ‘(s)he is in acute pain’ on one paraclinical cue ‘CABG by 4 with LIMA’. This cue was interpreted by the critical care nurses in question in the context of the ventilated patient’s intra-operative status, i.e. ‘problem with RCA graft’ or
sick coming off bypass’, rather than pain expected due to major surgery. This finding would fit neatly with the labile haemodynamic status of those specific patients that was observed during fieldwork. A contrasting picture emerged with the critical care nurses who reached the judgement ‘(s)he is not in acute pain at present’. The aforesaid paraclinical cue ‘CABG by 4 with LIMA’ was utilised to infer that pain should be experienced by the ventilated patient due to such major surgery and was part of their primary preventative pattern of pain cues. Ultimately, there was a difference in the number of intermediate judgements across both groups (see Figure 5.33A, B). However, the haemodynamic and anxiety status of the ventilated patient could account for this discrepancy.

Nevertheless, the major dissimilarities occurred across both groups with regard to first-order cues within physiological, paraclinical, technical, behavioural general, covert behaviour and overt motor pain behaviour cues. Likewise, one pain descriptor cue ‘patient self-report pain’ was excluded in the final judgement ‘(s)he is not in acute pain at present’. These findings suggest that critical care nurses use a pattern of cues to make a judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery. However, the pattern of cues were drawn from their experiential knowledge, theoretical knowledge, and sophisticated knowledge of the ventilated patients’ haemodynamic responses. This practice was facilitated by the critical care nurses’ presence at the bedside in unremitting surveillance. However, the judgement process was also made possible by the ventilated patient who revealed numerous conflicting cues in an untimely and often unpredictable manner reflecting the fragile haemodynamic status of some patients to which the critical care must make sense of to arrive at a final judgement, be it ‘(s)he is in acute pain’ or ‘(s)he is not in acute pain at present’. The final judgement phase is represented diagrammatically in Figure 5.31 A, i.e. ‘(s)he is in acute pain’, while the aforesaid latter judgement was presented earlier (see Figure 5.31).

The next section presents the findings pertinent to the judgement process of twenty-seven critical care nurses out of thirty, concerning another pain incident which occurred as the ventilated patient was at rest five hours post cardiac surgery. The remaining three critical care nurses were not included because two ventilated patients underwent elective electrocardiograms and one ventilated patient underwent suctioning, which has been reported as a painful procedure (Puntillo 1994). These three cases are omitted from the findings pertinent to this pain incident.

5.2 Section Two: Pain Incident: Rest: Judgement Process of Critical Care Nurses

5.2.1 Introduction

The pain incident which is discussed in this section occurred as the ventilated patient was resting five hours post cardiac surgery in the critical care unit. Consequently, this section will present the findings pertinent to individual and contrasting judgements relevant to cue utilisation and integration by twenty-seven critical care nurses. Moreover, there were twenty-four critical care nurses who formulated the final judgement ‘(s)he is in acute pain’ based on five intermediate judgements as the ventilated patient was at rest five hours approximately post
Figure 5.31A  
Turned Chest X-Ray (Within First Hour Post-Op.) Case Analysis — Second Order Cues —  
Diagrammatic Representation "Judgement Process"  

Intermediate Judgements (2nd Order Cues) 

Intermediate Judgements (2nd Order Cues)  
8 CASES  
Final Judgement  

CASE 4  
CASE 7  
CASE 6  
CASE 14  
CASE 22  
CASE 23  
CASE 27  
CASE 29  

(S)he is sore  
(S)he is awake  
(S)he is unstable haemodynamically  
(S)he is anxious  
(S)he is fighting the ventilator  

(S)he is in acute pain
cardiac surgery. Conversely, three critical care nurses reached a final judgement ‘(s)he is not in acute pain at present’. The section is divided into subsections which represent each individual and counterpart intermediate judgement discussed side by side. In addition, each judgement process is discussed in depth followed by an overview of both judgement processes concerning ‘(s)he is in acute pain’ and ‘(s)he is not in acute pain’. The first subsection presents the intermediate judgement ‘(s)he is a bit more stable haemodynamically’.

5.2.2 Intermediate Judgement: ‘(S)he is a bit more stable haemodynamically’

The following intermediate judgement ‘(s)he is a bit more stable haemodynamically’ was formulated by twenty-four critical care nurses through the utilisation and combination of a variety of first-order cues numbering between six and ten with an example illustrated in Figure 5.15. There were two physiological cues ‘peripheral and central temperature’ in conjunction with two mechanical cues ‘adrenaline’ and ‘nitroglycerin’ evident across all cases. The aforesaid cues set the background for the interpretation of additional physiological cues on the part of all the critical care nurses. Meanwhile, the present focus is pertinent to twenty-four critical care nurses who used three supplementary physiological cues as follows: ‘increased heart rate’, ‘decreased MAP’, ‘increased MAP’, ‘normal heart rate’ and ‘decreased heart rate’ in conjunction with ‘increased respiratory rate’, which are illustrated in Table 5.10. The physiological cue ‘decreased MAP’ with particular emphasis on the value qualifier ‘no big dips’ enabled critical care nurses, utilise a pattern of salient cues, i.e. physiological, paraclinical and technical cues in order to make an inference of the ventilated patient’s haemodynamic state with some certainty. In addition, the transfer of practical knowledge of similar patients to the individual case facilitated this process in conjunction with an in-depth understanding on the part of the critical care nurse of the ventilated patient’s haemodynamic responses with particular emphasis placed on temperature readings and support requirements. The following think aloud extracts give a sense of this scenario:

431 S/14 C: “...low MAP 60 there, she has low filling pressures and she is vasodilating, plus her heart rate dips and hits the mean, she is also support dependent...”.

397 S/18 H: “...my mean is 65, borderline, vasodilating, warning, CVP 6mmhg, I want it between 70 and 80 but we are going in the right direction...he is lovely and warm centrally and peripherally...from my experience I find once the patient warms everything settles on all counts which is the case with M, so decreased MAP is purely to do with his haemodynamics at this time...”.

403 S/11 A: “...mean 60 so vasodilating and warning, bit to go to reach 70 to 75...no big dips MAP, CVP low despite blood products, poor LV function also so no other reason for low MAP...”

This finding is important as critical care nurses exemplify their interpretation of altered physiological cues in context and give a sense of their rationale of cue utilisation and integration in these circumstances. The remaining first-order cues such as technical, paraclinical, behavioural general and physiological varied across individual cases (see Figure 5.16), for example the technical cue ‘CVP 8mmhg’, paraclinical cue ‘support requirements’ and physiological cue, i.e. ‘respiratory pattern altered’. There were similarities across all cases with respect to the following physiological cues: ‘peripheral and central temperature’, ‘increased
Figure 5.15  
Rest - Case Analysis - First Order Cues (Approx 5 Hours Post-Op.) -  
Altered Haemodynamics  

Interim Assessment  
(Second Order Cues)  

Cues (1st Order Cues)  

- Respiratory rate 21  
- Trying to talk via ET tube  
- Fast Track strategy  
- MAP 60  
- Heart rate 92  
- Temperature central 37.1°C  
- Temperature peripheral 34.0°C  
- Adrenaline 3  
- Nitroglycerin .1  
- ET tube uncomfortable  

- Fast Track policy  
- Respiratory rate 16  
- MAP 70  
- Heart rate 89  
- Adrenaline 3  
- GTN 1  
- Temperature 36.9°C central  
- Temperature 30.2°C peripheral  
- ET tube causing discomfort  

- Airway pressure 38cmH₂O  
- MAP 60  
- Adrenaline 3  
- Nitroglycerin .5  
- Dobutamine 3  
- Heart rate 58  
- Temperature central 37.0°C  
- Temperature peripheral 31.8°C  

(S)he is a bit more stable haemodynamically.
Table 5.10: First Order Cue Utilisation Across Intermediate Judgements (Second Order Cues) ‘One Pain Incident’: Rest

<table>
<thead>
<tr>
<th>Cue Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiological Cue</td>
<td>Increased MAP</td>
<td>4 [*1]</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Decreased MAP</td>
<td>12 [*6]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal MAP</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increased heart rate</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>* Asterisk = value qualifier 'acute rise'</td>
<td>Decreased heart rate</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal heart rate</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increased respiratory rate</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal respiratory rate</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Central temperature**</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Peripheral temperature**</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MAP response to analgesia</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Mechanical Cue**</td>
<td>Nitroglycerin</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Adrenaline</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Nipride</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Dobutamine</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Paraclinical Cue</td>
<td>Support requirements</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Fast track policy</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Technical Cue</td>
<td>Airway pressure</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>CVP 8mmHg</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Behavioural Cue</td>
<td>Coughing on ETTube</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>[General] Cue</td>
<td>Restful</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Trying to talk via ETTube</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Pain Descriptor Cue</td>
<td>ETTube uncomfortable</td>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Patient self-report pain</td>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>Knowledge Cue</td>
<td>Knowing the patient</td>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MAP = Mean Arterial Blood Pressure.
LIMA = Left Internal Mammary Artery
CVP = Central Venous Pressure
ETTube = Endotracheal Tube
LVF = Left Ventricular Ejection Fraction

* Value qualifier 'acute rise' / 'No big dips'.
** Alterations in MAP and heart rate readings were interpreted in the context of mechanical cues and central and peripheral temperature readings.
** Central and peripheral temperature were utilised in all intermediate judgements, therefore only appear on this page.
Figure 5.16

Rest - Case Analysis - First Order Cues (Approx 5.5 Hours Post-Op.) - Altered Haemodynamics

Cases 28, 11 & 16

# Respiratory rate 21
# MAP 76
# Heart rate 85
■ Dobutamine 5
■ Adrenaline 5
# Temperature central 36.9°C
# Temperature peripheral 31.3°C
■ GTN 2
# Respiratory rate 18
# Mean 60 still
# Temperature 37.0°C central
# Temperature 32.7°C peripheral
■ Adrenaline 3
■ Nitroglycerin .5
# Heart rate 94
# Acute rise MAP 90
# Respiratory pattern altered
△ Support requirements
# Heart rate 100
# Temperature 37.0°C central
# Temperature 33.4°C peripheral
■ Nitroglycerin 6

(S)he is a bit more stable haemodynamically.

Broken Line = Dissimilar First Order Cue

# Physiological cue □ Covert behaviour cue
■ Mechanical cue ☉ Overt motor pain behaviour cue
+ Technical cue ▲ Knowledge cue
● Behavioural (general) cue ≈ Physical cue
★ Pain descriptor cue △ Parachronic cue
heart rate', 'increased MAP' or 'decreased MAP' along with two mechanical cues 'adrenaline' and 'nitroglycerin'. Therefore, the smaller the number of cues selected and utilised, the more apparent the parallels, which is illustrated in Figure 5.17. However, it could also be the case that some cues were not accessible or were not utilised by the critical care nurse. Nonetheless, this was not the case during the observation period as the cues articulated by the critical care nurses were identical to the cues exhibited by the ventilated patient and recorded by the researcher in the field. Conversely, the more first-order cues that were utilised, the less similarities were evident, with the exception of the physiological and mechanical cues cited previously. However, the degree of haemodynamic instability could also be a factor where additional cues were available. Furthermore, the knowledge cue 'knowing the patient' was evident in a few cases which will be discussed shortly.

In contrast, three critical care nurses formulated the intermediate judgement 
\((s)he\ is\ a\ bit\ a\ bit\ more\ stable\ haemodynamically\)' with fewer first-order behavioural general, technical and paraclinical cues (see Figure 5.18). The most striking difference was noted within the normal physiological readings, i.e. 'normal MAP', 'normal respiratory rate' and 'normal heart rate', presented in Table 5.10. However, there was a compilation of normal and altered physiological readings evident in the opposite intermediate judgement 
\((s)he\ is\ more\ stable\ haemodynamically\)', which is illustrated in Table 5.10, with additional mechanical cues indicating that haemodynamically instability was still present. It is noteworthy that each physiological cue will be explored in detail presently giving a sense of the many meanings attached to each first-order cue. The subsequent intermediate judgement 
\((s)he\ is\ awake\)' is analysed in the next subsection.

**5.2.3 Intermediate Judgement: '\((S)HE\ IS\ AWAKE\)'**

The formulation of the intermediate judgement 
\((s)he\ is\ awake\)' was based on the utilisation and combination of between three and eight first-order cues by twenty-four critical care nurses. There were three physiological cues noted as follows: 'increased respiratory rate' (twenty-two cases), 'increased MAP' (six cases) and 'increased heart rate' (five cases). The following think aloud extracts give a sense of the many likely meanings attached to the physiological cue 'increased respiratory rate' which provides some insight into the ambiguity of this physiological cue conveyed by the ventilated patient in the immediate phase post cardiac surgery at rest during this pain incident:

470 S/22 EY: "...her respiratory rate is 16, good effort, awake but not distressed or anxious like earlier, nearly ready for weaning...".

334 S/1 MO: "...respiratory rate 20, some respiratory effort, so she is waking up a little bit... but she is also anxious, plus she is fighting the ventilator, chewing on ETTube... she is also sore I would say... trying to talk to me...".

450 S/23 N: "...his respiratory rate is 19, M, do you find you are breathing yourself there, you do, he is awake, he is trying to tell me the tube is uncomfortable, and he becomes very anxious in the process and now the ventilator alarms are going off, fighting the ventilator, very anxious and distressed and so his respiratory rate is fast as a result..."
Figure 5.17

Rest – Case Analysis – First Order Cues (Approx 5 Hours Post-Op.)
Altered Haemodynamics

Cases (1st Order Cues)
- Heart rate 90
- Nitroglycerin 4
- Adrenaline 1
- Temperature central 37.1°C
- Temperature peripheral 33.9°C

Intermediate judgement (Second Order Cues)
- MAP 67
- Heart rate 90
- Temperature central 37.0°C
- Temperature peripheral 33.6°C
- GTN.5

(5)he is a bit more stable haemodynamically.
Figure 5.18
Rest – Case Analysis – First Order Cues (Approx. 5 Hours Post-Op.)
Altered Haemodynamics

Cases (1st Order Cues)
# MAP 70
# Heart rate 88
■ Nitroglycerin 1
■ Adrenaline 3
# Temperature central 36.9°C
# Temperature peripheral 33.1°C
* Restful
▲ Knowing the patient
# Respiratory rate 14
# MAP 74
# Heart rate 86
▲ Knowing the patient
■ Nitroglycerin .5
# Temperature central 36.9°C
# Temperature peripheral 33.0°C
# Mean arterial blood pressure 72
# Temperature central 37.9°C
# Temperature peripheral 33.8°C
■ Nitroglycerin 1
▲ Fast Track Strategy
# Respiratory rate 14

Intermediate Judgement
(Second Order Cues)

Cases 3, 7 & 8

Altered Haemodynamics
Case 3

Altered Haemodynamics
Case 7

Altered Haemodynamics
Case 8

Broken Line = Dissimilar First Order Cue

(S)he is a bit more stable haemodynamically.
Therefore, several explanations are put forward by the critical care nurses as to the source of the alteration in the physiological cue ‘increased respiratory rate’, which relate not only to the ventilated patient’s level of wakefulness but to anxiety, distress on the ventilator and pain. Furthermore, as ventilated patients attempted to communicate their pain, the respiratory rate increased accordingly which is reflected in the number of critical care nurses (ten cases) who utilised the behavioural general cue ‘trying to talk via the ETTube’. In addition, one behavioural general cue was evident across several cases, i.e. ‘obeys all verbal commands’. The critical care nurses systematically checked the ventilated patient’s level of wakefulness via their ability to follow specific commands which was evident during fieldwork. Another behavioural general cue ‘eyes open spontaneously’ occurred across the majority of cases. The remaining first-order cues utilised by individual critical care nurses with a representation in Figure 5.19 varied and included behavioural general cues ‘trying to write with hands’, ‘moving hands under covers’, and a covert behaviour cue ‘looks worried’.

In contrast three critical care nurses formulated the intermediate judgement ‘(s)he is asleep’ which showed that two physiological cues ‘normal respiratory rate’ and ‘normal heart rate’ diagrammatically represented in Figure 5.20 were utilised in each case along with two behavioural general cues ‘no movement’ and ‘eyes closed’. However, the behavioural general cue ‘no movement’ was also used as a cue to infer a pain state which will be discussed presently. The difference between the two intermediate judgements ‘(s)he is asleep’ versus ‘(s)he is awake’ is related in particular to the physiological cues such as ‘increased MAP’, ‘increased heart rate’ and ‘increased respiratory rate’ illustrated in Table 5.11 along with several additional behavioural general cues. The finding that ‘trying to talk to talk via ETTube’ was linked to the physiological cue ‘increased respiratory rate’ will be addressed in detail presently along with one knowledge cue ‘knowing the patient’. The cue use and assimilation related to the subsequent intermediate judgements are compared in the ensuing subsection.

5.2.4 INTERMEDIATE JUDGEMENT: ‘(S)HE IS COMPLIANT ON THE VENTILATOR’

The intermediate judgement ‘(s)he is compliant on the ventilator’ was formulated by six critical care nurses based on between three and four first-order cues presented in Figure 5.21. Meanwhile, the contrasting intermediate judgement ‘(s)he is fighting the ventilator’ was reached by five critical care nurses based on the same number of first-order cues. It is noteworthy that one physiological cue ‘increased respiratory rate’ was used by nine of the eleven critical care nurses with ‘normal respiratory rate’ reflected in two cases (see Table 5.14). The following extracts provide a contrasting view of the abovementioned physiological cue ‘increased respiratory rate’ selected and utilised by the critical care nurse in the context of the awake but in some instances anxious ventilated patient at rest in the immediate phase post cardiac surgery:

388 S/30 J: “...he is taking a few breaths himself there, rate is 20 but his rasps are anxiety related as he is fighting the ventilator and trying to talk to me about the uncomfortable tube and he is awake there...”.

598 S/4 M: “...his respiratory rate is 20, awake now, has respiratory effort, trying to let me know he is just that bit uncomfortable, but relaxed on the ventilator even though fast rate...ready to wean...”.

172
Figure 5.19

Rest – Case Analysis – First Order Cues (Approx. 5 Hours Post-Op.) – Level of Wakefulness

Cases 4, 5, 12 & 13

Level of Wakefulness
Case 4

Level of Wakefulness
Case 5

Level of Wakefulness
Case 12

Level of Wakefulness
Case 13

Cues (1st Order Cues)

* Moving both hands under covers
* Eyes wide open
* Obeys all verbal commands
# Respiratory rate 20
* Trying write with hands

# MAP 85 climbing
* Eyes open
* Obeys all verbal commands
# Bilateral chest expansion
# Respiratory rate 18

* Restlessness
☐ Looks worried
* Trying to self-extubate
* Eyes open, looking around
* Obeys all commands

* Coughing ET tube
* Eyes open, looking around
* Trying to communicate via ET tube
# MAP 85
# Heart rate 90

Intermediate Judgment
(Second Order Cues)

Broken Line = Dissimilar First Order Cue

(S)he is awake now.
Rest - Case Analysis - First Order Cues (Approx 5 Hours Post-Op.) - Level of Wakefulness

Figure 5.20

Cues (1st Order Cues)

- Heart rate 88
- Obey all verbal commands
- Eyes closed
- Restful
- No movement
- Respiratory rate 13
- Knowing the patient

Intermediate Judgement (Second Order Cues)

Level of Wakefulness
Case 3

- Restful
- No movement

Level of Wakefulness
Case 7

- Not biting on ETTube
- Heart rate 86

Level of Wakefulness
Case 8

- Fast Track Strategy
- Respiratory rate 14

(S)he is asleep.

Broken Line = Dissimilar First Order Cue

- Physiological cue
- Mechanical cue
- Technical cue
- Behavioural (general) cue
- Pain descriptor cue
- Covert behaviour cue
- Overt motor pain behaviour cue
- Knowledge cue
- Physical cue
- Paradoxical cue
<table>
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<tr>
<th>Cue Category</th>
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<th>Number of Potential Cases</th>
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<td></td>
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<td></td>
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<td></td>
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<td></td>
<td>Trying to write with hands</td>
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<td></td>
<td>Moving tongue either side ETTube</td>
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<td></td>
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<tr>
<td></td>
<td>Moving hands towards tube</td>
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<td></td>
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*Value qualifier 'acute rise' / 'gradual rise'*
Figure 5.21
Rest - Case Analysis First Order Cues (5 Hours Post-Op.)
Patient Ventilator Compliance

Cases (1st Order Cues)

- Respiratory rate 20
- MAP 86
- Knowing the patient
- Respiratory rate 18
- Not biting ET Tube
- Airway pressure 24cms
- Bilateral chest expansion
- Respiratory rate 18
- Airway pressure 22cms
- Airway pressure 38cms
- Respiratory rate 16
- Knowing the patient
- Restful
- Not biting ET Tube
- Respiratory rate 13
- Knowing the patient
- Respiratory rate 14
- Not biting on ET Tube
- Knowing the patient

Intermediate Judgement
(Second Order Cues)

- Patient Ventilator Compliance Case 4
- Patient Ventilator Compliance Case 11
- Patient Ventilator Compliance Case 5
- Patient Ventilator Compliance Case 14
- Patient Ventilator Compliance Case 3
- Patient Ventilator Compliance Case 7

Broken Line = Dissimilar First Order Cue

(S)he is compliant on ventilator.
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<thead>
<tr>
<th>Cue Category</th>
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<th>Number of Potential Cases</th>
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**Table 5.14: First Order Cue Utilisation Across Intermediate Judgements (Second Order Cues) ‘One Pain Incident’: Rest**

<table>
<thead>
<tr>
<th>Cue Category</th>
<th>First Order Cue</th>
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<th>Number of Potential Cases</th>
<th>Cue Category</th>
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</table>
The interesting point to be made here is that in nine of the cases the ventilated patient was judged to be awake and of those nine, five were judged to be anxious by the critical care nurse. In addition, the same five patients who were anxious were judged to be ‘fighting the ventilator’. Therefore, some of the many possible interpretations of ‘increased respiratory rate’ become visible based on the critical care nurse’s interpretation of that physiological cue in context. The detail of this scenario will be revealed in another judgement ‘(s)he is sore’ along with one behavioural general cue ‘chewing on ETTube’. Meanwhile, the following think aloud excerpts provide an insight into the many potential meanings attached to ‘chewing ETTube’ which were used by four of the critical care nurses:

357 S/16 K: “...he is biting on the ETTube, uncomfortable now with the tube, only way to communicate as foreign body present, awake, uneasy...not ventilator compliant...

380 S/30 J: “...he is chewing away on the ETTube, anxious and fighting the ventilator, it is his way of letting me know that the tube is uncomfortable, he is also awake...

The above extracts show the minute detail accrued over time by the critical care nurses regarding the ventilated patient’s approach to communicating their discomfort which indirectly influences their ability to synchronise with the ventilator. Another behavioural general cue ‘restlessness’ also plays a part. There appears to be no one specific first-order cue which was indicative of the ventilated patient’s synchronisation or non-synchronisation with the ventilator. The ventilated patient confirmed with the critical care nurse their source of discomfort, i.e. the endotracheal tube. In addition, ‘biting on ETTube’ was subject to the ETTube causing some discomfort which was confirmed during observation by the researcher. This affected the ventilated patient’s ability to synchronise with the ventilator. There may have been similarities across both intermediate judgements with respect to one physiological cue ‘increased respiratory rate’. However, context was seen as important in relation to the reliability of the aforementioned physiological cue. The literature recommends that ‘compliance with mechanical ventilation’ has a moderate but effective contribution to pain assessment in the uncommunicative critically ill patient (Aissaoui et al. 2005). However, in this study, specific cues were identified by critical care nurses as the ventilated patient was resting to indicate ‘fighting the ventilator’ (see Table 5.14). Nonetheless, the ventilated patient at rest was judged by the critical care nurse to be also awake, anxious, ready to wean and in some discomfort with the endotracheal tube (ETTube) which resulted in their capacity to adapt with the ventilator. Another interesting finding in this study was that four of the six ventilated patients who were judged to be ‘compliant on the ventilator’ or ‘not fighting the ventilator’ were also in pain which was confirmed by a pain descriptor cue ‘patient self-report pain’. This is illustrated in the following think aloud quotation:

671 S/4 M: “...will I get a piece of paper and you can write down what you are trying to say...okay the tube in your mouth...when does it come out...in another hour...wants to know the length of intubation...tube is uncomfortable...awake...but not fighting the ventilator...even though his resps are fast...

673 S/4 M: He said he was sore...not fighting the ventilator...I know him...just wants the tube out...

Therefore, the intermediate judgement ‘(s)he is compliant on the ventilator’ in this study means the ventilated patient is synchronising with the ventilator. This judgement was based on physiological, behavioural general and technical cues along with an in-depth knowledge of the
ventilated patient’s responses, despite the presence of ambiguous cues such as ‘increased airway pressure’ and ‘increased MAP’ and ‘increased respiratory rate’. The knowledge cue ‘knowing the patient’ which featured across both intermediate judgements will be explored in depth presently. The following subsection presents the analyses of another intermediate judgement which reflects cue utilisation and combination by seven critical care nurses in this pain incident.

5.2.5 Intermediate Judgement: ‘(S)he is anxious’

The intermediate judgement ‘(s)he is anxious’ was compiled by seven critical care nurses on the basis of between four and eight first-order cues. There was a diversity of first-order cues used and combined by the critical care nurses as follows: one physiological cue ‘increased respiratory rate’ which was implicated within preceding and ensuing intermediate judgements. Meanwhile, two other physiological cues ‘increased heart rate’ and ‘increased MAP’ with many possible meanings were used in different cases. In addition, two behavioural general cues ‘restlessness’ and ‘chewing on ET Tube’ were also evident across four different cases. The remaining first-order cues were dissimilar across all cases (see Figure 5.22). The individual first-order cues are represented in Table 5.12 which gives a sense of the variety of behavioural general cues that were used across cases related to the ventilated patient’s anxious state. The only cue that featured in the majority of cases was ‘increased respiratory rate’ which will also be revealed in the following intermediate judgement ‘(s)he is not anxious at present’ along with ‘increased heart rate’. The following think aloud excerpts provide contrasting detail on the many possible meanings attached to another physiological cue ‘increased heart rate’ which is implicated in both ‘(s)he is anxious’ versus ‘(s)he is not anxious at present’ intermediate judgements:

420 S/11 A: “heart rate is still at 94, bit fast, mean 60...low volume warming nicely, usually around 86...she could be a bit sore, plus on support still, not anxious like before which is great...”.

431 S/23 N: “heart rate 98 so rate is increased, bit fast as base is 74...MAP dropping at 65, they want it at 80...also anxious and awake which does not help and he is uncomfortable...low in volume and warming too...”.

Consequently, each physiological cue was not interpreted on the part of the critical care nurse in isolation but in the context of baseline data, support requirements, temperature readings and volume status. Both first-order cues are similar, i.e. physiological, mechanical and behavioural general in both cases, but the judgement is different based also on practical knowledge of the individual ventilated patient in each case. Furthermore, there was no first-order cue that could be viewed as being indicative of ‘anxiety’ in this context. In contrast, a similar picture emerges with the following contrasting intermediate judgement.

5.2.6 Intermediate Judgement: ‘(S)he is not anxious at present’

The next intermediate judgement ‘(s)he is not anxious at present’ was reached by ten critical care nurses based on a compilation of between three and four first-order cues. The following first-order physiological cues were similar across some cases: ‘increased heart rate’ ‘normal MAP’, ‘normal heart rate’ and ‘increased respiratory rate’ (see Figure 5.23). The
Figure 5.22

Rest - Case Analysis First Order Cues (5 Hours Post-Op.)

Anxiety

Cases 23, 1, 16 & 12

Anxiety Case 23

Anxiety Case 1

Anxiety Case 16

Anxiety Case 12

(S)he is anxious.
<table>
<thead>
<tr>
<th>Cue Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
<th>Cue Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td># Physiological Cue</td>
<td>Increased MAP</td>
<td>3 [12]</td>
<td>7</td>
<td># Physiological Cue</td>
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<tr>
<td></td>
<td>Increased heart rate</td>
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<td>Increased heart rate</td>
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<td></td>
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<tr>
<td></td>
<td>Increased respiratory rate</td>
<td>6</td>
<td></td>
<td></td>
<td>Increased respiratory rate</td>
<td>7</td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td>Decreased MAP</td>
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<td></td>
</tr>
<tr>
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<td>MAP response to analgesia</td>
<td>1</td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td>Respiratory pattern altered</td>
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<td></td>
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<td>Normal heart rate</td>
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<td></td>
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<td>Normal heart rate</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Normal MAP</td>
<td>4</td>
<td></td>
<td></td>
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<td>Normal respiratory rate</td>
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<td></td>
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<td>Normal respiratory rate</td>
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</tr>
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<td>* Behavioural (General) Cue</td>
<td>Restlessness</td>
<td>4</td>
<td>7</td>
<td>* Behavioural (General) Cue</td>
<td>Restlessness</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Fidgety</td>
<td>2</td>
<td></td>
<td></td>
<td>Fidgety</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chewing on ET Tube</td>
<td>4</td>
<td></td>
<td></td>
<td>Chewing on ET Tube</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pulling at chest drains</td>
<td>1</td>
<td></td>
<td></td>
<td>Pulling at chest drains</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Eyes open</td>
<td>2</td>
<td></td>
<td></td>
<td>Eyes open</td>
<td>1</td>
<td></td>
</tr>
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<td></td>
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<td></td>
<td>Shaking head side to side</td>
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<td></td>
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<td></td>
<td>Trying to sit up bed</td>
<td>1</td>
<td></td>
<td></td>
<td>Trying to sit up bed</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Obey all commands</td>
<td>3</td>
<td></td>
<td></td>
<td>Obey all commands</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Restful</td>
<td>1</td>
<td></td>
<td></td>
<td>Restful</td>
<td>1</td>
<td></td>
</tr>
<tr>
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<td>Trying to pull at lines</td>
<td>1</td>
<td></td>
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<td>Trying to pull at lines</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trying to self-extubate</td>
<td>1</td>
<td></td>
<td></td>
<td>Trying to self-extubate</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not fidgety</td>
<td>1</td>
<td></td>
<td></td>
<td>Not fidgety</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moving around a bit in the bed</td>
<td>1</td>
<td></td>
<td></td>
<td>Moving around a bit in the bed</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not biting ET Tube</td>
<td>1</td>
<td></td>
<td></td>
<td>Not biting ET Tube</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moving arms</td>
<td>1</td>
<td></td>
<td></td>
<td>Moving arms</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exploring the ET Tube in mouth</td>
<td>1</td>
<td></td>
<td></td>
<td>Exploring the ET tube in mouth</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moving a bit</td>
<td>1</td>
<td></td>
<td></td>
<td>Moving a bit</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trying to communicate via ET Tube</td>
<td>1</td>
<td></td>
<td></td>
<td>Trying to communicate via ET tube</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not biting ET Tube</td>
<td>1</td>
<td></td>
<td></td>
<td>Not biting ET Tube</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No movement</td>
<td>1</td>
<td></td>
<td></td>
<td>No movement</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>▲ Knowledge Cue</td>
<td>Knowing the patient</td>
<td>1</td>
<td>7</td>
<td>▲ Knowledge Cue</td>
<td>Knowing the patient</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>□ Covert Behaviour Cue</td>
<td>Apprehensive</td>
<td>1</td>
<td>7</td>
<td>□ Covert Behaviour Cue</td>
<td>Apprehensive</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Looks worried</td>
<td>1</td>
<td></td>
<td></td>
<td>Looks worried</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>● Pain Descriptor Cue</td>
<td>ET tube uncomfortable</td>
<td>1</td>
<td>7</td>
<td>● Pain Descriptor Cue</td>
<td>ET tube uncomfortable</td>
<td>1</td>
<td>10</td>
</tr>
</tbody>
</table>

*Value qualifier 'acute rise'
Rest - Case Analysis First Order Cues (5 Hours Post-Op.)
Risk for Anxiety

Cases 22, 27, 24 & 4

Intermediate Judgement
(Second Order Cues)

Cues (1st Order Cues)

- Moving a bit
- Eyes open, looking around
# Respiratory rate 16
# Respiratory rate 19
# MAP 70
# Heart rate 90

- Respiratory rate 18
# MAP 70
# Heart rate 90

- Eyes wide open
# MAP 86

- Knowing the patient

(S)he is not anxious at present.
following think aloud extracts provide additional detail on the meanings attached to the physiological cue ‘increased respiratory rate’ by the critical care nurse:

525 S/29 SB: "...respiratory rate 19, so taking some spontaneous breaths there, more awake and does not find the tube very comfortable, not distressed like before or anxious right now... but who knows there is always that risk... just trying to talk and breathe at the same time...".

428 S/15 EI: "...he is trying to talk and breathe so his respiratory rate is 19, telling me he is sore, letting me know he is awake... nothing to do with anxiety... lovely and calm now... so anxious earlier... ready for weaning...".

The critical care nurse used her individualised knowledge of the ventilated patient in this instance to compare and contrast previous and current salient cues in order to reach the above intermediate judgement. In addition, knowledge of the particular patient allowed the critical care nurse to look at the entire picture drawing on her relationship with the patient which has accumulated over time with attention to each detail pertinent to the cause of the physiological cue ‘increased respiratory rate’. The reality of talking and breathing at the same time seems a very simple explanation but a very important element as the patient is ventilated and simultaneously communicating with the critical care nurse who articulates the process and locates the source of discomfort, i.e. endotracheal tube. This finding is important as another behavioural general cue ‘trying to communicate through the ET Tube’ becomes apparent in a subsequent intermediate judgement ‘(s)he is sore’. The rest of the first-order cues varied across individual critical care nurses which is reflected in Table 5.12. There were two cases that were similar, namely cases twenty-four and twenty-seven, whereby three alike cues were used and combined into the intermediate judgement ‘(s)he is not anxious at present’ (see Figure 5.23). Looking at both intermediate judgements, there was no definitive first-order cue that could assist the critical care nurse in differentiating ‘(s)he is anxious’ versus ‘(s)he is not anxious at present’ (see Table 5.12) which demonstrated ‘increased respiratory rate’ and ‘increased heart rate’ in both intermediate judgements. However, the critical care nurses’ knowledge of the individual patient over the course of five hours seems to inhabit their approach to the latter judgement. This knowledge is evaluated in the context of the ventilated patient’s present and previous demeanour over the post-operative period. Therefore, this finding is relevant in that ‘knowing the patient’ allowed the critical care nurse to differentiate between the physiological cues ‘increased heart rate’ and ‘increased respiratory rate’ which were similar for both judgements.

Furthermore, cases three and seven were judged by the critical care nurses to be compliant on the ventilator which means that not being anxious can assist in this process (see Figure 5.24). Therefore, knowledge of the particular allows the critical care nurse to draw comparisons between current behaviour and past behaviour exhibited by the ventilated patient in order to reach an intermediate judgement amidst several first-order ambiguous cues. The following subsection presents the intermediate judgement ‘(s)he is sore’ with a contrasting intermediate judgement ‘(s)he is not in pain at present’.
Figure 5.24
Rest - Case Analysis First Order Cues (5 Hours Post-Op.)
Risk for Anxiety

Cases 3 & 7

Intermediate Judgement
(Second Order Cues)

Cues (1st Order Cues)

* Restful
* No movement
* Not biting ET tube
# Respiratory rate 13
▲ Knowing the patient

* Fidgety
# MAP 74
# Heart rate 86
▲ Knowing the patient

Risk for Anxiety
Case 3

Risk for Anxiety
Case 7

(5)he is not anxious at present.

Legend:
# Physiological cue
■ Mechanical cue
+ Technical cue
★ Behavioural (general) cue
● Pain descriptor cue
□ Covert behaviour cue
☐ Overt motor pain behaviour cue
▲ Knowledge cue
≈ Physical cue
△ Paradichorial cue

Broken Line = Dissimilar First Order Cue
5.2.7 Intermediate Judgement: ‘(S)he is sore’

The subsequent intermediate judgement ‘(s)he is sore’ was formulated based on the utilisation and aggregation of between five and fourteen first-order cues on the part of twenty-four critical care nurses which are represented with examples in Figures 5.25 and 5.26. Three physiological cues ‘increased respiratory rate’, ‘increased MAP’ and ‘increased heart rate’ were apparent. Besides, the physiological cue ‘increased respiratory rate’ was implicated within preceding intermediate judgements previously discussed. Studies have not incorporated the physiological cue ‘increased respiratory rate’ as part of the assessment of pain using the Behavioural Pain Scale in the critically ill ventilated patient (Payen et al. 2001, Aissaoui et al. 2005, Young et al. 2006). In contrast, this study gives a detailed account of the critical care nurses’ utilisation, integration and interpretation of the physiological cue ‘increased respiratory rate’ as part of their judgement strategy in the context of the ventilated patient’s pain state at rest in the immediate phase post cardiac surgery. The following think aloud citations give an understanding of the many probable meanings associated with another physiological cue ‘increased MAP’ in this instance and the value qualifier which the critical care nurse employs to describe the significant alteration in this parameter:

352 S/16 K: “...blood pressure is 150/79 with a mean of 90, acute rise, experiencing pain I would say, anxious there and awake... his support requirements shows that he is more than likely experiencing pain as no adrenaline but GTN at 6 as MAP could be higher...”.

Therefore, the application of a value qualifier ‘acute rise’ to the mean arterial blood pressure assisted critical care nurses in using a paraclinical cue such as ‘support requirements’ as a salient cue in ruling pain in alongside a mechanical cue ‘GTN at 6’. This process highlighted the critical care nurses’ integration of her theoretical knowledge of pharmacotherapeutics and her practical knowledge of the ventilated patient’s haemodynamic responses gleaned through constant attendance and care at the bedside. The literature suggests that physiological indicators lack specificity in the critical care environment and can be influenced by many medications (Hamill-Ruth & Marohn 1999). In this study, the explicit account forwarded by critical care nurses pertinent to their utilisation of altered physiological indicators as pain cues gives a sense of the relevance placed on context in this scenario. In contrast, one physiological cue ‘decreased MAP’, which incorporated a different value qualifier ‘steady dip’, emphasised a trend in the ventilated patient’s physiological parameters. The need to differentiate precisely between important and unimportant cues is acknowledged in critical care nursing (Baumann & Bourbonnais 1982, Baumann & Bourbonnais 1984). Moreover, the process utilised in this study of applying a value qualifier, for example ‘steady dip’, to an altered mean arterial blood pressure reading allowed the critical care nurse to cluster more salient cues into a physiological schema influenced by her experience with similar patients:

430 S/91: “...MAP is 60 which is low as they want it between nearer 80, low in volume, steady dip, no sudden dips...so not pain related or anxiety related...he is warming...from my experience with others...and him, volume will sort it out as he is toasty now...”.

Moreover, the above extract shows how knowing the patient in conjunction with practical knowledge of similar patients aids in the interpretation of one physiological cue and its value
Figure 5.25
Rest - Case Analysis First Order Cues (5 Hours Post-Op.)
Impaired Comfort

Cases (1st Order Cues)
- MAP 79 beginning to climb
- Moving quite a bit
- Respiratory rate 20
- Trying to talk via ETTube
- Restlessness
- Shaking head side to side
- Pain location pointing chest
- Mouth sore
- Throat sore
- ETTube annoying
- Patient self-report pain
- Knowing the patient
- Sore old injury
- MAP response previous analgesic
- Moving both hands under covers
- Respiratory rate 20
- Pointing to mouth
- MAP 86
- Grimace
- Pain intensity
- Pointing to chest drain
- Patient self report pain
- Mouth very dry
- Pointing chest incision
- Pain pattern
- Knowing the patient
- Heart rate 95

Intermediate Judgement
(Second Order Cues)

Impaired Comfort
Case 1

Impaired Comfort
Case 4

Broken Line = Dissimilar First Order Cue

# Physiological cue
■ Mechanical cue
+ Technical cue
* Behavioural (general) cue
● Pain descriptor cue
□ Covert behaviour cue
○ Overt motor pain behaviour cue
△ Knowledge cue
≈ Physical cue
△ Paradoxical cue

(S)he is sore.
Figure 5.26

Rest - Case Analysis First Order Cues (5 Hours Post-Op.)
Impaired Comfort

Cases 29, 5, 10 & 12

Cues (1st Order Cues)
- Moving hands and right leg in bed
- Trying to talk via ET tube
- Respiratory rate 19
- ET tube uncomfortable
- Patient self report (1)
- Patient self report (2)
- Patient self report pain (3)
- Pain location chest
- MAP 85 climbing
- MAP previous response to analgesia
- Patient self report pain
- Respiratory rate 18
- Heart rate 90
- Chewing on ET tube
- MAP 95
- Patient self report pain
- Respiratory rate 20
- Restlessness
- Restlessness
- Looks worried
- Trying to self-extubate
- Pointing to ET tube
- Patient self report pain

Intermediate Judgement (Second Order Cues)

Impaired Comfort Case 29
- Moving hands and right leg in bed
- Trying to talk via ET tube
- Respiratory rate 19
- ET tube uncomfortable
- Patient self report (1)
- Patient self report (2)
- Patient self report pain (3)
- Pain location chest
- MAP 85 climbing
- MAP previous response to analgesia
- Patient self report pain
- Respiratory rate 18
- Heart rate 90
- Chewing on ET tube
- MAP 95
- Patient self report pain
- Respiratory rate 20
- Restlessness
- Restlessness
- Looks worried
- Trying to self-extubate
- Pointing to ET tube
- Patient self report pain

Impaired Comfort Case 5
- Moving hands and right leg in bed
- Trying to talk via ET tube
- Respiratory rate 19
- ET tube uncomfortable
- Patient self report (1)
- Patient self report (2)
- Patient self report pain (3)
- Pain location chest
- MAP 85 climbing
- MAP previous response to analgesia
- Patient self report pain
- Respiratory rate 18
- Heart rate 90
- Chewing on ET tube
- MAP 95
- Patient self report pain
- Respiratory rate 20
- Restlessness
- Restlessness
- Looks worried
- Trying to self-extubate
- Pointing to ET tube
- Patient self report pain

Impaired Comfort Case 10
- Moving hands and right leg in bed
- Trying to talk via ET tube
- Respiratory rate 19
- ET tube uncomfortable
- Patient self report (1)
- Patient self report (2)
- Patient self report pain (3)
- Pain location chest
- MAP 85 climbing
- MAP previous response to analgesia
- Patient self report pain
- Respiratory rate 18
- Heart rate 90
- Chewing on ET tube
- MAP 95
- Patient self report pain
- Respiratory rate 20
- Restlessness
- Restlessness
- Looks worried
- Trying to self-extubate
- Pointing to ET tube
- Patient self report pain

Impaired Comfort Case 12
- Moving hands and right leg in bed
- Trying to talk via ET tube
- Respiratory rate 19
- ET tube uncomfortable
- Patient self report (1)
- Patient self report (2)
- Patient self report pain (3)
- Pain location chest
- MAP 85 climbing
- MAP previous response to analgesia
- Patient self report pain
- Respiratory rate 18
- Heart rate 90
- Chewing on ET tube
- MAP 95
- Patient self report pain
- Respiratory rate 20
- Restlessness
- Restlessness
- Looks worried
- Trying to self-extubate
- Pointing to ET tube
- Patient self report pain

(S)he is sore.
qualifier ruling out pain in this instance. The meticulous knowledge of this particular patient's response facilitated the critical care nurse in making a judgement which Tanner et al. (1993) refer to as 'knowing the patient's patterns of responses', i.e. a detailed and specific knowledge about a particular patient's responses.

Another physiological cue 'increased respiratory rate', which was used across several cases as the initial cue, set the pain incident in motion related to the ventilated patient's readiness to wean, awake state, attempt at communicating their pain, anxious state and also compliance with the ventilator. This finding is interesting because it provides evidence that 'increased respiratory rate' has many probable meanings in the context of the ventilated patient in pain in the immediate phase post cardiac surgery. The literature recommends that critically ill adult patients who cannot communicate their pain should be assessed through physiological indicators, i.e. respiratory rate, heart rate, and blood pressure, along with subjective observation of pain related behaviours (movement, facial expression and posturing) (ASHP et al. 2002, Jacobi et al. 2002). However, respiratory rate was not included as part of the physiological indicators. In addition, Puntillo et al. (1997) found that critical care nurses used increased respiratory rate (21%) as a pain indicator during time one which was replaced by decreased respiratory rate (12%) during time five with critically ill patients within forty-eight hours post major surgery using a pain algorithm. The latter result may have been related to analgesia management according to the aforesaid authors. However, it seems that the utilisation and interpretation of the physiological cue 'increased respiratory rate' in this study is dependent not only on the critical care nurses' practical knowledge but also on their scrupulous knowledge of the individual ventilated patient which developed over time at the bedside.

Moreover, other critical care nurses used 'knowing the patient' to skilfully interpret the ventilated patient's physiological response to analgesia which was used as an indicator of pain in the midst of additional altered haemodynamic parameters. The following think aloud abstract gives a sense of how the critical care nurse integrated her experiential and theoretical knowledge with knowing the patient to explicate the uncertain and complex scenario as it unfolds with particular reference to using physiological indicators as pain cues in this instance:

411 S/16 K: "...I know him, at present he is sore, awake, and non-compliant with the ventilator.
412 S/16 K: I also know his vital signs over the last five hours, rasps heart rate and MAP acute rise, often on administering morphine sulphate as analgesia the blood pressure starts to come down beautifully, down to normotensive again, so I will see what his response will be...but the problem is that vital signs are not always a reliable index particularly when the patient is anxious as he is now plus he is vasodilating and is on GTN...".

The impetus for utilising the above-mentioned physiological cue evolved as the critical care nurse applied a value qualifier 'acute rise' to a physiological cue 'increased MAP' which warranted urgent attention. Furthermore, knowing the individual patient and knowing similar cases enabled the critical care nurse to interpret realistically haemodynamic responses within safe parameters taking cognisance of additional salient first-order cues in the context of the ventilated patient post cardiac surgery who is awake, anxious, warm, on support and fighting the ventilator. According to Jacavone & Dostal (1992) expert critical care nurses demonstrate a keen
perception of subtle physiological changes referred to as ‘qualitative distinction’ which influences their judgement. The following think aloud quotation provides explicit details of the reasoning strategies employed by some critical care nurses which confirms the interpretation taken by case sixteen above in relation to the physiological cue ‘MAP response to analgesia’:

389 S/1 MO: “...she was nodding her head confirming she was uncomfortable, and she seemed to have pain, she grimaced too.”
391 S/1 MO: Well, MAP 60, it was sensitive, that time the MAP response was related to low volume and sedative rather than morphine, especially when her CVP was low.
392 S/1 MO: So MAP response to previous analgesic, she was warming.
393 S/1 MO: I think it was definitely the sedative that dropped the blood pressure.
394 S/1 MO: She was also low in volume and she was also uneasy.
396 S/1 MO: So it was definitely not the morphine option that caused the MAP response...”.

It appears from the above think aloud quotation that the critical care nurse analyses her use of the first-order physiological cue ‘MAP response to previous analgesic’ in depth, drawing on additional physiological and technical first-order cues which are linked to her careful knowledge of the patient’s overall haemodynamic response. Moreover, it seems to suggest that the process used by the critical care nurse to reach a judgement is far from straightforward due to the complexity of the patient situation and the simultaneous presentation of cues, some of which are directly observable and some acquired by the critical care nurse while caring for this ventilated patient in pain. Knowing the patient was equated by Pyles & Stern (1983) to ‘nursing gestalt’ whereby expert critical care nurses used a process of linking fundamental knowledge, past experiences, cue identification and sensory clues which lead to categorisation of the patient picture involving a synergy of logic and intuition. In another case the word ‘previously’ indicates how the physiological cue ‘MAP response to analgesia’ is used as a pain cue to locate additional pain descriptor cues rather than a trial and error process or wait and see response approach:

421 S/5 D: “...his MAP is 85 and climbing...so he must be in some discomfort, they want 70...he is also awake.
423 S/5 D: His MAP went down to 60 post morphine given previously...so he must be sore with that mean...hello sir, have you any pain...yes, okay...so he is uncomfortable...”.

Moreover, one pain descriptor cue ‘patient self-report pain’ was used by twenty two of the twenty-four critical care nurses who also made reference to the importance of this cue in the midst of much uncertainty and ambiguity. It is noteworthy that the aforesaid pain descriptor cue acted as a precursor to the selection of additional pain descriptor cues on the part of the critical care nurse and the expression of pain locations in some instances by the ventilated patient. The following think aloud citations illustrate the significance some critical care nurses attached to the abovementioned pain descriptor cue:

412 S/24 CL: “...P is telling me he is sore at the surgical site down the chest there, so experiencing pain there, it makes things less complicated for me when he can tell me about his pain now as he is awake...it is an important guide for me when there is so much happening with him...”.
433 S/15 EL: “...he said he is experiencing soreness, pain is what the patient says it is...I always go by it as valid...especially when they are able to tell you...awake like he is...rarely that easy...but he is warm and everything settles...”.

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Therefore, the pain descriptor cue ‘patient self-report pain’ was viewed by several critical care nurses as a valid and reliable cue especially in the context of an awake ventilated patient with cardiovascular instability and anxiety. This finding is consistent with the literature which states that the verbal report of pain is the most valid indicator of acute pain (AHCPR 1992). The difference in this study relates to the fact that all patients were ventilated, which could be perceived as a barrier to the self-report pain. Another overt motor pain behaviour cue ‘grimace’ was seen as important to twelve critical care nurses. Studies have found that facial expression is an indicator of pain in the critically ill patient (Puntillo et al. 1997, Payen et al. 2001, Aissaoui et al. 2005, Young et al. 2006). In addition, facial expressions have been investigated by Prkachin (1992) providing confirmation for a universal facial expression of pain. Furthermore, the overt motor pain behaviour cue ‘grimace’ in this study acted as a precursor to the critical care nurse selecting the ‘patient self-report pain’ cue, which in turn operated as a sign to additional pain descriptor cues being made available proactively by some ventilated patients and located by critical care nurses in other instances. Besides, the presence of the critical care nurse at the bedside was seen as vital in this process which was observed by the researcher during the simultaneous observation period.

Subsequent to the attainment of the pain descriptor cue ‘patient self report pain’, there was some diversity in the number of additional pain descriptor cues utilised by some critical care nurses (see Figures 5.27, 5.28). According to Shanteau (1992) and Lammond & Farnell (1998) experts and novices know how to make use of multiple sources of information, but the ability to discriminate relevant from irrelevant in a given situation is what distinguishes the expert from the novice. In this study there may be several explanations for the number of pain descriptor cues used by some critical care nurses. One explanation for the number of pain descriptor cues used is that a few ventilated patients spontaneously provided some additional pain location cues such as pointing to chest drains, chest incision, ETTube and throat whose expression was facilitated by those critical care nurses. Furthermore, a number of ventilated patients were more alert, haemodynamically stable and less anxious which also may have aided the process. Another justification for this finding could be located in the time spent in critical care nursing, i.e. the longer the experience in critical care nursing the greater the number of pain descriptor cues utilised. Studies have found that expert critical care nurses linked assessment cues to form a typical pattern of pain and the number of cues were dependent on knowledge of the patient and their haemodynamic status at that particular time (Guyton-Simmons & Mattoon 1991, Guyton-Simmons & Ehrmin 1994). Furthermore, Pyles & Stern (1983) found that expert critical care nurses base their judgements on several cues in order to obtain the ‘whole picture’. However, in this study, the first-order cues used by the critical care nurses formed a pattern of specific pain descriptor cues rather than a generic pattern. Conversely, three critical care nurses who selected one or two pain cues (see Figure 5.28) had spent a short time in the critical care environment.

One important finding is that knowing the patient and experiential knowledge helped the critical care nurses to utilise a pattern of pain descriptor cues and apply it to the individual ventilated patient in their care. Moreover, this knowledge allowed critical care nurses to follow
Impaired Comfort Case 18

Impaired Comfort Case 15

Impaired Comfort Case 9

(S)he is sore.
**Figure 5.28**

*Rest - Case Analysis First Order Cues (5 Hours Post-Op.)*

**Impaired Comfort**

<table>
<thead>
<tr>
<th>First Order Cues</th>
<th>Intermediate Judgement (Second Order Cues)</th>
</tr>
</thead>
<tbody>
<tr>
<td># Respiratory rate 18</td>
<td>Impaired Comfort Case 21</td>
</tr>
<tr>
<td># MAP 85</td>
<td>Impaired Comfort Case 24</td>
</tr>
<tr>
<td>▲ Grimace</td>
<td>Impaired Comfort Case 26</td>
</tr>
<tr>
<td># Hands pointing to chest incision</td>
<td>Impaired Comfort Case 27</td>
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<tr>
<td>● ETTube uncomfortable</td>
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<tr>
<td>● Pain severity</td>
<td></td>
</tr>
<tr>
<td>* Trying to communicate via ETTube</td>
<td></td>
</tr>
<tr>
<td># Respiratory rate 18</td>
<td></td>
</tr>
<tr>
<td>▲ Pointing ETTube uncomfortable</td>
<td></td>
</tr>
<tr>
<td>● Patient self-report pain</td>
<td></td>
</tr>
<tr>
<td>▲ Pointing at chest</td>
<td></td>
</tr>
<tr>
<td># Heart rate 90</td>
<td></td>
</tr>
<tr>
<td>* Moving hands towards tube</td>
<td></td>
</tr>
<tr>
<td>+ Airway pressure 42mmHg</td>
<td></td>
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<tr>
<td>● ETTube uncomfortable</td>
<td></td>
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<tr>
<td>● Patient self-report pain</td>
<td></td>
</tr>
<tr>
<td># Respiratory rate 18</td>
<td></td>
</tr>
<tr>
<td># Heart rate 90</td>
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<tr>
<td># Respiratory rate 19</td>
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<tr>
<td>* Trying to talk via ETTube</td>
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<tr>
<td>● ETTube uncomfortable</td>
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<tr>
<td>▲ Grimace</td>
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<tr>
<td>● Patient self-report pain</td>
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<tr>
<td># Heart rate 90</td>
<td></td>
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</tbody>
</table>

(S)he is sore.
the ventilated patient’s lead in identifying pain locations which is evident in many cases such as case four (see Figure 5.25) offered previously where the nurse’s two years in critical care nursing came to fruition in this pain incident. Therefore, expertise in critical care nursing was not accounted for in years in this scenario. This finding is important because the task characteristics and knowledge of the ventilated patient contributed to the location of specific pain cues which seem to follow a pattern. Knowing the patient has been identified in the pain literature pertinent to older patients as central to identifying pain cues (Clarke et al. 2004). Furthermore, knowledge was seen as critical in order to learn the meaning of pain cues with patients who have their own set of subtle cues (Parke 1998). However, it could also be the case that some critical care nurses were aware of the researcher’s presence which influenced their attention to pain details. Nonetheless, the researcher’s attendance could not in any way impact the ventilated patient’s ability to exhibit overt motor pain behaviours cues as was evident in this case and many more during fieldwork.

Moreover, the next think aloud excerpt demonstrates how the critical care nurse applied her experiential knowledge and her knowledge of the patient to make sense of some conflicting, ambiguous and sometimes absent cues in order to make an intermediate judgement of the ventilated patient’s pain state in this instance:

462 S/14 C: “...knowing her helps because there are many conflicting pointers with her and it helps me to remain determined and get to the root of the issue with her
463 S/14 C: I also find with these patients and in particular this lady just because they appear to be asleep and look comfortable as she does, not moving. It does not guarantee that she is painfree, so I will ask her just to make sure...she is sore...”

Likewise, ‘knowing the patient’ seemed to provide some six critical care nurses with a deep appreciation of pain expression on the part of the ventilated patient in this pain incident, which is epitomised in the following think aloud extracts:

644 S/4 M: “...I know him by now that he is in pain...his blood pressure shot up, shooting up, no longer anxious like before or not distressed on the ventilator...I have come to know how he communicates his pain...knowing him now as I do...I can really focus and find out all about his pain quickly so that it makes it easier on both of us and I can help him with his pain...and he will do good with his recovery then...”

Knowing the patient allowed the critical care nurse to use a pattern of salient cues to reach a judgement of the ventilated patient’s pain state rapidly. It is not only about the utilisation and integration of salient physiological and behavioural general cues, but the value placed on the contribution of the ventilated patient in this process. This practical knowledge of the particular case enabled the critical care nurse, draw on the ventilated patient’s resources which had the potential to directly impact not only on his current pain state but his future well-being post cardiac surgery. Furthermore, ‘knowing the patient’ provides the critical care nurse with an in-depth understanding of the patient’s physiological signs and how these signs relate with and respond to other states i.e. ‘he was nervous pre-operative’.

Moreover, ‘knowing the patient’ provides the critical care nurse with a comprehensive insight of how the ventilated patient expresses her pain and how it could be applicable to similar patients over the course of the surgical trajectory:
460 S/22 EY: "...I have a good handle on her physiological indicators which can be so unreliable in these patients, but sometimes that is all you have to work with, plus she was very nervous pre-operative and in the initial stages post-operative which impact on these indicators, but most importantly for me, I was able to understand her when she was trying to communicate her pain to me which is very important in ventilated patients, knowing her helps me come to know how she expresses her pain or does not as this was the case with her earlier, it can be very complex at times with these patients as there is so much going on all at once, but once they warm things start to resolve somewhat which is where she is right now...".

Knowing the patient provided this critical care nurse with a detailed knowledge and understanding of the ventilated patient's pattern of responses which she applied skilfully and appreciatively with her experiential knowledge of similar patients to make sense of several conflicting cues and anticipate future trends in the patient's pattern of responses. Moreover, knowing the patient also gave the critical care nurse a deep sense of the ventilated patient's own capabilities and the necessary route to gain access to this knowledge which would contribute to her judgement about a pain state. According to Jenny & Logan (1992), experience with similar scenarios increases the nurses' abilities to direct their knowing strategies skilfully and anticipate problems while knowing the patient will facilitate judgements about the availability of patient resources.

In addition, knowing the patient allowed some critical care nurses to locate the ventilated patient's pain terminology along with numerous pain descriptor cues to create a complete picture in this scenario. The critical care nurses' persistence in locating a pain descriptor cue 'patient self-report pain' revealed the ventilated patient's pain terminology which was originally perceived as a conflicting cue. This knowledge advanced through an ongoing partnership with the ventilated patient and the critical care nurse by spending time at the bedside.

428 S/19 MR: "...I know him even though he denied pain, I knew he was sore...plus the word was sore and not pain..."
429 S/19 MR: His MAP was a reliable indicator which based on my experience is not always a good index post cardiac surgery, but as I got to know him over the hours caring for him I understood his MAP trend which allowed me use it as a pointer of his pain when he was not able to tell me verbally, plus he grimaced which is important as he was at rest and so he grimaced when he moved, so something was going on with him and for me then grimace and his mean were the reliable ones here with him...plus sore is the word he responds to...

According to Doona et al. (1997), nurses' presence is the context for informed judgement and vigilance (Grambling 2004). Knowing the patient is seen as a unique form of knowledge that nurses achieve through interpersonal relationships with patients (Jenks 1993) and central to skilled clinical judgement (Tanner et al. 1993). Furthermore, during this study, knowing the patient was used by a number of critical care nurses to integrate theoretical and practical knowledge along with physiological cues, overt motor pain behaviour cues and sensory cues. There were supplementary first-order cues utilised by individual critical care nurses, for example, behavioural general cues 'chewing on ET Tube', 'restlessness' and 'trying to talk via the ET Tube'. This last behavioural general cue was interpreted by eight critical care nurses to be related to the ventilated patient's attempt to convey that the ET Tube was causing discomfort which is exemplified in the following think aloud quotes:

371 S/28 B: "...T is trying to talk via the ET Tube, awake and making a good effort of telling me that the tube is uncomfortable...".

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Therefore, much detail can be obtained from the ventilated patient with perseverance on the part of the critical care nurse. This finding is important as the source of pain is located in view of the patient’s intubation status. A contrasting judgement ‘(s)he is not in pain at present’ is formulated by another group of critical care nurses which will be discussed in the following subsection.

### 5.2.8 Intermediate Judgement: *(S)he is not in pain at present*

Three critical care nurses used and combined between six and nine first-order cues to formulate the following intermediate ‘(s)he is not in pain at present’ which is diagrammatically illustrated in Figure 5.29. There were similarities across each of the critical care nurses (3, 7, 8) regarding the utilisation of the following first-order cues: three physiological ‘normal MAP’, ‘normal heart rate’ and ‘respiratory rate 13/14’; one overt motor pain behaviour cue ‘no grimace’; and one behavioural cue ‘no movement’. The following extracts present an interesting take on the behavioural cue ‘no movement’ while its interpretation is facilitated by the critical care nurse’s knowledge of the patient along with her experiential knowledge:

542 S/7 AL: “...I know her by now over the last five hours, I know when she is in pain because she has been able to tell me but it is not always that straightforward with these cardiac patients who are ventilated and in particular agitated
544 S/7 AL: I also know by her demeanour, she does not appear to be in pain at the moment, because she is relaxed, not fighting the ventilator like before and she is asleep
545 S/7 AL: I take no movement here to mean that she is comfortable and asleep but that is because I know her and the way she communicates her pain to me as no movement does not always mean no pain...”.

418 S/3 J: “…I know the patient, I know his trend over the last hours, haemodynamics are stable, compliant on ventilator now, no movement because I know him indicates he is comfortable, not sore, warm and cozy, no longer shivery, not nervous, know by him...so I will not disturb him...”.

Therefore, the behavioural general cue ‘no movement’ was construed by the critical care nurse to deduce no pain within the context of the ventilated patient’s haemodynamic status, compliance on the ventilator, level of wakefulness and anxiety status. Moreover, knowledge of the patient and practical knowledge played a vital part in enabling the critical care nurse to read and integrate the ventilated patient’s behaviour in order to interpret the behavioural general cue ‘no movement’ with certainty and infer absence of pain at that particular time. In addition, the following think aloud extract afforded the ventilated patient’s interpretation of the behavioural general cue ‘no movement’ which was established by the critical care nurse by spending time with the patient and getting to know how she communicated her pain:

450 S/14 C: “...She is not grimacing there, not moving, so she is not in any distress at the moment but she will be sore or could be
451 S/14 C: I have come to know her over the last couple of hours ....so even though she looks comfortable and is asleep and she is relaxed on the ventilator, not moving...I am not persuaded that she is not sore...she tends not to move in case of pain...I checked and she is sore...”.
Figure 5.29

Rest - Case Analysis First Order Cues (5 Hours Post-Op.)
Risk for Impaired Comfort

Cases (1st Order Cues)

- MAP 70
- Heart rate 88
- Restful
- No movement
- Not biting ET Tube
- Respiratory rate 13
- Knowing the patient
- Eyes closed
- Not moving
- Respiratory rate 14
- Not biting on ET Tube
- Not fidgety
- Relaxed facial expression
- MAP 74
- Heart rate 86
- Knowing the patient
- Mean arterial blood pressure 72
- Heart rate 88
- Patient self-report pain
- No grimace
- No movement
- Respiratory rate 14

Intermediate Judgement
(Second Order Cues)

Cases 3, 7, & 8

Risk for Impaired Comfort
Case 3

- No grimacing
- Heart rate 88
- Respiratory rate 13
- Knowing the patient

Risk for Impaired Comfort
Case 7

- Not fidgety
- Respiratory rate 14

Risk for Impaired Comfort
Case 8

- Patient self-report pain
- No grimace
- No movement
- Respiratory rate 14

(S)he is not in pain at present.

Key:
- # Physiological cue
- □ Mechanical cue
- ☀ Overt motor pain behaviour cue
- + Technical cue
- ▲ Knowledge cue
- ★ Behavioural (general) cue
- ≈ Physical cue
- P Pain descriptor cue
- △ Paradigmatic cue
- Broken Line = Dissimilar First Order Cue
In contrast, the following think aloud citation demonstrates how the critical care nurse is unconvinced about the usefulness of the behavioural general cue ‘no movement’ and validates her scepticism with the patient:

428 S/18 H: "...M, tell me about the pain, is it sore when you move, very sore, and there all the time now...
429 S/18 H: Oh...when you lie still it is fine but when you move, so is that why you are lying so still...you are afraid to move because of the pain...I get the picture...I will sort it out this minute...see I knew...no movement needs to be addressed with the patient...".

It would also seem that much detail can be obtained from the ventilated patient with the assistance of a critical care nurse who skilfully probes to ascertain important cues in order to infer a pain state and intervene accordingly. This finding is important as it provides graphic evidence of the approach critical care nurses take to the behavioural general cue ‘no movement’, which may be represented as no pain unless validated with the ventilated patient in this case. Furthermore, this finding is different to Puntilllo et al. (1997) whereby no movement was used an indicator of pain by critical care and post-anaesthesia care nurses in time one assessment, while in later assessments ‘no movement’ behaviour increased, which was deemed to be more than likely related to analgesia. The Behavioural Pain Scale refers to no movement of upper limbs as no response to nociceptive stimulus (Payen et al. 2001, Aissaoui et al. 2005, Young et al. 2006) which means no pain with a total score of 3 on all items. Therefore, the approach adopted by the critical care nurses in this study is important as it confirms their earlier scepticism that ‘no movement’ is an unreliable pain indicator. Moreover, Doona et al. (1997) postulates that when nurses make judgements without validating their assessment with the patient, clinically inflicted pain is made invisible. The remaining first-order cues used by each critical care nurse were behavioural general, which is evident in Table 5.13. There was evidence of similarity across the three cases with respect to some first-order cues such as physiological, overt motor pain behaviour and behavioural general cues (see Figure 5.29 shown previously). The judgement process of critical care nurses (n=27) within and across both terminal judgements will be explored in depth in the following subsections.

5.2.9 The Judgement Process: ‘(S)he is in Acute Pain’

This subsection presents the findings of the judgement process of critical care nurses (n=24) with specific attention to cue categories (see Figure 5.34A) during the pain incident which evolved five hours post cardiac surgery as the ventilated patient was at rest. There is evidence that across all five intermediate judgements, physiological cues were utilised by the majority of the critical care nurses along with mechanical and behavioural general cues. In addition, paraclinical, technical, and covert behaviour cues were utilised by some critical care nurses which were pertinent to some intermediate judgements such as ‘(s)he is anxious’ and ‘(s)he is fighting the ventilator’ which give a sense of the overlapping process of some cues across intermediate judgements.

There was one significant difference within the physiological cues which related to ‘increased respiratory rate’ identified in the majority of cases. This finding represents the critical care nurses’ explicit reasoning, not only for using this physiological parameter, but also overt detail as to the cause of the increase in the ventilated patient in the context of their pain. The
<table>
<thead>
<tr>
<th>Cue Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td># Physiological Cue</td>
<td>Increased MAP</td>
<td>7 [*4]</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Decreased MAP</td>
<td>1 [*1]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal MAP</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Increased heart rate</td>
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<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal heart rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increased respiratory rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal respiratory rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MAP response to analgesia</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Change respiratory pattern</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>▲ Paraclinical Cue</td>
<td>Support requirements</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>+ Technical Cue</td>
<td>Airway pressure high 42cms</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>* Behavioural</td>
<td>No movement</td>
<td>2</td>
<td>24</td>
</tr>
<tr>
<td>(General) Cue</td>
<td>Restlessness</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chewing ETTube</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moving hands under covers</td>
<td>2</td>
<td></td>
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<tr>
<td></td>
<td>Restful</td>
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<td>Moving tongue either side of ETTube</td>
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<tr>
<td></td>
<td>Moving hands a bit</td>
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<tr>
<td></td>
<td>Trying to self-extubate</td>
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<tr>
<td></td>
<td>Coughing on ETTube</td>
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<td></td>
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<tr>
<td></td>
<td>Eyelids closed</td>
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<td></td>
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<tr>
<td></td>
<td>Not fidgety</td>
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<tr>
<td></td>
<td>Pulling chest drains</td>
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<tr>
<td></td>
<td>Moving hands and right leg</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coughing on ETTube</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>□ Covert Behaviour Cue</td>
<td>Looks worried</td>
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<td>24</td>
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<td></td>
<td>Apprehensive</td>
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<td></td>
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<tr>
<td>≈ Physical Cue</td>
<td>Sore old injury</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>▲ Knowledge Cue</td>
<td>Knowing the patient</td>
<td>6</td>
<td>24</td>
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<td>Normal heart rate</td>
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<td></td>
<td>Increased respiratory rate</td>
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<td></td>
<td>Moving hands and right leg</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coughing on ETTube</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Covert Behaviour Cue</td>
<td>Looks worried</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apprehensive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≈ Physical Cue</td>
<td>Sore old injury</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>▲ Knowledge Cue</td>
<td>Knowing the patient</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

*Value qualifier 'acute rise'/ 'steady dip'/ 'gradual rise'.

Table 5.13: First Order Cue Utilisation Across Intermediate Judgements (Second Order Cues) 'One Pain Incident': Rest
Table 5.13 (continued): First Order Cue Utilisation Across Intermediate Judgements (Second Order Cues) ‘One Pain Incident’: Rest

<table>
<thead>
<tr>
<th>Cue Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Descriptor Cue</td>
<td>Patient self-report pain</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>ET tube uncomfortable</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pain location (chest)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pain intensity</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mouth sore</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Throat sore</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pain pattern</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pain leg</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pain location (chest drains)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sore moves bed</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Previous pain medicine</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Position in bed uncomfortable</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Overt Motor Pain Behaviour Cue</td>
<td>Grinace</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Pointing to chest</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No grinace</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pointing to chest drains</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pointing to ET tube</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pointing to mouth</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cue Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Descriptor Cue</td>
<td>Patient self-report pain</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ET tube uncomfortable</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pain location (chest)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pain intensity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mouth sore</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Throat sore</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pain pattern</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pain leg</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pain location (chest drains)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sore moves bed</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Previous pain medicine</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Position in bed uncomfortable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overt Motor Pain Behaviour Cue</td>
<td>Grinace</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Pointing to chest</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No grinace</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pointing to chest drains</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pointing to ET tube</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pointing to mouth</td>
<td></td>
<td></td>
</tr>
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</table>

Table 5.14: First Order Cue Utilisation Across Intermediate Judgements (Second Order Cues) ‘One Pain Incident’: Rest

<table>
<thead>
<tr>
<th>Cue Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiological Cue</td>
<td>Increased MAP</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Increased respiratory rate</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal respiratory rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Change respiratory pattern</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal respiratory pattern</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical Cue</td>
<td>Airway pressure high 42cms</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Airway pressure normal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavioural (General) Cue</td>
<td>Chewing on ET tube</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Not biting ET tube</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Restlessness</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Restful</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shaking head side to side</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Covert Behaviour Cue</td>
<td>Apprehensive</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Knowledge Cue</td>
<td>Knowing the patient</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cue Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiological Cue</td>
<td>Increased MAP</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Increased respiratory rate</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal respiratory rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Change respiratory pattern</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal respiratory pattern</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical Cue</td>
<td>Airway pressure high 42cms</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Airway pressure normal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavioural (General) Cue</td>
<td>Chewing on ET tube</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Not biting ET tube</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Restlessness</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Restful</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shaking head side to side</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Covert Behaviour Cue</td>
<td>Apprehensive</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Knowledge Cue</td>
<td>Knowing the patient</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>
current pain literature focuses on increased heart rate and blood pressure as physiological indicators (Payen et al. 2001, Aissaoui et al. 2005, Young et al. 2006). The important finding in this study was the location of discomfort, i.e. 'endotracheal tube', on the part of the critical care nurse, which was communicated by the ventilated patient via 'trying to talk via the ETTube' with a subsequent rise in respiratory rate. However, for some patients who were agitated this process seemed to inhibit their ability to synchronise with the ventilator which was articulated by the critical care nurse. This process was also confirmed by the researcher during simultaneous fieldwork.

Besides, the critical care nurses used 'decreased MAP' with a value qualifier 'steady dip' in order to rule out pain in the agitated patient and integrated a pattern of salient cues in the context of support requirements, vasodilatation and temperature readings. All critical care nurses incorporated core and peripheral temperature readings in conjunction with support requirements when analysing the patients' physiological cues at this point in time. This finding is important as the ventilated patients were five hours post cardiac surgery with a progression in their haemodynamic trends reflected in part by the measurement of temperature parameters, support and volume status. Furthermore, all critical care nurses ascertained level of wakefulness by taking the patient through a pattern of activities which was mediated in this pain incident by the cue 'eyes open spontaneously'. This finding is important as all patients were to be fast tracked and 'no sedatives if possible' was deemed a component of this policy which was articulated by the critical care nurses through their use of a paraclinical cue 'fast track policy'.

Another physiological cue 'MAP response to analgesia' was used to situate the source of an 'increased mean arterial blood pressure acute rise' and rule in pain in the context of the ventilated patient who was very sensitive to support, agitated, awake and fighting the ventilator. In contrast, 'MAP response previous analgesia' was also used as a precursor to locating additional pain descriptor cues. One explanation for these findings is that critical care nurses used a pattern of specific cues that were created to match each individual ventilated patients' needs, driven mainly by current haemodynamic status. It is interesting to note that one knowledge cue 'knowing the patient' was used across all intermediate judgements by a number of critical care nurses. Moreover, knowing the ventilated patient over five hours through constant monitoring at the bedside gave the critical care nurses an in-depth sense of subtle pain cues such as physiological, behavioural general (no movement) and pain descriptor cues, in particular appropriate pain terminology and pain expression. Furthermore, it also enabled the critical care nurse to draw on the ventilated patients' own resources in identifying pain sites. This finding demonstrated that pain stories can be made visible by the critical care nurses' knowledge of the ventilated patient's pain expression. This knowledge is accrued by spending time with the patient, noticing subtle pain cues and facilitating pain expression despite intubation which become part of a pattern in the critical care nurses' vocabulary.

There was one cue category, i.e. overt motor pain behaviour cue 'grimace' and pain descriptor category 'patient self-report pain', which was peculiar to the intermediate judgement '(s)he is sore'. These were used as valid cues of the ventilated patient's pain state and acted as
precursors to locating additional specific pain descriptor cues. This finding is consistent with the literature with one different slant. It is assumed that the ventilated patient may be unable to provide a self-report pain due to intubation status and medications. However, in this study, all thirty ventilated patients five hours post cardiac surgery were able to provide a self-report of their pain state. One explanation for this finding was the critical care nurses’ ability to notice subtle cues, her proactive approach to locating pain cues, her knowledge of the patient’s haemodynamic parameters, pain expression and their contribution to the judgement process.

Critical care nurses used a pattern of cues such as physiological, mechanical, behavioural general, covert motor behaviour, technical, overt motor pain behaviour, knowledge and pain descriptor cues (see Figure 5.34A as shown previously). However, dissimilarities were evident within each cue category. One explanation for the dissimilarity could be related to the haemodynamic status of the ventilated patient, anxiety, level of wakefulness and dysynchrony with ventilator. Nonetheless, the utilisation of specific pain cues were also dissimilar. Another explanation put forward for this finding was the ability of some ventilated patients to proactively locate pain sites or reactively respond to the critical care nurses probing about current pain and pain sites. In addition, knowing the patient was also implicated in this process. More importantly, minimum time spent in critical care nursing may have been an additional cause for underutilisation of accessible pain cues which were observed by the researcher in the field and omitted by the critical care nurses at the bedside. In contrast, another final judgement was formulated by the remaining critical care nurses ‘(s)he is not in acute pain’ which will be presented in detail in the following subsection.

5.2.10 The Judgement Process: ‘(S)he is not in acute pain’

A contrasting judgement ‘(s)he is not in acute pain at present’ was formulated by another group of critical care nurses based on some similar cue categories as the previous judgement ‘(s)he is in acute pain’ with some notable differences (see Figure 5.34B). There was one cue category covert motor pain behaviour cue such as ‘apprehensive’ not utilised across any of the intermediate judgements along with one pain descriptor cue ‘ETTube uncomfortable’. One explanation for this finding is that the ventilated patients were not anxious and were compliant on the ventilator (see Figure 5.34B). This detail would confirm the critical care nurses' findings that the endotracheal tube (ETTube) was a major source of anxiety to the critically ill ventilated patient which affected their ability to synchronise with the ventilator. Furthermore, ‘knowing the patient’ in this instance enabled the critical care nurse to differentiate between an anxious or at risk for anxiety state in the context of the ventilated patient who exhibited conflicting physiological cues such as ‘increased respiratory rate’. Therefore, ‘increased respiratory rate’ was interpreted as a strategy to communicate pain and patient readiness to wean from the ventilator. Besides, the critical care nurse utilised one pain descriptor cue 'patient self-report pain' which secured a negative response from the ventilated patient confirming no pain. This could account for the finding that no additional pain descriptor cues were sought at that particular time which is in direct contrast to its counterpart judgement.
Consequently, all of the critical care nurses (n=27) formulated five intermediate judgements (see Figure 5.34A, B) based on a pattern of physiological, mechanical, paraclinical, technical, behavioural general, knowledge, overt motor pain behaviour, pain descriptor cues and in some cases covert behaviour cues and a physical cue in one case (old injury). Subsequent to the formulation of intermediate judgements by each of the critical care nurses, a final judgement was reached which related to the ventilated patient's pain state, i.e. 'he is in acute pain' or 'he is not in acute pain', approximately five hours post arrival to the critical care unit post cardiac surgery. The intermediate judgements acted as second-order cues in this process. The subsequent think aloud abstracts provide examples of the second level of the judgement process where intermediate judgements operated as second-order cues which were combined into a final judgement of the ventilated patient's pain state in the immediate phase post cardiac surgery:

467 S/91: 'Now where was I...okay so P is wide awake now
469 S/91: He is more stable haemodynamically
470 S/91: Plus he is uncomfortable
472 S/91: He is very nervous
473 S/91: So I will give him morphine now because he is in acute pain at present'.

353 S/10 E: 'Okay, so I will put my little bits together... everything happens so fast with her...
354 S/10 E: She is sore there
355 S/10 E: More awake also
358 S/10 E: She is labile cardiovascularly...haemodynamics a worry at the minute...were fine
360 S/10 E: She is anxious which is not helping
362 S/10 E: Now, S, just rest back against the pillows
360 S/10 E: So in my mind she is in acute pain...I will give her something when her pressure goes back to where it was a minute ago'.

The aforementioned extracts provide a picture of the approach taken by the critical care nurse to bring together numerous strands of detail to create a pattern of the ventilated patient's pain state in order to make a final judgement five hours post cardiac surgery. Hammond et al. (1966b) found that the cognitive characteristics of the nursing task was complex with respect to the number of cues involved. Therefore, the judgement process of the critical care nurses in this pain incident as the ventilated patient was at rest involved two levels. During level one, the critical care nurses used and combined several first-order cues into five intermediate judgements. Subsequently, the intermediate judgements became second-order cues which were utilised and integrated into a final judgement, i.e. 'he is in acute pain' or 'he is not in pain at the moment'. The final stage of the judgement process is illustrated in Figure 5.32 relevant to 'he is in acute pain'. The following subsections discusses the similarities and differences of the judgement processes of critical care nurses across two pain incidents, i.e. 'turned post chest x-ray', which occurred within one hour post cardiac surgery and 'rest' in the context of the ventilated patient five hours phase post cardiac surgery.

5.2.11 COMPARISON OF THE JUDGEMENT PROCESSES: PAIN INCIDENT - TURNED FOR CHEST X-RAY VERSUS PAIN INCIDENT - REST: '(S)HE IS NOT IN ACUTE PAIN'

Finally, a comparison of cue categories was undertaken to ascertain any further dissimilarities across judgement policies of critical care nurses who formulated a final judgement
### Figure 5.32

**Rest - Case Analysis - Second Order Cues (5 Hours Post-Op.)**

- **Diagrammatic Representation "Judgement Process"**

<table>
<thead>
<tr>
<th>CASE 18</th>
<th>CASE 19</th>
<th>CASE 21</th>
</tr>
</thead>
<tbody>
<tr>
<td>CASE 25</td>
<td>CASE 28</td>
<td>CASE 26</td>
</tr>
<tr>
<td>CASE 9</td>
<td>CASE 12</td>
<td>CASE 5</td>
</tr>
<tr>
<td>CASE 14</td>
<td>CASE 24</td>
<td>CASE 15</td>
</tr>
<tr>
<td>CASE 29</td>
<td>CASE 27</td>
<td>CASE 22</td>
</tr>
<tr>
<td>CASE 17</td>
<td>CASE 4</td>
<td>CASE 11</td>
</tr>
<tr>
<td>CASE 10</td>
<td>CASE 30</td>
<td>CASE 1</td>
</tr>
<tr>
<td>CASE 23</td>
<td>CASE 16</td>
<td></td>
</tr>
</tbody>
</table>

Intermediate Judgments (2nd Order Cues)

1. He is awake
2. He is a bit more stable hemodynamically
3. He is sore
4. He is anxious
5. He is fighting the ventilator
6. He is compliant on the ventilator
7. He is not anxious at present

Final Judgement

(S)he is in acute pain

Dissimilar
‘(s)he is not in acute pain at present’ during both pain incidents, i.e. repositioning and at rest, which is diagrammatically represented in Figure 5.35A, B. The pattern of cues utilised by all critical care nurses during both pain incidents comprised of physiological, mechanical, technical, paraclinical, behavioural general and overt motor pain behaviour cues. There were individual dissimilarities across the cue categories which could be explained by the difference in activity, for example overt motor pain behaviour cue ‘guarded movement’ during repositioning. Another important detail is the absence of a pain descriptor ‘patient self-report pain’ during repositioning (see Table 5.26) which was not the case during the rest period. This detail is important as several critical care nurses in the absence of a ‘patient self-report pain’ during repositioning utilised one behavioural cue ‘no movement’ with some degree of scepticism as to its reliability. The same view was taken by the critical care nurses during the pain incident at rest. However, they confirmed their scepticism with a ‘patient self-report of pain’. Interestingly, one of the patients who exhibited the behavioural general cue ‘no movement’ at rest confirmed the presence of pain while another pointed to a painful site following persistent probing by the critical care nurse which gives credence to the critical care nurses view that ‘no movement’ is an unreliable pain cue in the context of the ventilated patient in the immediate phase post cardiac surgery.

Another cue category ‘knowledge cue’ was utilised by critical care nurses during the rest period. Moreover, knowing the ventilated patient enabled the critical care nurse to zone in and make a judgement rapidly with the ventilated patient who confirmed no pain at that particular time. Hence the judgement ‘(s)he is not in pain at present’. In contrast, the critical care nurses relied during repositioning of the ventilated patient on their experiential knowledge and created a primary preventative pattern in the absence of a pain descriptor which heightened awareness of the ‘risk for acute pain’ which was translated into the judgment ‘(s)he is not in pain at present but is at risk of being in pain shortly’. Moreover, there was a difference in the number of intermediate judgements, i.e. second-order cues between both groups (see Figure 5.35A, B), concerning ‘(s)he is not anxious at present’. This finding is interesting as ‘knowing the patient’ allowed the critical care nurses in question, compare current and previous behaviour of the ventilated patient over five hours based on conflicting first-order cues in order to reach the aforesaid intermediate judgement. The contrasting judgement ‘(s)he is in acute pain’ across both pain times ‘repositioning post chest x-ray’ versus ‘rest’ is presented from a cue category perspective in the subsequent section.

5.2.12 COMPARISON OF THE JUDGEMENT PROCESSES: PAIN INCIDENT - TURNED FOR CHEST X-RAY VERSUS PAIN INCIDENT - REST: ‘(S)HE IS IN ACUTE PAIN’

This subsection presents dissimilarities across both pain incidents pertinent to the judgement policy of the critical care nurses in question who formulated the judgement ‘(s)he is in acute pain’. There was only one cue category that appeared during the rest period, i.e. knowledge cue ‘knowing the patient’ which was not articulated by the critical care nurse during the ‘repositioning pain incident’ as is evident in Figure 5.36A, B. There were several details to this pain cue which gave the critical care nurse an opportunity to come to know the ventilated patient’s pain expression which incorporated physiological, behavioural general and overt motor
<table>
<thead>
<tr>
<th>Cues Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td># Physiological Cues</td>
<td>Increased MAP</td>
<td>12 [6]</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Decreased MAP</td>
<td>5 [4]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal MAP</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increased heart rate</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal heart rate</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal respiratory rate</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MAP response to analgesia</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Change respiratory pattern</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal respiratory pattern</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pupils pinpoint</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Mechanical Cues</td>
<td>Fentanyl 1mg OT</td>
<td>10</td>
<td>22</td>
</tr>
<tr>
<td>Paraclinical Cues</td>
<td>No spinal morphine OT</td>
<td>5</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>CABG by 4 with LMA</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Support requirements</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weight 114kg – big man</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fast track principle</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Technical Cues</td>
<td>Turned chest X-ray</td>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>Behavioural Cues</td>
<td>No movement</td>
<td>18</td>
<td>22</td>
</tr>
<tr>
<td>General Cues</td>
<td>No response to questions about pain</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Restlessness</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chewing ETube</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not biting ETube</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Restful</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fidgety</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Eyelids not flickering</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dressing wound withdrew leg</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not fidgety</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Pain Descriptor Cues</td>
<td>Patient self-report pain</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>Overt Motor Pain Behaviour Cues</td>
<td>Grimace</td>
<td>2</td>
<td>22</td>
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<tr>
<td>Knowledge Cues</td>
<td>Knowing the patient</td>
<td>2</td>
<td>22</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cues Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td># Physiological Cues</td>
<td>Increased MAP</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Decreased MAP</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal MAP</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increased heart rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal heart rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal respiratory rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MAP response to analgesia</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Change respiratory pattern</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal respiratory pattern</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pupils pinpoint</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical Cues</td>
<td>Fentanyl 1mg OT</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Paraclinical Cues</td>
<td>No spinal morphine OT</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CABG by 4 with LMA</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Support requirements</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Weight 114kg – big man</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Fast track principle</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Technical Cues</td>
<td>Turned chest X-ray</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Behavioural Cues</td>
<td>No movement</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>General Cues</td>
<td>No response to questions about pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Restlessness</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chewing ETube</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not biting ETube</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Restful</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fidgety</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Eyelids not flickering</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dressing wound withdrew leg</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not fidgety</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain Descriptor Cues</td>
<td>Patient self-report pain</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Overt Motor Pain Behaviour Cues</td>
<td>Grimace</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Knowledge Cues</td>
<td>Knowing the patient</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

MAP = Mean Arterial Blood Pressure.
LMA = Left Internal Mammary Artery.
CVP = Central Venous Pressure.
ETTube = Endotracheal Tube.
LVEF = Left Ventricle Ejection Fraction.

*Value qualifier: 'acute rise' / 'no big dips'.
**Alterations in MAP and heart rate readings were interpreted in the context of mechanical cues and central and peripheral temperature readings.

**Central and peripheral temperature were utilised in all intermediate judgements, therefore only appear on this page.
pain behaviour cues alongside pain terminology. In addition, it allowed the critical care nurse to utilise a pattern of salient first-order cues and rule out pain in the context of anxiety, fighting the ventilator, awake state and haemodynamic instability. In addition, the critical care nurse used a specific pattern of pain descriptor cues in conjunction with the ventilated patient’s contribution to complete the pain story. In contrast, during repositioning, which happened in some cases within thirty minutes post cardiac surgery, critical care nurses utilised a different pattern of individual pain cues (see Table 5.25) within the cue categories in particular physiological and overt motor pain behaviour cues alongside two pain descriptor cues, i.e. ‘ETTube uncomfortable’ and ‘patient self-report pain’. An explanation for this finding is located in the ventilated patient’s haemodynamic instability and their ability to communicate with the critical care nurse. However, the critical care nurse drew on her experiential knowledge to compile a pattern of cues and their relevant application specific to the ventilated patient which were driven for the most part by the ventilated patient’s vulnerable haemodynamic status.

Finally there was one physiological cue ‘increased respiratory rate’ that occurred across the majority of cases during the resting period (see Table 5.25) to which the critical care nurse gave a valuable explanation for the utilisation of this first-order cue as a pain cue in the context of the ventilated patient in pain five hours post cardiac surgery. The point to be made here is that the same finding was suggested during the earlier repositioning pain incident (see Table 5.25) with a less expanded version, which gives credence to the critical care nurses’ utilisation and interpretation of this ambiguous physiological cue during both time frames, which was discussed in-depth in previous sections. In both pain incidents the same number of intermediate judgements were utilised as second-order cues in the formulation of ‘(s)he is in acute pain’. Therefore, the two-tier inference process is similar for all the critical care nurses concerning the above final judgement. There was consistency with regard to the second-order cues. The dissimilarity lies, not in the cue categories, but within each cue category in the initial phase of the judgement process. An explanation for this finding may be identified within the critical care nurse or the ventilated patient who must make accessible the first-order cues. Moreover, in the absence of such detail the critical care nurse must be creative in locating these subtle cues. However, this process happens in an uncertain, fragile and unpredictable surgical trajectory in the real world of the ventilated patient and the critical care nurse. The following section presents the findings pertinent to the pain behaviours exhibited by the same thirty ventilated patients observed by the researcher in the field.

5.3 SECTION THREE: PATIENT PAIN BEHAVIOURS

5.3.1 INTRODUCTION

This subsection presents the findings concerning the pain behaviours exhibited by thirty ventilated patients within one hour and five hours post cardiac surgery. The initial pain incident developed as the ventilated patients were turned following a routine chest x-ray. Subsequently, another set of findings will be reported which evolved five hours later as the ventilated patient was at rest. Finally, a comparison between both pain incidents, i.e. repositioning versus rest in
**TABLE 5.25: Comparison First Order Cue Utilisation Across Intermediate Judgements (Second Order Cues) ‘Two Pain Incidents’**

<table>
<thead>
<tr>
<th>Cue Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physiological Cues</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Physical</td>
<td>Increased MAP</td>
<td>8 [*4]</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Decreased MAP</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Increased heart rate</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Increased respiratory rate</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>MAP response to analgesia</td>
<td>Change respiratory pattern</td>
<td></td>
</tr>
<tr>
<td># Physical</td>
<td>Fentanyl 1 mg OT</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>No spinal morphine OT</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>CAbG by 4 with LMA</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Support requirements</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Big lady 81kg</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Airway pressure high 40cm</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>No movement</td>
<td>Restlessness</td>
<td>5</td>
</tr>
<tr>
<td># Physical</td>
<td>Chewing ET Tube</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Moving hands under covers</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Trying to talk via ET Tube</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Moving tongue either side of ET Tube</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Moving hands a bit</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Trying to self-extubate</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Coughing on ET Tube</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Eyelid closed</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Pulling chest drains</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Moving hands and right leg</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Coughing on ET Tube</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Startled look in eyes</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Covert Behaviour Cues</td>
<td>Looks uncomfortable</td>
<td>2</td>
</tr>
<tr>
<td># Physical</td>
<td>Looks distressed</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Looks worried</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Apprehensive</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Pain Descriptor Cues</td>
<td>Patient self-report pain</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>ET Tube uncomfortable</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Pain location (chest)</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Pain intensity</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Mouth sore</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Throat sore</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Pain pattern</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Pain leg</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Pain location (chest drains)</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Sore moves bed</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Previous pain medicine</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td># Physical</td>
<td>Position in bed uncomfortable</td>
<td>1</td>
<td>8</td>
</tr>
</tbody>
</table>

**PAIN INCIDENT: TURNED CHEST X-RAY (WITHIN ONE HOUR POST-OPERATIVE) INTERMEDIATE JUDGEMENT: ‘HE IS SORSE’**

**PAIN INCIDENT: REST (FIVE HOURS POST-OPERATIVE) INTERMEDIATE JUDGEMENT: ‘HE IS SORSE’**
<table>
<thead>
<tr>
<th>Cue Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
<th>Cue Category</th>
<th>First Order Cue</th>
<th>Number of Critical Care Nurses Used the First Order Cue</th>
<th>Number of Potential Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PAIN INCIDENT: TURNED CHEST X-RAY (WITHIN ONE HOUR POST-OPERATIVE)</strong></td>
<td><strong>INTERMEDIATE JUDGEMENT: ‘(5)HE IS SORE’</strong></td>
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</tr>
<tr>
<td>≈ Physical Cue</td>
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<td>8</td>
<td>≈ Physical Cue</td>
<td>Pressure areas red</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Sore old injury</td>
<td></td>
<td></td>
<td></td>
<td>Sore old injury</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Overt Motor Pain Behaviour Cue</td>
<td>Grimace</td>
<td>4</td>
<td>8</td>
<td>Overt Motor Pain Behaviour Cue</td>
<td>Grimace</td>
<td>12</td>
<td>24</td>
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<tr>
<td></td>
<td>Guarded movement</td>
<td>5</td>
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<td></td>
<td>Guarded movement</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>No grimace</td>
<td></td>
<td></td>
<td></td>
<td>No grimace</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pointing to chest</td>
<td></td>
<td></td>
<td></td>
<td>Pointing to chest</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pointing to chest drains</td>
<td></td>
<td></td>
<td></td>
<td>Pointing to chest drains</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pointing to ET tube</td>
<td></td>
<td></td>
<td></td>
<td>Pointing to ET tube</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pointing to mouth</td>
<td></td>
<td></td>
<td></td>
<td>Pointing to mouth</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>▲ Knowledge Cue</td>
<td>Knowing the patient</td>
<td>8</td>
<td></td>
<td>▲ Knowledge Cue</td>
<td>Knowing the patient</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td><strong>PAIN INCIDENT: REST (FIVE HOURS POST-OPERATIVE)</strong></td>
<td><strong>INTERMEDIATE JUDGEMENT: ‘(5)HE IS SORE’</strong></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
the context of the ventilated patient's pain behaviours in the immediate phase post cardiac surgery, are discussed.

5.3.2 Pain Incident: Turned Post Chest X-ray

Critically ill ventilated patients (n=30) post cardiac surgery exhibited three physiological cues during repositioning within one hour post routine chest x-ray. The most prevalent physiological cue displayed was 'increased heart rate' (twenty-four cases) along with 'increased MAP' (nineteen cases) and 'increased respiratory rate' (nine cases), which are displayed on Table 5.1. According to Crews (2000) pain and systemic responses to tissue injury produce a hyperdynamic cardiovascular state characterised by increased heart rate, mean arterial blood pressure and myocardial contractility. It is important to note that all patients in this study were in receipt of inotropic and vasodilator support at that particular time and core temperatures ranged between 35.0°C and 35.4°C, while peripheral recordings were 25.0°C to 27°C, which could potentially impact on the above physiological parameters. However, some mean arterial blood pressure (MAP) readings increased promptly to between 95 and 100 during the turn (see Table 4.3a), a marked change from baseline recordings and to which the researcher overheard the critical care nurse at the bedside refer to as 'sudden jump' which was also evident in the think aloud data. The alteration in blood pressure and increase in heart rate is consistent with the literature where changes were found during nociceptive procedures such as turning critically ill ventilated patients post major surgery (Payen et al. 2001, Puntillo et al. 2001, Young et al. 2006). In addition, Aissaoui et al. (2005) with a cohort of medical critically ill ventilated patients found that heart rate and blood pressure increased significantly during nociceptive procedures with an increase for heart rate measuring 10%. Moreover, the most frequent physiological indicators of pain in the critically ill patient were blood pressure and heart rate (Puntiolo et al. 1997).

Meanwhile, a decrease in MAP readings was also evident in seven ventilated patients who were labile intra-operatively and presented a similar picture for some time post-operatively. Another physiological cue 'increased respiratory rate' was evident in nine cases, along with one behavioural general cue 'restlessness'. In eight of those cases (see Table 5.1) one 'patient ventilator dysynchrony' cue, i.e. 'chewing on ETTube', was also apparent while 'distress on the ventilator' was exhibited in four cases. Studies have shown that critically ill ventilated patients respond to a nociceptive stimulus with a change in compliance (cough, fight) with the ventilator (Payen et al. 2001, Aissaoui et al. 2005, Young et al. 2006). Moreover, procedural pain in critically ill patients was found to be not only painful but also distressful (Puntiolo et al. 2001). In this study, four of the thirty ventilated patients were non compliant with the ventilator which is consistent with the findings from the critical care nurses' think aloud data. Therefore, 'chewing on the ETTube' was noticeable by the researcher at the same time that an increase in 'respiratory rate' was evident as the ventilated patient was repositioned along with restlessness. Despite evidence of anxiety in each of those cases, six ventilated patients confirmed the presence of pain subsequent to the critical care nurse probing about their current pain state. Therefore, an increase in respiratory rate happened as the ventilated patient was 'chewing on ETTube' and attempting to respond verbally to the critical care nurse regarding their pain state. In addition,
PATIENT PAIN BEHAVIOUR CUES

The patient returned from theatre at 12 noon hours following coronary artery grafts by four (inclusive left internal mammary artery). This 'pain incident' commenced at 12.35 hours while the ventilated patient was being repositioned subsequent to a routine chest x-ray. The following pain cues were recorded:

<table>
<thead>
<tr>
<th>Table 4.3a</th>
<th>Case Three: Pain Incident</th>
<th>Repositioning Post Chest X-Ray</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cue</strong></td>
<td><strong>Context (Vasodilators / Inotropes)</strong></td>
<td><strong>Category</strong></td>
</tr>
<tr>
<td>Mean arterial blood pressure (MAP)</td>
<td>Nipride 5 Nitroglycerin 15</td>
<td>Physiological</td>
</tr>
<tr>
<td>Heart Rate</td>
<td>Physiological</td>
<td>90</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td>Physiological</td>
<td>10</td>
</tr>
<tr>
<td>Grimace</td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
</tr>
<tr>
<td>Guarded movement</td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
</tr>
<tr>
<td>Restlessness</td>
<td>Behavioural General Cue</td>
<td></td>
</tr>
<tr>
<td>Chewing in ET Tube</td>
<td>Patient Ventilator Dysynchrony</td>
<td></td>
</tr>
<tr>
<td>Distress on the ventilator</td>
<td>Patient Ventilator Dysynchrony</td>
<td></td>
</tr>
<tr>
<td>Patient self-report pain</td>
<td>Verbal Subjective Pain Behaviour Cue</td>
<td></td>
</tr>
</tbody>
</table>
### Table 5.1

**Table 5.1: Case One to Thirty**

*Researcher Observation Data - Patient Pain Behaviour Cues*

<table>
<thead>
<tr>
<th>Cue Category</th>
<th>Cue</th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
<th>Case 4</th>
<th>Case 5</th>
<th>Case 6</th>
<th>Case 7</th>
<th>Case 8</th>
<th>Case 9</th>
<th>Case 10</th>
<th>Case 11</th>
<th>Case 12</th>
<th>Case 13</th>
<th>Case 14</th>
<th>Case 15</th>
<th>Case 16</th>
<th>Case 17</th>
<th>Case 18</th>
<th>Case 19</th>
<th>Case 20</th>
<th>Case 21</th>
<th>Case 22</th>
<th>Case 23</th>
<th>Case 24</th>
<th>Case 25</th>
<th>Case 26</th>
<th>Case 27</th>
<th>Case 28</th>
<th>Case 29</th>
<th>Case 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiological</td>
<td>Increased Heart Rate</td>
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<td>✓</td>
<td>✓</td>
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the same six ventilated patients were also very anxious which could have influenced their respiratory rate as they exhibited restlessness. Studies have indicated that changes occurred in vital signs which included respiratory rate (Odhner et al. 2003; Puntillo et al. 1997) in critically ill patient ventilated or recently ventilated patients in pain post major surgery or burns. However, the difference in this study is that ‘increased respiratory rate’ as a potential physiological pain cue was also captured by the critical care nurses in the same cases and placed in context which suggested many reasons for the alteration in respiratory rate during repositioning of the ventilated patient in pain post cardiac surgery.

In addition, two overt motor pain behaviours cues ‘grimace’ and ‘guarded movement’ were noticeable across seventeen and eighteen ventilated patients respectively (see Table 5.1). Furthermore, the use of facial expression as a pain indicator in critically ill ventilated patients post major surgery associated with nociceptive procedures such as repositioning is supported in the literature (Payen et al. 2001, Young et al. 2006) and suctioning (Aissaoui et al. 2005). In other study populations motor pain behaviours such as ‘guarded movement’ and ‘grimace’ are reported as observable actions that communicate the fact that pain is being experienced (Keefe et al. 1984, McDaniel et al. 1986, Sanders et al. 2001).

Furthermore, one supplementary behavioural general cue was noticeable, namely ‘immobile posture’ across eighteen out of thirty cases. It is interesting that fifteen ventilated patients who exhibited no movement did not exhibit a verbal subjective pain behaviour cue ‘self-report of pain’ despite the critical care nurses’ best efforts to ascertain their current pain status. There were nineteen ventilated patients out of thirty who were unresponsive to the critical care nurses’ probing regarding their current pain state. The omission of a verbal subjective pain report ‘self-report of pain’ not afforded proactively on the part of the ventilated patient could be explained by the presence of the endotracheal tube or level of wakefulness within one hour post or in some instances thirty minutes post cardiac surgery. These nineteen ventilated patients were judged to be asleep by the critical care nurses.

Meanwhile, the verbal subjective pain behaviour cue ‘patient self-report pain’ was exhibited by eight ventilated patients in response to questioning by the critical care nurse (see Table 5.1). It is interesting that eight of the ventilated patients who exhibited both overt motor pain behaviour cues ‘grimace’ and ‘guarded movement’ provided an additional verbal subjective pain behaviour cue ‘patient self-report pain’ in response to the critical care nurse’s questioning regarding their current pain state. Moreover, Puntillo (1994) found that critically ill intubated patients are able to communicate wide-ranging information about procedural pain. Besides, Closs et al. (2005) found that patients with low levels of cognitive impairment proactively offered information about their pain while others only reported pain reactively in response to an inquiry from a carer, concluding that carers need to initiate regular pain assessment. Moreover, studies have confirmed that a significant increase in pain was associated with the activity of turning patients post cardiac surgery (Puntillo 1990, Watt-Watson et al. 2004, Yorke et al. 2004).
Conversely, another eight of the ventilated patients who exhibited both 'grimace' and 'guarded movement' (see Table 5.1) along with marked changes in their physiological parameters were unable to provide responses subsequent to the critical care nurse's probing regarding their present pain (see Table 4.12a). Nonetheless, no pain report was sought in three cases where either one (case 10) or both overt-motor pain behaviours (case 26) were evident (see Table 5.1), while in case five all physiological parameters were normal and 'immobile posture' was apparent. The researcher observed the patient's pain behaviours which were matched with the critical care nurse's verbalisations of the patient's cues within the judgement process in this pain incident. Therefore, an explanation for the omission of a verbal subjective pain behaviour cue could be located in the following scenario where the critical care nurses provide a rationale for not seeking a pain descriptor cue, i.e. 'patient self-report pain':

46 S/10 E: "...her MAP is 83 just borderline just above the baseline 70 to 80...but she is asleep and tolerating the ventilator...MAP is controlled with GTN.
68 S/10 E: She is not moving in the bed, still under anaesthesia...comfortable at present...not sore I would say.
74 S/10 E: Heart rate is 80 regular sinus rhythm, so not uncomfortable then...and anyway there's no response when we turned her, no grimace, no response facial expression...
103 S/10 E: S, you are doing really well...no response when I am talking to her...so I will not disturb her because to me she is not in pain at present but she will be...".

97 S/26 R: "...he is sound asleep...no movement...looks comfortable since we turned him...MAP bit up but also on adrenaline...I will see will it settle...but sound asleep...so not in pain at present...".

The above think aloud data when matched with the pain behaviour cues observed by the researcher confirmed that one overt motor pain behaviour cue 'guarded movement' was not articulated by both of the above critical care nurses while 'grimace' was not noted in case twenty-six think aloud data. There could be several explanations for these omissions. One explanation could be that the overt motor pain behaviour cues were seen but not verbalised. On the other hand the pain cues may have gone unnoticed during repositioning when a ventilated patient is so labile which was actual reality in these incidents. According to Prkachin (1992) there are individual differences in the extent to which facial display will be present during painful events and it is possible for some individuals to endure painful events impassively. In addition, the absence of pain-related behaviours does not necessarily imply an absence of pain (Ferrell et al. 1991). In contrast, a similar rationale was put forward in this instance which gives a sense of the reasoning behind the exclusion of a verbal subjective pain-report:

91 S/5 D: "...there is no significant evidence of him waking up yet...pupils are constricted and reacting to light, so heavily sedated and very comfortable...normotensive and his heart rate is normal.
119 S/5 D: He is not moving either, no movement there which means he is sedated, asleep and not uncomfortable, so I won't disturb him...just let him sleep because he will be in pain shortly but not at the moment...".

The assumption that the behavioural general cue 'no movement' indicates no pain is not consistent with the interpretations put forward by the majority of critical care nurses in this study or with the pain literature. Puntillo et al. (1997) found that intensive care nurses frequently selected 'no movement' as an indicator of pain in critically ill patients post major surgery. The complimentary role of observing pain behaviours and matching this detail with the think aloud
PATIENT PAIN BEHAVIOUR CUES

The patient returned from theatre at 12.45 hours following coronary artery grafts by four (inclusive left internal mammary artery). This 'pain incident' commenced at 13.10 hours while the ventilated patient was being repositioned subsequent to a routine chest x-ray. The following pain cues were recorded:

<table>
<thead>
<tr>
<th>Cue</th>
<th>Context (Vasodilators / Inotropes)</th>
<th>Category</th>
<th>Prior to Pain Incident</th>
<th>Baseline Parameters</th>
<th>Current Parameters</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean arterial blood pressure (MAP)</td>
<td>Nitroglucrin 10</td>
<td>Physiological</td>
<td>70</td>
<td>70-80</td>
<td>90</td>
<td>Increased MAP</td>
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<tr>
<td>Heart Rate</td>
<td></td>
<td>Physiological</td>
<td>88</td>
<td>68</td>
<td>105</td>
<td>Increased heart rate</td>
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<tr>
<td>Respiratory Rate</td>
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<td>Physiological</td>
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<td>10</td>
<td>14</td>
<td>Increased respiratory rate</td>
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<tr>
<td>Grimace</td>
<td>Overt Motor Pain Behaviour Cue</td>
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<td>Change</td>
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<tr>
<td>Guarded movement</td>
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<td>Change</td>
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<tr>
<td>Restlessness</td>
<td>Behavioural General Cue</td>
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<td>Moving her head vigorously from side to side; moving both hands continuously post-turn.</td>
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<tr>
<td>Distress on the ventilator</td>
<td>Patient Ventilator Dysynchrony</td>
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<td>Change (fighting the ventilator)</td>
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<td>Chewing in ET Tube</td>
<td>Patient Ventilator Dysynchrony</td>
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<td>Change</td>
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<td>Patient self-report pain</td>
<td>Verbal Subjective Pain Behaviour Cue</td>
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<td></td>
<td>No response to questions about pain by critical care nurse: are you in pain?; are you uncomfortable?; are you sore?</td>
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</table>
data was seen as helpful during data analysis, which is exemplified in the following think aloud extracts:

88 S/9 IB: "...and when we turned him he wasn't grimacing but saying that..."

During fieldwork the researcher observed and recorded at the identical time the overt motor pain behaviour cue ‘grimace’ which was helpful during interpretation of the data and representing the reality of the constructors. Another indirect verbalisation is evident in the following think aloud extract in which one overt motor pain behaviour cue ‘guarded movement’ was recorded by the researcher but not verbalised overtly by the critical care nurse in case thirteen:

94 S/13 P: "...It is difficult to assess her as there is no response to my verbal commands
95 S/13 P: I am going with her physical signs, there was a grimace when she was being turned, plus she didn't like the turn...”.

It could be interpreted from ‘plus she did not like the turn’ that ‘guarded movement’ could have been the additional physical sign. The researcher assisted with the repositioning of this ventilated patient and ‘guarded movement’ was apparent as the critical care nurse utilised the terminology ‘she did not like the turn’. In addition, another overt motor pain behaviour cue ‘grimace’ recorded by the researcher was absent in the corresponding verbal protocol. Furthermore, one behaviour general cue ‘chewing on ETTube’ was observed by the researcher in this pain incident but was not evident in the think aloud data. The explanation for these omissions in the verbal protocols could be that the critical care nurse noticed the aforesaid cues but failed to articulate the cues. Conversely, the critical care nurse may not have been aware of the abovementioned cues, hence the omission in the think aloud data. However, another explanation could be forwarded which highlights how the centrality of haemodynamic instability coinciding with an anxious state becomes the focus that could indirectly influence the verbalisation of think aloud data:

72 S/27 S: "...she looks uncomfortable, L, are you uncomfortable, you are, okay, I will get you sorted
86 S/27 S: L, are you sore, not really sure there if she is nodding her head, are you in pain, you are, I think she nodded there but she is so hassled it is hard to say for sure
87 S/27 S: I am a bit perplexed myself here as there is a great deal going on with her as she is so sick and I don't know if she nodded there or not because she is agitated and not really awake...”.

The matching of cues between the researcher-observer pain cues and the pain cues articulated by the critical care nurse revealed an overt motor pain behaviour cue ‘grimace’ as the critical care nurse was seen watching the ventilated patient’s face and remarking ‘she looks uncomfortable’. However, it can only be assumed that this is the case as clarification of the critical care nurses’ intentions were not sought by the researcher. The following subsection presents the findings in relation to the ventilated patient’s pain behaviours during the resting period five hours post surgery.

5.3.3 Pain Incident: Rest

The ventilated patients in this pain incident during a resting period conveyed a pattern of pain cues to the critical care nurses. All patients were warm centrally and peripherally and on minimal vasodilator or inotropic support which was being weaned at that point in time. The successful rewarming of the ventilated patient over five hours post cardiac surgery can mean that
vasodilatation is occurring simultaneous with a progressive stable haemodynamic status. This could explain the reduction in cases with ‘increased mean arterial blood pressure’ apart from the fact that the ventilated patient was at rest. Conversely, ‘decreased MAP’ was apparent in twelve cases. One interesting finding was that the physiological cue ‘increased respiratory rate’ was evident across all cases, which is illustrated in Table 5.2. At this particular time in the majority of cases the ventilated patient was attempting to communicate their pain state in response to the critical care nurses’ probing to secure this detail. There were six ventilated patients whose increase in respiratory rate set the pain incident in motion. This detail was matched with the critical care nurses’ think aloud data and found to be consistent. While triangulating these datasets, an explanation was afforded by the critical care nurses for this increase in respiratory rate at this particular time, i.e. ready for weaning, awake and a process by which ventilated patients communicated their pain. Furthermore, the majority of the ventilated patients confirmed that the source of some discomfort was the endotracheal tube. This finding is consistent with Grap et al. (2002) who reported that endotracheal tube (ETT) irritation in patients post CABG surgery occurs at multiple levels, i.e. pharyngeal, laryngeal and tracheal mucosal areas, with patients using word descriptors such as uncomfortable and sore throat. Moreover, in this study the discomfort of the endotracheal tube (ETT) also seemed to cause some anxiety and influenced the ability of six patients to cope with the ventilator (see Table 5.2). These patients were noted to be restless, observed chewing on the ETTube and were visibly distressed on the ventilator. In addition, three ventilated patients sought the attention of the critical care nurse by tapping their hands off the bedclothes.

During the observation period it was evident that the ventilated patients expended a lot of energy trying to provide a verbal subjective pain behaviour cue ‘self-report pain’ in response to the critical care nurses’ questioning about current pain state. Furthermore, twenty-five patients who were intubated and ventilated were able to communicate their pain state to the critical care nurse and provide a verbal subjective pain behaviour cue, i.e. ‘patient self-report pain’. This finding is interesting in light of the literature which suggests that communication may be inhibited by endotracheal tubes, medications and altered levels of consciousness (Hamill-Ruth & Marohn 1999, Kwekkeboom & Herr 2001) and self-reports of pain are difficult to ascertain in the ventilated patient which are omitted on current Behavioural Pain Scales (Payen et al. 2001, Aissaoui et al. 2005, Young et al. 2006). According to Turk & Flor (1987) self-reports are pain behaviours. In addition, motor pain behaviours also described as non-verbal indices of pain (Keefe et al. 1984) such as guarded movement, body posturing, facial grimacing and rubbing the painful area are observable actions that communicate the fact that pain is being experienced (Keefe et al. 1985, Sanders et al. 2001). In this study, ‘pointing to the painful site’ on the part of the ventilated patient provided additional fundamental data on pain location sites, i.e. endotracheal tube, chest incision, chest drain site, mouth and throat discomfort, which confirms Fagerhaugh & Strauss (1977) findings that a variety of discomforts post surgery can be anticipated such as dry mouths and irritations from tubes placed in various body orifices.

The communication process employed by the ventilated patients was via the following routes: forming the word ‘yes’ and or squeezing the critical care nurses’ hand and or nodding
Table 5.2: Pain Incident

| Cue Category          | Case 1 | Case 2 | Case 3 | Case 4 | Case 5 | Case 6 | Case 7 | Case 8 | Case 9 | Case 10 | Case 11 | Case 12 | Case 13 | Case 14 | Case 15 | Case 16 | Case 17 | Case 18 | Case 19 | Case 20 | Case 21 | Case 22 | Case 23 | Case 24 | Case 25 | Case 26 | Case 27 | Case 28 | Case 29 | Case 30 |
|-----------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Physiological         |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Increased Heart Rate  | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      |
| Decreased Heart Rate  |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Normal Heart Rate     | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      |
| Physiological (MAP)   |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Increased MAP         | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      |
| Decreased MAP         |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Normal MAP            | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      |
| Physiological         |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Increased Respiratory Rate | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| Decreased Respiratory Rate |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Normal Respiratory Rate |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Overt Motor Pain      |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Pain Behaviour Cue    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Grimace               | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      |
| Guarded Movement      |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Pointing to Painful Area |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Behavioural General   |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Cue                   |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Restlessness          | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      |
| Attention-Seeking Behaviour |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Immobile Posture      |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Teering               |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Patient Ventilator    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Dysynchrony           |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Chewing on ET Tube    | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      |
| Distress on the Ventilator |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Subjective Pain       |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Behaviour Cue         |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Patient Self-Report    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Pain (Responses to    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Questions about Pain) |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
their head (yes) or shaking their head (no) in two cases, which was facilitated by the critical care nurses in question. This finding is consistent with Puntillo (1994) who found that intubated patients were able to provide much detail on their pain state with the aid of pain assessment tools. The difference in this study is that the researcher was able to confirm the process that located the verbal subjective pain cue which was reactively provided by the ventilated patient subsequent to a proactive approach undertaken by the majority of critical care nurses without the aid of pain assessment tools. However, at times the ventilated patient provided conflicting reports (see Table 4.19b) regarding their pain state to which the critical care nurse in question was seen to persist with her questioning which revealed a different outcome. This process was carefully articulated by the critical care nurse which is evident in the following think aloud extracts:

391 S/19 MR: "...F, have you any pain, no pain, that's great, he is able to tell me because he is awake that he has no pain but I am not convinced here...I feel he has pain but we will see...he is exploring the ET Tube...wondering what it is doing there...respirations 20...so he is awake and trying to communicate that..."

392 S/19 MR: F, are you sore, you are...have you pain, no pain...so he denies pain but he is sore...so word is sore and not pain...just goes to show...need to persist...find the word he uses..."

In this instance, the skilful use of questioning by the critical care nurse was observed by the researcher which bypassed the conflicting cues exhibited by the ventilated patient and located their pain terminology. Likewise, terms used by the older patient may be 'sore' rather than 'pain' (Closs & Briggs 2002). In another instance, a ventilated patient indicated to the critical care nurse that she had no pain (see Table 4.29b). However, the critical care nurse persisted which again highlights the conflicting messages ventilated patients may exhibit five hours post cardiac surgery pertinent to their pain state:

505 S/29 SB: "...O, have you any pain, no, you are doing great, have you any pain, you have no pain, I will check again...

529 S/29 SB: O, have you any pain, no pain, are you sure, she looks to me to be uncomfortable, vitalis normal...

530 S/29 SB: O, hold on until I get a hold of your hand, have you any pain, oh, you have pain, okay she has pain...takes effort to find out about her pain..."

This finding is noteworthy as evidence in the literature suggested that nurses missed pain cues when cues were ambiguous such as postoperative patients indicating they were not in pain but sore (Manias et al. 2005). Meanwhile, eighteen ventilated patients exhibited an overt motor pain behaviour cue 'grimace' on movement as they shifted their position in bed. Facial expression has been found to be a valid index of pain in critically ill patients (Payen et al. 2001, Aissaoui et al. 2005, Young et al. 2006). During data triangulation it was apparent that although seventeen of the eighteen critical care nurses articulated 'grimace' as a pain cue, it was not evident if this overt motor pain behaviour cue was noted during movement or at rest. Nonetheless, the researcher recorded that on all occasions 'grimace' was exhibited as the ventilated patient was attempting to shift their position in the bed, as if they were trying to find a comfortable situation. The literature recommends that facial expression 'grimace' offers a promising adjunct to self-report measures of pain (Craig & Prkachin 1983), in particular the affective state (distress) of the pain patient (Beecher 1959).
**PATIENT PAIN BEHAVIOUR CUES**

This 'pain incident' commenced at 18.50 hours while the ventilated patient who was back from theatre approximately five hours was at rest. The following pain cues were recorded:

<table>
<thead>
<tr>
<th>Table 4.19B</th>
<th>CASE NINETEEN: PAIN INCIDENT</th>
<th>REST</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cue</strong></td>
<td><strong>Context</strong> (Vasodilators / Inotropes)</td>
<td><strong>Category</strong></td>
</tr>
<tr>
<td>Mean arterial blood pressure (MAP)</td>
<td>Nitroglycerin 3</td>
<td>Physiological</td>
</tr>
<tr>
<td>Heart Rate</td>
<td></td>
<td>Physiological</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td></td>
<td>Physiological</td>
</tr>
<tr>
<td>Grimace</td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
</tr>
<tr>
<td>Patient self-report pain</td>
<td>Verbal Subjective Pain Behaviour Cue</td>
<td></td>
</tr>
</tbody>
</table>
This 'pain incident' commenced at 18.45 hours while the ventilated patient who was back from theatre approximately five hours was at rest. The following pain cues were recorded:

**TABLE 4.29B  CASE TWENTY-NINE: PAIN INCIDENT**

<table>
<thead>
<tr>
<th>Cue</th>
<th>Context (Vasodilators / Inotropes)</th>
<th>Category</th>
<th>Prior to Pain Incident</th>
<th>Baseline Parameters</th>
<th>Current Parameters</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean arterial blood pressure (MAP)</td>
<td>Nitroglycerin 0.5</td>
<td>Physiological</td>
<td>65</td>
<td>70 - 80</td>
<td>68</td>
<td>Slight change upwards in MAP</td>
</tr>
<tr>
<td>Heart Rate</td>
<td></td>
<td>Physiological</td>
<td>80</td>
<td>70</td>
<td>88</td>
<td>No change in heart rate</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td></td>
<td>Physiological</td>
<td>15</td>
<td>10</td>
<td>19</td>
<td>Increased respiratory rate</td>
</tr>
<tr>
<td>Grimace</td>
<td></td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Patient self-report pain</td>
<td></td>
<td>Verbal Subjective Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td>Shakes her head (no) to the critical care nurse’s initial question about pain: have you any pain? Nods her head (yes) and squeezes the critical care nurses hand in response to questions about pain later: is the tube uncomfortable?; have you pain?; is your chest sore?; is the pain very severe?</td>
</tr>
</tbody>
</table>
On the other hand, six patients showed no signs of movement, conveyed no change in facial expression, yet four provided a ‘self-report of pain’ to the critical care nurse. According to Prkachin & Craig (1995) clinicians tend to underrate pain based on facial expression and need to be aware of this bias when important choices are being made upon their evaluation of another’s suffering. In this study each patient has their own unique way of communicating pain during a resting period, thirteen of the ventilated patients identified the location of their pain (see Table 5.2) spontaneously with the critical care nurse subsequent to providing a ‘self-report pain’ which was facilitated by the critical care nurses (see Tables 4.4b). The breakdown of this process revealed that seven ventilated patients pointed to their chest incision, five pointed to the chest drain sites and another seven pointed to the ETTube which seemed to cause some discomfort in these instances. Consequently, the critical care nurse on each of these occasions spent time with the ventilated patient ascertaining the exact location of pain. Therefore, it seems in some instances the ventilated patient was able to give a spontaneous account of their pain location. Therefore, much information about pain in the immediate phase post cardiac surgery can be revealed by the ventilated patient through their own individual pain cues. There was no ventilated patient across the twenty-seven cases that conveyed a similar pattern of pain cues during this resting period five hours post cardiac surgery. This finding is important as the location of the ventilated patient’s pain evolved from the verbal subjective pain cue ‘patient self-report pain’ which was established by the critical care nurse. Moreover, the endotracheal tube did not present a barrier to these ventilated patients in communicating their pain state. There could be several explanations for this finding in that all patients were awake, warm and beginning to progress haemodynamically. Furthermore, the skilful persistence of the critical care nurse in locating pain cues with the ventilated patient could have contributed to this finding. More importantly, the ventilated patient’s own knowledge in relation to his/her own pain could have helped the process.

However, some of the pain cues were not articulated overtly by the critical care nurse which surfaced during data-set matching of think aloud extracts and researcher-observer pain cues. The following abstracts confirm this detail where non-verbal behaviour of the ventilated patients was invisible in some instances in the think aloud data and was simultaneously revealed in the researcher-observer data:

401 S/16 K: “… Have you pain, yes or no, okay
  [Patient nods his head (yes) in response]
403 S/16 K: Is it in your chest where the surgery is, yes
  [Patient nods his head (yes) in response]
403 S/16 K: Have you discomfort there at the drain sites [Patient nods his head (yes) in response]
  are you sore where I touch you there at the drains, okay [Patient nods his head (yes) in response]
404 S/16 K: Have you pain anywhere else [Patient shakes his head (no) in response]
  have you any leg pain, okay [Patient nods his head (yes) in response]…”.

Meanwhile, the verbal subjective pain behaviour cue ‘patient self-report pain’ was not sought by the critical care nurse or provided spontaneously by two patients. During data-set linking, additional detail was located which could explain why in only two of the twenty-seven cases a ‘patient self-report pain’ was not sought which was highlighted in the field notes. The
PATIENT PAIN BEHAVIOUR CUES

This 'pain incident' commenced at 18.00 hours while the ventilated patient who was back from theatre approximately five hours was at rest. The following pain cues were recorded:

<table>
<thead>
<tr>
<th>Cue</th>
<th>Context (Vasodilators / Inotropes)</th>
<th>Category</th>
<th>Prior to Pain Incident</th>
<th>Baseline Parameters</th>
<th>Current Parameters</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean arterial blood pressure (MAP)</td>
<td>Nitroglycerin 5</td>
<td>Physiological</td>
<td>57</td>
<td>70-80</td>
<td>86</td>
<td>Increased MAP</td>
</tr>
<tr>
<td>Heart Rate</td>
<td></td>
<td>Physiological</td>
<td>80</td>
<td>70</td>
<td>95</td>
<td>Increased heart rate, change in heart rate</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td></td>
<td>Physiological</td>
<td>14</td>
<td>10</td>
<td>20</td>
<td>Increased respiratory rate</td>
</tr>
<tr>
<td>Grimace</td>
<td></td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Attention-seeking Behaviour</td>
<td></td>
<td>Behavioural General Cue</td>
<td></td>
<td></td>
<td></td>
<td>Tapping bed with hands under the covers</td>
</tr>
<tr>
<td>Patient self-report pain</td>
<td></td>
<td>Verbal Subjective Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td>Nods his head (yes) in response to questions by the critical care nurse: are you sore?; is the pain severe (still sore)?; shakes his head (no) has the pain eased?; when you shift your position in bed are you in pain?</td>
</tr>
<tr>
<td>Pointing to mouth area</td>
<td></td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td>Nods his head (yes) in response to questions by the critical care nurse: is your throat sore?; is your mouth sore?</td>
</tr>
<tr>
<td>Pointing to chest drains</td>
<td></td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td>He is moving his right hand towards his abdomen: nods his head (yes) in response to the critical care nurse's question: are you sore at the chest drains?</td>
</tr>
<tr>
<td>Pointing to chest</td>
<td></td>
<td>Overt Motor Pain Behaviour Cue</td>
<td></td>
<td></td>
<td></td>
<td>He is moving his right hand towards centre chest: nods his head (yes) in response to the critical care nurse's question: are you pointing there, so you are sore there at the chest wound?</td>
</tr>
</tbody>
</table>
following think aloud extracts gives a sense of why a verbal subjective pain behaviour cue ‘patient self-report pain’ was not observed by the researcher:

546 S/7 AL: “...plus she is no longer frightened or anxious which is good, and her vitals are normal now
548 S/7 AL: But I will not disturb her, I want her to sleep
549 S/7 AL: She is comfortable at the moment but I will give her pain control
550: S/7 AL: I will be constantly be watching her because she is at risk of becoming sore...”.

418 S/3 J: “…I know the patient, I know his trend over the last hours, haemodynamics are stable, compliant on ventilator now, no movement because I know him indicates he is comfortable, not sore, warm and cozy, no longer shivery, not nervous, know by him...so I will not disturb him...”.

During the observation period both cases above were very restless and agitated for the previous four hours which may have influenced the above outcome. In both cases analgesia was given as a preventative measure in anticipation of background post-operative pain which was articulated in the think aloud data transcripts. The next subsection compares the findings concerning the ventilated patients during repositioning (N=30) and during rest (n=27).

5.3.4 Comparison Pain Behaviours Across Both Pain Incidents: Turned Post Chest X-ray Versus Rest

The pattern of pain behaviours exhibited by all thirty patients across both pain incidents are illustrated in Figure 5.37. There are some notable differences between repositioning within one hour and resting five hours post cardiac surgery. One notable difference can be located across physiological cues in particular ‘increased MAP’ and ‘increased heart rate’ during repositioning, which is consistent with the literature (Puntillo et al. 1997, Payen et al. 2001, Assaoui et al. 2005). The parameters of ‘increased heart rate’ during repositioning ranged between 100-117 bpm in twenty-four of the thirty cases compared to rates of between 90-98 bpm in sixteen cases at rest. The tentative explanation for these findings could be related to repositioning, inotropic support infusing, core and peripheral temperature readings, pain, level of wakefulness and anxiety states. A similar explanation could be afforded for the significant difference in the number of ventilated patients who showed signs of increased mean arterial blood pressure (see Figure 5.37). These findings pertinent to alterations in heart rate and mean arterial blood pressure during painful procedures is consistent with studies utilising a Behavioural Pain Scale with critically ill ventilated medical (Aissaoui et al. 2005) and surgical (Payen et al. 2001) patients. Similar findings were reported by Odhner et al. (2003) with a non-verbal pain scale (NVPS). In contrast, the alterations in the numbers of physiological cues and parameters, i.e. ‘increased respiratory rate’ and ‘decreased MAP’ were more noticeable five hours later during the resting period. One explanation for the ‘decreased MAP’ and ‘increased respiratory rate’ was evident in the improved haemodynamic parameters over the five hours post cardiac surgery. During matching of the data-sets it became evident that in the case of ‘decreased MAP’ a value qualifier was applied by the critical care nurse which identified a ‘steady dip’ / ‘no big dips’ ruling out anxiety as a cause but also the term ‘sick heart’ was pertinent to one ventilated patient with a sagging mean arterial pressure.
Comparison of Patients' Pain Behaviour Across Two Pain Incidents

**PAIN INCIDENT: TURNED FOR CHEST X-RAY (WITHIN ONE HOUR POST-OPERATIVE)**
**NUMBER OF CASES: 30**

- **Physiological Cues**
  - Increased heart rate > [100-117] = (24 cases)
  - Increased MAP = (19 cases)
  - Increased respiratory rate = (9 cases)
  - Normal heart rate = (6 cases)
  - Normal MAP = (4 cases)
  - Decreased MAP = (7 cases)

- **Overt Motor Pain Behaviour Cues**
  - Grimace = (17 cases)
  - Guarded movement = (18 cases)

- **Verbal Subjective Pain Behaviour Cues**
  - Patient self-report pain = (8 cases)

- **Behavioural (General) Cues**
  - Restlessness = (9 cases)
  - Attention-seeking behaviour = (1 case)
  - Immobile posture = (18 cases)
  - Tearing = (2 cases)

- **Patient Ventilator Dysynchrony**
  - Chewing on ETTube = (8 cases)
  - Distress on Ventilator = (4 cases)

**PAIN INCIDENT: REST (FIVE HOURS POST-OPERATIVE)**
**NUMBER OF CASES: 27**

- **Physiological Cues**
  - Increased heart rate > [90-98] = (16 cases)
  - Increased MAP = (8 cases)
  - Increased respiratory rate = (27 cases)
  - Normal heart rate = (10 cases)
  - Normal MAP = (7 cases)
  - Decreased MAP = (12 cases)

- **Overt Motor Pain Behaviour Cues**
  - Grimace = (18 cases)
  - Pointing to painful area = (13 cases)
  - Patient self-report pain = (25 cases)

- **Verbal Subjective Pain Behaviour Cues**
  - Restlessness = (5 cases)
  - Attention-seeking behaviour = (3 cases)
  - Immobile posture = (6 cases)

- **Patient Ventilator Dysynchrony**
  - Chewing on ETTube = (7 cases)
  - Distress on Ventilator = (6 cases)

* Variance in cues across both pain incidents.
The notable change in ‘increased respiratory rate’ occurred across all cases at rest and was evident in only nine cases during repositioning following routine chest x-ray. This finding is noteworthy as it could be anticipated that respiratory rate should increase during repositioning which was not the case in this study. The increase in respiratory rate was evident during the observation period at rest and could be attributed to anxiety, awake state, communication technique regarding the uncomfortable endotracheal tube and in some instances patients were ready for extubation. A small number of patients were visibly distressed on the ventilator. Nonetheless, those patients confirmed the source of their pain to be the endotracheal tube. Therefore, there were many possible explanations for the increase in respiratory rate in both pain incidents. However, the difference in time frames would rule out readiness for extubation in the context of time one pain incident, i.e. repositioning. This finding is important in relation to increased respiratory rates which are recommended in the literature to be included as part of the assessment of pain in the critically ill patient along with behavioural indicators (Jacobi et al. 2002).

There was evidence that one overt motor pain behaviour cue ‘grimace’ occurred across both pain incidents. This finding is interesting as studies have demonstrated that facial expression is a valid indicator of pain in the critically ill ventilated surgical patient during nociceptive procedures (Payen et al. 2001, Young et al. 2006) and medical patients who are critically ill (Aissaoui et al. 2005) while ‘guarded movement’ has been identified as a motor pain behaviour (Keefe et al. 1984). Meanwhile, Aissaoui et al. (2005) reported a minor change in BPS (facial expression, upper limb movement and compliance for mechanical ventilation) at rest. Another detail is applicable in this study where ‘grimace’ was only noted during the resting period as the ventilated patient attempted to change or shift their position in any way. According to Edwards (2001), background pain is always present or occurs with ordinary activity such as moving in bed. In this study, ‘grimace’ was recorded by the researcher and verbalised by the same critical care nurses which confirms the presence of this overt motor pain behaviour cue. Puntillo et al. (1997) found that ‘grimacing’ decreased substantially between time one and time two after patients were medicated, which was not the case in this study.

There was a notable difference in the number of ventilated patients who reactively provided a verbal subjective pain behaviour cue ‘patient self-report pain’ in time one (repositioning) versus time two (rest). The level of wakefulness could account for this finding as only eight ventilated patients were awake within the first hour post cardiac surgery versus all cases were awake or had woken and were now asleep five hours later. The verbal subjective pain behaviour cue ‘self-report pain’ operated as an antecedent to the following pain behaviour during the resting period only. This overt motor pain behaviour acknowledged and recorded during the resting period, i.e. ‘pointing to painful area’, involved the critically ill ventilated patient proactively identifying a specific pain site. This finding shows that not only is the ‘patient self-report pain’ a valid index of pain despite its subjectivity, but the ventilated patient can contribute to locating the source of pain by bypassing the communication barriers associated with oral intubation and mechanical ventilation.
One behavioural general cue 'restlessness' decreased over time one (repositioning) versus time two (rest). However, in both pain incidents the ventilated patients were agitated and in some instances showed evidence of distress on the ventilator. One more noteworthy detail is that the same four patients in time one (repositioning) identified the endotracheal tube as causing discomfort who were distressed on the ventilator and were seen to be chewing on the endotracheal tube. Similarly, another four ventilated patients of six cases in time two (rest) who pointed to the endotracheal as the source of their pain previously identified on Table 5.2 were chewing on the endotracheal tube and were distressed on the ventilator. However, all of those ventilated patients were anxious which could have aggravated the issue in this context. Therefore, ventilator dysynchrony was evident in only six of the twenty-seven cases during the resting period and in four of the thirty cases during repositioning. Therefore, 'ventilator dysynchrony' was not indicative of a pain state per se which is different to findings in the literature where 'compliance with mechanical ventilation' was seen as an indicator of pain in the critically ill patient (Payen et al. 2001, Aissaoui et al. 2005, Young et al. 2006) during nociceptive procedures.

There was one behavioural cue 'immobile posture' which was evident in eighteen of the thirty cases during repositioning and post repositioning while during the rest period it featured in only six cases. One explanation for this finding could be related to the time period, i.e. thirty minutes post arrival to the critical care unit post cardiac surgery where the ventilated patient was still under the effects of anaesthesia versus five hours later. In addition, the verbal subjective pain behaviour cue 'self-report pain' was not accessible in those eighteen cases despite the best efforts of the critical care nurses. In this study the majority of critical care nurses used this cue to indicate level of wakefulness and the potential of a pain state. Furthermore, the ventilated patients were not in receipt of any analgesia prior to repositioning or during the rest period in this pain incident which outrules the impact of therapeutic interventions. In the pain literature 'no movement' as a behaviour increased over time while 'grimace' 'restlessness' and 'muscle tension' decreased after critically ill patients were medicated for pain (Puntillo et al. 1997). However, 'no movement' on the Behavioural Pain Scale (BPS) studies was indicative of no pain (Payen et al. 2001, Aissaoui et al. 2005, Young et al. 2006).

Finally, all of the pain behaviours observed and recorded by the researcher were matched with the critical care nurses' pain cues in the think aloud transcripts which not only confirmed the presence or absence of behaviours but also provided a complimentary picture of reality in the natural habitat as the pain behaviours were revealed by ventilated patient and noticed and articulated by the critical care nurse at the bedside. There was evidence of very few missing cues in the think aloud data for which a tentative explanation has been put forward. In addition, matching the data enabled the researcher to fill in the gaps pertinent to non-verbal behaviour which were not articulated in the think aloud current accounts by the critical care nurses. In the next section, reflections by the researcher during her fieldwork are presented.
5.4 Reflections on the Personal Characteristics of Observation

My objective was to record the naturally occurring pain behaviours of the ventilated patient in the immediate phase post cardiac surgery in the critical care unit while being attentive to the critical care nurse participant who was thinking aloud at the bedside. In the initial stages of my fieldwork, I remained as unobtrusive as possible, until my assistance was sought and given with mutual consent as I tried to maintain affinity with the inhabitants in this critical care environment. Consequently, my role shifted between researcher-as-observer and participant-as-observer on a pure technical level as I was approached by critical care nurses to participate with repositioning the patient, respiratory assessments, hyperventilation, monitoring the patient while bloods were undertaken, x-rays were reviewed and individual patient progress was discussed with relatives. I accepted this as part of building rapport with the participants which still afforded me the opportunity to observe the patient’s pain behaviours in proximity to the bedside while emotionally I remained peripheral to the scenario as it unfolded at that particular point.

However, uninvolvement was difficult as the temptation to participate was ever present in other areas such as mean arterial blood pressure crash, arrhythmia interpretation, bubbles around the endotracheal tube and pain events. It was a constant struggle initially with the urge to discard the sensations that appeared to induce me, the researcher-observer not to participate, and to react spontaneously to the situation, to relate to people as a participant and to develop rapport rather than data from the situation. However, frequently I was pulled between how much spontaneous participation was possible without missing something as a researcher, or without jeopardising the neutrality which the researcher tries to maintain when (s)he is studying more than one group so that (s)he does not risk being rejected by contrasting groups. Aside from not wishing to estrange the people one is studying, the researcher-as-observer also wants to be liked, to feel part of the group. I wanted to fit in, which creates its own struggles for identification with the people being studied which is an issue with participant observation.

As the field work progressed the researcher-as-observer role involved observing the patient’s pain behaviours in a passive objective capacity while the concerned participant-observer role seemed to bring into play my experiential knowledge as a critical care nurse. Subsequently, the realisation that the participant-as-observer role seemed to have two dimensions, technical and emotional, emerged over the course of this fieldwork. The participant-as-observer technical dimension surfaced as I was consulted regarding electrocardiograms (ECGs) and sinister rhythm strips. I acknowledged that participants were aware of my interests in cardiology which seemed to superimpose my interest in pain. There was a fine line between being facilitative and being over-zealous with my knowledge, particularly in the early stages of fieldwork while attempting to assume a stance of naivety. The aforesaid scenario could be viewed in several ways: the critical care nurse participant consulting with me out of concern regarding a sudden change in the patient’s ECG, accepting me as a participant on the basis of my experiential knowledge or my presence was having some impact on the critical care nurse’s usual approach to a scenario like this. On the other hand, this process seemed to promote rapport with the participant while at the same preserving my neutral stance thereby diminishing the emphasis on pain.
However, there were times during fieldwork when my technical and emotional hat were in overdrive, for example a damp wave-form pressure on the monitor with a corresponding low mean arterial blood pressure, a shivery patient, a chest drainage bottle filling with blood in conjunction with unequal lung expansion. I was never partial to damp tracings on the monitor and this one reflected a sagging blood pressure with some consequences. On another occasion, I observed an anxious patient with a very high mean arterial blood pressure undergoing lung re-inflation who confirmed to the critical care nurse participant about their pain state. The patient it appeared received no pain relief until this procedure was completed. The urge here to become involved was powerful as my values about pain relief seemed to have superimposed my reason for being in the field. Conversely, an additional dilemma developed as another patient conveyed pain behaviours which to the researcher may have gone unnoticed at that particular time. It was not about sub-optimum care, it was more to do with my assumption that the critical care nurse was overwhelmed because the patient was extremely unstable in the initial few hours.

Meanwhile, towards the final stages of my fieldwork on another occasion I found it extremely difficult not to be concerned when a patient seemed distressed, was nauseated with an ET Tube in situ, had fluctuating vital signs and the term sick heart raised its head. I am not sure why the monitor was like a magnet to me, or why I felt an innate need to assist the critical care nurse participant in this scenario. Perhaps it is something natural that I developed over the years as a critical care nurse with some averted catastrophes under my belt. This was possibly one of the difficulties for me in a researcher-as-observer role in a familiar environment, being objective on the margins versus the participant-as-observer role I adopted here, and becoming more subjective in the process. I was concerned that in some way the vulnerability of the patient and the disquiet of the critical care nurse participant may have placed some internal pressure on me to participate eagerly when requested and on this occasion intuitively to participate due to the potential for aspiration. At that moment, the indications for me were that the natural habitat of the participants dictated my level of participation. In reality detachment generated a power struggle for me at times or did I get a sense on this occasion that the critical care nurse participant was in some way beset with the rapidly changing scenario and I felt an instinctive need to decrease anxiety all around including my own. However, I was mindful of my experiential knowledge and my current objective to observe the patient’s pain behaviours.

Conversely, if the researcher-observer has observed care that is perceived by her as being exceptional there is always the risk the terrain may be taken for granted and one may not notice even the minutiae of detail in this instant. Hence, the ordinariness could be bypassed. There were times even though I was a participant-as-observer at the bequest of some critical care nurses or of my own volition, I felt under no pressure to become drawn-in emotionally in these scenarios. I speculated over the course of these situations and wondered were the roles I adopted influenced by my assumption that some critical care nurse participants revealed exceptional qualities while caring for the ventilated patient in pain in the immediate phase post cardiac surgery. I acknowledged that the reactive element of observation is very much a reciprocal process not only involving the researcher and inhabitants but also vice versa. Perhaps, some of these unanswered questions came to the fore the following day as one exceptional critical care nurse
participant in my mind approached me indicating that she meant to include some other detail on the think aloud tape. I believed this to be very important for me, highlighting the fact that there may be a reactive effect on critical care nurse participants as they think aloud while I observed the patient’s pain behaviours. The process of observing in your own backyard suggests that familiarity can also block seeing the familiar through the eyes of the participant rather than the filtered eye’s of the researcher.

Towards the latter part of my fieldwork, some critical care nurse participants assumed I would monitor the patient during various activities which seemed to indicate I had arrived as a participant. Moreover, the environment had become familiar and there were no longer bumps on the terrain. I think the ordinariness of it had become mundane and I have begun to take it for granted, my worry then was, in the ordinariness of it, if I had bypassed that and now I am looking for the exotic. However, I consistently reminded myself during each day in the field as I observed the patient’s pain behaviours of the following question: how would this terrain be viewed through the eyes of a stranger? Another detail did not go unnoticed as the think aloud data revealed; the participants paved the way for my exit with comments to their colleagues such as:

"...the academy awards are next week, you seem to be doing a good job there exercising your vocal chords...”

"...are you charging by the hour or it is just words...I did it the other day...no big deal...but she is keen on pain you know...”

In summary, the researcher adopted the role of researcher-as-observer with participant-as-observer during fieldwork in order to record the naturally occurring pain behaviours of the ventilated patient in the immediate phase post cardiac surgery in the critical care environment. The participant-as-observer role seemed to incorporate two elements, i.e. technical and emotional. The challenge to remain detached, to separate feeling from observation and concentrate on the task at hand created several dilemmas for the researcher which were described. Furthermore, studying in your own backyard has the potential to block seeing the familiar through the eyes of the participant rather than the filtered eye’s of the researcher.

5.5 SUMMARY

The findings reported in this chapter identified the judgement strategy of thirty critical care nurses during one pain episode as the ventilated patient was turned following a routine chest x-ray within one hour post cardiac surgery. In addition, the findings also detailed the judgement strategy of twenty-seven of the same critical care nurses throughout a second pain incident as the ventilated patient was resting five hours post cardiac surgery in the critical care unit. Firstly, it is suggested that the judgement policy adopted by all of the critical care nurses was decomposed into a two-level inference process which is consistent with the literature (Adelman et al. 1975, Cooksey et al. 1986). Therefore, level one comprised of a large number of first-order cues which were utilised and integrated into intermediate judgements. The concluding level comprised of a final judgment which was formulated on the basis of the intermediate judgements which operated as second-order cues. The idea of a judgement structure was put forward by
Mumpower & Stewart (1996) in the guise of a hierarchy which describes how concrete data is organised into intermediate judgements which in turn are organised into higher level judgements. However, across both pain incidents two contrasting final judgements emerged which reflected two pain states, i.e. 'he is in acute pain' versus 'he is not in acute pain at present'. Therefore, across both judgements and pain incidents critical care nurses used a pattern of cues which comprised of physiological, mechanical, technical, paraclinical, behavioural general, overt motor pain behaviour cues, physical and pain descriptor cues. In addition, there was evidence of similarity across all critical care nurses during both pain incidents with the utilisation of mechanical and physiological cues which related to temperature readings and support requirements. This detail became visible as physiological cues were interpreted by all critical care nurses in the context of vasodilator and inotropic support alongside peripheral and core temperature readings. Moreover, there were two behavioural general cues utilised across both judgements and timeframes which related to the level of wakefulness of each critically ill ventilated patient. Therefore, similarities were evident pertinent to the abovementioned cues within those cue categories i.e. physiological and mechanical and behavioural general cues.

However, within the two individual judgements there were several dissimilarities at level one stage of the judgement process in each pain incident which were highlighted and detailed in-depth. In addition, critical care nurses utilised different patterns of cues such as a physiological pattern, primary preventative pattern and specific pain descriptor pattern which depended on the ventilated patient's haemodynamic status, the critical care nurses' experiential knowledge, theoretical knowledge, and the knowledge of the ventilated patient pertinent to their own pain status. This knowledge was accrued through constant surveillance at the bedside. Moreover, knowing the patient was evident in the latter pain incident. The critical care nurses applied different strategies to rule in and rule out pain in order to reduce any catastrophic effect on the ventilated patient when altered physiological parameters caused concern. This was especially the case in the absence of pain descriptors cues in particular during repositioning the ventilated patient within one hour post cardiac surgery. Some explanations were put forward for the dissimilarities within each cue category across both judgements and pain incidents such as haemodynamic status of the ventilated patient, anxiety, level of wakefulness and dysynchrony with the ventilator. Moreover, the ventilated patient's ability to proactively locate pain sites or reactively respond to the critical care nurses' probing about current pain status was also a consideration.

Finally there was consistency with regard to the utilisation of the second-order cues across both pain incidents, across both final judgements. The dissimilarity it seems lies not in each cue category but within each cue category which are the first-order cues. However, it was recognised that the inference process happens within an uncertain, fragile and unpredictable patient surgical trajectory. Therefore, critical care nurses use a pattern of cues to make a judgement of the pain state of the ventilated patient in the immediate phase post cardiac surgery. Similarly, ventilated patients convey a pattern of pain cues to the critical care nurse which was discussed in depth in this chapter. This pattern of pain cues comprise of physiological, overt motor pain behaviour cues, behavioural general cues, patient ventilator dysynchrony cues, and
verbal subjective pain behaviour cues. Across both pain incidents there were dissimilarities within each cue category which were discussed in detail. According to Kirwin et al. (1983b) variation in judgements among physicians reflected differences in the weights (policies) attached to cues.

Some notable changes occurred within some physiological cues, for example ‘increased respiratory rate’ in time two (rest) versus time one (repositioning). In addition, the ability of the ventilated patient to convey a verbal subjective pain behaviour cue was presented with the observation of their proactive contribution during the rest period. Another behavioural general cue ‘immobile posture’ was evident in the time one (repositioning) and decreased in the time two (rest) pain incident. In addition, all pain cues exhibited by the ventilated patient were matched with the pain cues identified by the critical care nurse in order to provide converging lines of inquiry in this case study. There were few missing cues for which a tentative explanation was afforded. Therefore, the ventilated patient in the immediate phase post cardiac surgery in this case study conveyed a pattern of pain cues which differed within and across both pain incidents. Ultimately, the researcher who observed the ventilated patients’ pain behaviours while the critical care nurse talked aloud described some of her reflections from the field which remained a constant challenge. The next chapter will review the study findings and the methodological approach while the implications of the findings for nursing practice will be considered and suggestions for further research will be discussed.
CHAPTER SIX

6.0 DISCUSSION AND CONCLUSIONS

6.1 INTRODUCTION

In this final chapter, the methodological approach adopted, in particular, the data collection approach within a naturalistic case study design and its role in the elicitation of findings, is discussed. This thesis reports on one study with a small sample in one critical care unit in one geographical area, which sought to capture the judgement process of critical care nurses in the context of the ventilated in pain in the immediate phase, i.e. within the first six hours, post cardiac surgery. This study sought evidence of the judgement process utilising the Lens Model as a framework which can be modified to produce different system designs (Cooksey 1996a), which in this case, was the single system design represented in Chapter Two. However, the vital drawback of the single system case is that the task outcome is not known, therefore the interrelationships between the judge's cognitive system and the task system cannot be scrutinised (Cooksey 1996a). The researcher was heedful of these limitations which narrowed the focus of the study to the cognitive side of the Lens Model, i.e. the right side (see Figure 2.2). Nonetheless, much detail was obtained concerning the critical care nurses' judgement policy in particular, their use of cues in formulating a judgement of the ventilated patient's pain state in the immediate phase post cardiac surgery. Furthermore, the captured policies of thirty critical care nurses were analysed to look for common policies in this case study.

6.2 DISCUSSION OF METHODOLOGICAL STRATEGY ADOPTED

6.2.1 NATURALISTIC CASE STUDY

The strength of the case study approach is its ability to examine a case in depth within its 'real-life' context (Yin 2005). The choice of case study, which was explored in Chapter Three, was made in order to get a close-up view of an important phenomenon, i.e. critical care nurses' judgement. This was examined from two different perspectives: think aloud and researcher observation in order to give a sense of what is was like to make a judgement of the ventilated patient's pain state in the immediate phase post cardiac surgery. Therefore, the strength of this naturalistic case study lies in its examination of the judgement process in its real-life context, which in turn, will facilitate the reader adding to their experience. The researcher emphasised the distinctiveness of the case more than its generality, in order to provide a lot of detail about particulars that enable those reader-made generalisations, acknowledging that each reader will generalise to situations. The strong point of case studies, Stake (1976) argued, is that they provide vicarious experience in the form of complete and meticulous knowledge of the particular and, in this way, they build up the body of tacit knowledge otherwise referred to as experiential knowledge, on the basis of which people act. The methodological issues related to the sources of evidence are discussed in the following section.
6.2.2 Methodology of Think Aloud

Verbal protocol analysis using think aloud technique has been used in the field of health care and is guided by the work of Ericsson & Simon (1984), who claim that the information processing theory (IPT) illuminates the processes by which humans reach judgements and solve problems. In this study, the method chosen was a concurrent report, which means that the information was verbalised at the instant that the critical care nurse was attending to it. The process is therefore labelled concurrent verbalisation, i.e. think aloud reports, where the cognitive processes described as successive states of heeded information are verbalised directly (Ericsson & Simon 1993). Moreover, the time of verbalisation is important in determining from what type of memory the information is likely to be drawn (Ericsson & Simon 1980). The accuracy of verbal reports depends on the procedures used to elicit them and the relationship between the requested information and the actual sequence of heeded information (Ericsson & Simon 1984); this was discussed in detail in Chapter Three. Therefore, for verbal reports to be valid recollections, it makes sense for them to be as close in time as possible to the recollected material.

Since concurrent verbal reports are held to be a more valid and reliable source of the internal cognitive processes taking place than retrospective reports (Ericsson & Simon 1984, 1993), concurrent verbal reports from thirty critical care nurses in real everyday practice situations were collected to capture how they made a judgement that the ventilated patient was in pain in the immediate phase post cardiac surgery. The preparatory think aloud phase, employed to train critical care nurses to adhere to verbalising their thoughts and not to interpret their thoughts, was described in some detail in Chapter Three. Some training of subjects is wise since thinking aloud while performing a cognitive task is not a frequently practiced skill (Shulman & Elstein 1975, Ericsson & Simon 1984). The preparatory, primary and closing phases of the think aloud data collection process were described in depth in Chapter Three. The process for establishing intercoder reliability of the think aloud protocols was based on three entire segmented protocols and two independent coders and was also described. The methodological approach to data collection was appropriate as the researcher was interested in the participants giving verbal reports of their judgement strategy as it occurred while caring for the ventilated patient in pain in the immediate phase post cardiac surgery. A possible disadvantage of concurrent reporting is that the act of thinking aloud distorts the critical care nurse’s cognitive processes, which were the item of measurement. Nonetheless, this approach to data collection was appropriate to the research question.

Moreover, it is the researcher’s opinion that in using simulations or retrospective accounts it would be difficult to create the actual scenarios that evolved and the sophisticated sense that some critical care nurses utilised to get to the root of the problem against a background of unpredictability, fragility and uncertainty. The sense of a labile mean arterial blood pressure or a grossly elevated mean in the context of a patient who was bleeding with sinister arrhythmias, was articulated on some of the transcripts and provided a lot of detail in contributing to the judgement structure of critical care nurses in the immediate phase post cardiac surgery as they
cared for the ventilated patient in pain. The only issue which evolved during the analysis of the think aloud data, was that it was difficult to get a sense of the continuous surveillance of the critical care nurses; this became part of the intricacies of the findings and was evident in the following data collection strategy. Moreover, this study revealed that think aloud, as a data collection method, is feasible and does not compromise patient care; this is consistent with previous work (Aitken & Mardegan 2000, Thomas & Fothergill-Bourbonnais).

6.2.3 RESEARCHER OBSERVATION DATA

The methodology of researcher observation was detailed in Chapter Three. Field-work is the central activity of naturalistic inquiry, getting close to the people being studied to personally understand the realities and the minutiae of daily life (Patton 2002). The central tenet of this theory is that face-to-face interaction is potentially the fullest for achieving intimate familiarity with the actions and orientations of other human beings (Lofland et al. 2006). The choice of fieldwork in this study, i.e. the observation of patient pain behaviours, was utilized to add new dimensions to understanding how critical care nurses make a judgement in the context of the ventilated patient’s pain state in the immediate phase post cardiac surgery. The role of researcher-observer was documented in terms of the fieldworker’s relationships with the subjects, i.e. participant-observer versus researcher-observer and was discussed in Chapter Three. The reality of the experience was presented in Chapter Five. The methodological approach undertaken by this researcher was to attempt to do justice to both perspectives, i.e. researcher-observer versus participant-observer: by sharing as intimately as possible in the activities of the critical care environment in order to develop an insider’s view of the judgement process of critical care nurses in the context of the ventilated patient in the immediate phase post cardiac surgery, the emic perspective, while describing it to and for outsiders, i.e. the etic perspective.

The researcher was mindful of the viewpoint of LeCompte et al. (1993) that concentrating on observation reduces the ability to participate well, while participating fully in events can interfere with the scope and depth of observations. The possibility of the researcher modifying and influencing the research context, as well as being influenced by it themselves, raises a series of common problems regarding the influence of the researcher on the researched. The researcher acknowledged that this research and writing could not be divorced from her past experiences, values and beliefs. However, so called objectivity and distance vis-à-vis the field setting will usually result in a failure to collect any data that are worth analysing (Lofland & Lofland 1995, Lofland et al. 2006). The researcher remained open to the research experience and had her thinking informed by the data, and vice versa, in order to understand the people who inhabited the setting.

The researcher was constantly aware of attempting to achieve acceptable incompetence and to adhere to the suggestion by Lofland et al. (2006) that for a naturalistic researcher who is a non-threatening, non-judgemental learner, the rewards of the information received can be considerable. The researcher played down her knowledge at the bedside, emphasising her neutrality; this is evident in her detailed reflections from the field in Chapter Five. More
importantly, the too familiar landscape demands that the researcher scrutinise the flat terrain for bumps that, otherwise, may be overlooked; the researcher was careful to do that in this study. Besides, the researcher was aware, that, in familiar settings, investigators may experience an overwhelming urge to evaluate them, rather than to observe in them (Wolcott 1994). The process of developing a coding template for the observation data was described in detail in Chapter Three. The reliability of the observation coding template was established using inter-reliability and intra-reliability which was discussed in depth in Chapter Three.

The relevance of fieldwork in this study was that it enabled the researcher, to document the process used by critical care nurses to locate pain descriptors cues which were not evident on the think aloud transcripts and the reality of that world when pain cues were not exhibited by the ventilated patient. Moreover, it allowed the researcher view how ventilated patients can contribute to their pain story. During think aloud transcriptions it was difficult to get a sense of ‘oh you are sore’ which highlighted the incompleteness of verbal reports; these were, however, complemented by simultaneous recordings of non-verbal behaviours at the bedside by the researcher. Fieldwork, also provided evidence of the context of anxiety for the ventilated patient as they attempted to exhibit pain cues which at times, were conflicting. Furthermore, it gave a sense of the complexity of the judgement task when patients were labile; this was then matched with the critical care nurses’ transcripts to complete the puzzle of the judgement structure. This puzzle is made visible in the following subsection.

6.3 DISCUSSION OF FINDINGS

6.3.1 CUE CHARACTERISTICS OF CRITICAL CARE NURSES

From the outset, the thesis set forward was that critical care nurses use a pattern of cues to make a judgement that the ventilated patient is in pain in the immediate phase post cardiac surgery. The single system design as represented in the Lens Model framework, i.e. the right side of the model, was used to establish the critical care nurses’ judgement policy. The single system design in Social Judgement Theory (SJT) research is frequently identified as policy capturing used to study the value system of judges in order to establish which cues are important to the judgement and how they are utilised (Cooksey 1996a). Therefore, each individual critical care nurse’s judgement policy was scrutinised in isolation and as a coherent whole, of which examples were presented in Chapter Four, before aggregation across critical care nurses’ judgement strategies, which transpired in Chapter Five. Consequently, the cross-case proposition proposed that similarities in critical care nurses’ judgement policy were due to similarities in how the critical care nurses would weight and combine cues.

In this study, two pain incidents emerged which evolved as the ventilated patient was repositioned following a routine chest x-ray, within one hour post cardiac surgery and five hours later approximately, during a rest period. One important finding was noted: for each pain incident a different judgement was reached, i.e. ‘(s)he is not in acute pain at present’ versus ‘(s)he is in acute pain’. The findings suggest that critical care nurses use a pattern of cues to make a judgement of the ventilated patient’s pain state in the immediate phase post cardiac
surgery. The pattern of cues used by all critical care nurses across both judgements and across both incidents comprised the following with some exceptions: physiological, mechanical, technical, paraclinical, behavioural general and overt motor pain behaviour cues. There were similarities across all critical care nurses pertinent to the following cues: physiological, mechanical and behavioural general, which reflected temperature, support parameters and level of wakefulness. This finding is important in that all physiological cues, when used, were interpreted in the context of support and temperature readings. Therefore, even when mean arterial blood pressure (MAP) parameters were within normal or near-normal baselines, some critical care nurses assumed that the ventilated patient may be in pain due to the control of vasodilator support; this demonstrated a sophisticated knowledge of pharmacotherapeutics and haemodynamic responses. Equally, the level of wakefulness was deemed to be part of the process of ascertaining the ventilated patient's cerebral status and pain state.

There was another physiological cue which had contrasting meanings across both judgements. This cue, ‘MAP response to analgesia’, was used in the first pain incident as a pain cue in the absence of a pain descriptor cue and in the presence of a grossly altered MAP with the word qualifier ‘acute rise’ applied by the critical care nurse. However, the unreliability of this cue was reported by critical care nurses in the context of arrhythmias, support, poor left ventricular function and current haemodynamic status. The aforesaid cue has been reported in the literature with relevance to analgesia evaluation (Jacobi et al. 2002) and as a pain cue in the presence of altered blood pressure (Guyton-Simmons & Ehrman 1994). Meanwhile, a word qualifier applied to alterations in MAP readings enabled critical care nurses to draw on a cluster of salient cues and rule in or rule out pain across both judgements and timeframes.

There were different patterns of first order cues utilised by the critical care nurses. One noteworthy example was a ‘primary preventative pattern’, which combined paraclinical, mechanical and technical cues in the absence of a pain descriptor cue during repositioning. In addition, physiological and level of wakefulness patterns were used, which, in several cases were linked to the experiential knowledge of the critical care nurse and the haemodynamic status of the ventilated patient. Moreover, some critical care nurses used a pattern of pain descriptor cues during the rest period which were related to their knowledge of the patient and their constant surveillance at the bedside. This finding is important in that ‘self-report pain’ is absent on Behavioural Pain Scales for use with the critically ill ventilated patient yet, it is considered in the pain literature as a ‘pain behaviour’ (Turk & Flor 1987) and a valid index of acute pain (AHCPR 1992). Furthermore, ‘knowing the patient’ in this study developed with spending time at the bedside in partnership with the ventilated patient and becoming aware of their pain expression and pain terminology. Knowing the patient was seen by Jenks (1989) as a unique form of knowledge that nurses achieve through interpersonal partnerships with patients and it is central to skilled judgement (Tanner et al. 1993). Knowing the patient was also used by a number of critical care nurses to integrate theoretical and practical knowledge along with physiological cues, overt motor pain behaviour cues and sensory cues which was similar to Pyles & Stern’s (1983) ‘nursing gestalt’. 

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One pain descriptor cue, ‘patient self-report pain’, was available at rest in every case and was viewed by all critical care nurses as a reliable pain cue, along with ‘grimace’ and ‘guarded movement’ during repositioning. The finding that there were dissimilarities across critical care nurses within cue categories is interesting and could be explained by the unpredictable and fragile ventilated patient who exhibited conflicting cues and the critical care nurses’ judgement policy. Moreover, the differences were noted within cue categories which incorporated first order cues. However, there were consistencies across all critical care nurses with their utilisation and integration of second order cues into a final judgement. That said, the finding that two contrasting final judgements materialised across two groups of critical care nurses in two pain incidents is important for the development of pain knowledge for which the focus has been on the presence of acute pain. The findings from the fieldwork are discussed in the following subsection.

6.3.2 PATIENT PAIN BEHAVIOURS

The findings of this study showed that ventilated patients convey a pattern of pain cues namely: physiological, overt motor pain behaviour, behavioural general, patient ventilator dysynchrony and verbal subjective pain behaviour cues in two pain incidents, i.e. turned post chest x-ray (time one) within one hour post cardiac surgery and within five hours at rest (time two). These findings are consistent with the literature, with particular reference to two of the physiological cues: ‘increased heart rate’ and ‘increased mean arterial blood pressure (MAP)’ during turning (Puntillo et al. 1997, Payen et al. 2001, Odhner et al. 2003, Young et al. 2006). These findings are reported in the context of support, temperature readings and time post cardiac surgery. There was one notable difference in this study with regard to another physiological cue: ‘respiratory rate’. The aforesaid physiological cue increased across all cases in time two (rest). There are recommendations in the pain literature to incorporate respiratory rate along with heart rate and blood pressure and other pain behaviours as part of the assessment process. In addition, it is recommended that response to analgesia should be monitored via respiratory rate in acute pain states in the critically ill patient (Jacobi et al. 2002). More importantly, respiratory rate is not currently incorporated into Behavioural Pain Scales (BPS) as a physiological cue. One reason for this omission may be that the ventilated patients were receiving sedation and analgesia infusions, which was not the case in this study.

This study offers new insight into the physiological cue ‘increased respiratory rate’, which was observed by the researcher in the field, but also articulated by the critical care nurses in the think aloud transcripts. Several explanations were put forward by the critical care nurses who used this physiological cue across all cases during the resting period and in nine cases out of thirty during repositioning. The explanations presented were related to the ventilated patient’s haemodynamic status with a view to weaning, anxiety, compliance with the ventilator and level of wakefulness. More importantly it was seen as a communication strategy on the part of the ventilated patient, not only to create awareness of his/her pain state, but also, to identify the source of their discomfort and anxiety, i.e. the endotracheal tube. This detail was confirmed by the researcher as the ventilated patient attempted to communicate their pain. Furthermore, as the
ventilated patient communicated their pain, during the rest period, the respiratory rate increased. However, it is also fair to note that a small number of the patients were anxious and distressed on the ventilator at that particular time.

There was another finding which was notable with regard to building our knowledge of the ventilated patient’s pain state and the subtle cues which may accompany this process. In this study, a very small number of patients in time one (repositioning) and time two (rest) were unable to synchronise with the ventilator, which heightened their anxiety levels and could have indirectly affected their pain. However, the converse was also true in that a small number were compliant on the ventilator and yet provided a self-report of severe pain. The Behavioural Pain Scale (Payen et al. 2001) utilises ‘compliance on the ventilator’ as a pain indicator with facial expression and movement of upper limbs. However, in this study it is suggested that the source of the ventilated patient’s pain was the endotracheal tube which created much of the difficulty surrounding ‘fighting the ventilator’ and had a domino effect with anxiety and level of wakefulness.

There was evidence of another behavioural general cue, ‘immobile posture’, which was apparent in greater numbers during repositioning. Puntillo et al. (1997) reported the opposite which was accounted for with reference to analgesia effects. Again, the critical care nurses in this study provided interesting detail on this cue as they used it in both pain incidents on the same number of occasions as recorded by the researcher. During repositioning, the behavioural general cue ‘no movement’ was evident in a large number of cases and its’ reliability as a pain cue was questioned by the critical care nurses’ who were unable to validate the presence or absence of pain with the ventilated patient in question due, perhaps, to level of wakefulness and time-frame post cardiac surgery i.e. thirty minutes. In contrast a small number of ventilated patients during the resting period who exhibited this behaviour reported pain and confirmed to the critical care nurse their fear of pain during movement, hence their reasoning for lying still. However, there were two patients who confirmed absence of pain also. Besides the Behavioural Pain Scale utilises ‘no movement’ along with the score of two additional items as indicative of no pain.

There was consistency in this study and the pain literature pertinent to ‘grimace’ during repositioning (Puntillo et al. 1997, Payen et al. 2001, Young et al. 2006) along with ‘guarded movement’ (Keefe et al. 1984, Guyton-Simmons & Ehrmin 1994, Odhner et al. 2003). One noteworthy point is that ‘grimace’ was observed at rest as the ventilated patient tried to shift their position or pointed to their pain site. Besides, Aissaoui et al. (2005) reported a minor change in Behavioural Pain Scale items at rest with medical critically ill ventilated patients, confirming the presence of background pain. In this study, another overt motor pain behaviour cue occurred during the rest pain incident, in which a moderate number of ventilated patients proactively located their pain sites; this is not reported in the literature. In addition, all patients during this pain incident provided a verbal subjective pain behaviour cue, ‘self-report pain’, reactively to the critical care nurses’ probing about current pain status. This finding is consistent with a much earlier study in which Puntillo (1990) reported that intubated patients can give
6.4 Implications for Clinical Practice

This study has the potential to influence nursing in its detail about how critical care nurses made a judgement and the knowledge encompassed in critical care nursing practice. The most important detail which has the power to change pain practice in the absence of a pain descriptor cue for this cohort of patients was the formulation by critical care nurses of a 'primary preventative pattern' of pain cues. This is consistent with Neuman’s work (2002), who advocates a primary prevention as intervention role for nurses, which could be applied in the context of critical care nursing. Therefore, the ‘at risk’ patient post major cardiac surgery can be acknowledged speedily in the absence of pain descriptors cues and in the presence of haemodynamic stability. Much of critical care nurses’ activities focus on secondary prevention as intervention due to the nature of surgical trajectories.

The validation of pain behaviours with the ventilated patient is possible, which means that a verbal report of pain should be a requisite on Behavioural Pain Scales. In addition, a verbal report is only one aspect of the ventilated patient’s pain story, therefore, emphasis needs to be placed on pain locations and behavioural indicators on pain assessment tools. The literature places much emphasis on the ‘patient self-report pain’ as a valid index of acute pain. Moreover, in this study the verbal report of pain was a precursor to additional pain cues being sought reactively by critical care nurses and proactively presented by ventilated patients. Therefore a rationale for securing pain descriptor cues needs to be emphasised which is more than a subjective report. The discomfort of the endotracheal is equally relevant and cognisance needs to be taken of this when compliance on the ventilator becomes an issue. Moreover, perhaps compliance on the ventilator should be revisited in the context of the ventilated patient who is anxious and distressed, which has a domino affect on physiological parameters and pain and the existence of ventilators that currently synchronise with the patient.

The attention to detail of context in relation to alterations in physiological parameters could be the norm in pain, as they may be the only pain cues exhibited by the ventilated patient in the early stages post cardiac surgery. More importantly, respiratory rate needs to be appreciated as a method by which the ventilated patient may communicate discomfort with the endotracheal tube keeping all other haemodynamic parameters in check. The importance in clinical practice of emphasising typical versus atypical trends in physiological parameters especially in light of the value qualifiers the critical care nurses utilised in this study, which allowed pain to be ruled in or out in the context of haemodynamic instability, level of wakefulness and anxiety needs to be appreciated.
The descriptions of clinical judgement may allow the less experienced critical care nurse to learn to identify uncertain and salient cues in similar situations with less trial and error, thus reducing personal anxiety and providing higher quality patient care. The emphasis on the practical knowledge underpinned by theoretical knowledge involved in exercising clinical judgement and in the case of the experienced critical care nurse, a recognition of their in-depth knowledge base and the process of maintaining that knowledge base and passing it on to other critical care nurses in the context of the ventilated patient in pain during the surgical trajectory, needs to be treasured. Nonetheless, learning is a part of the process and there are implications for educators which are described in the next section.

6.5 IMPLICATIONS FOR EDUCATION

One important implication is that the theoretical and practical knowledge gained as a result utilising clinical pain incidents in the context of the ventilated patient in pain post cardiac surgery should be given to students as part of the orientation programme in critical care so that pain patterns for organising knowledge in memory can be acquired over time and consistently. Gradually increasing the complexity of clinical scenarios at the bedside and encouraging critical thinking through think aloud and cognitive feedback will stimulate students to consider different possibilities when making clinical judgements in an uncertain environment. Moreover, the identification of subtle pain cues could be part of the norm in the context of the ventilated patient, whose pain terminology could be ascertained prior to elective surgery. Furthermore the involvement of critical care nurses in pain programmes could enhance the delivery of best pain practice to the ventilated patient in pain in the immediate phase post cardiac surgery. However, simulations in the classroom need to be reality-based and give a sense of the simultaneous compilation of cues that are exhibited by haemodynamically labile ventilated patients, rather than a neat sequential process that eliminates the urgency of a sagging blood pressure, a chest drainage bottle filling with blood and an agitated patient with a sick heart, which was the experience of the researcher during fieldwork. Finally, the contribution of the ventilated patient needs to be a part of the learning process as was acknowledged by all of the critical care nurses in this study. For this, more evidence is needed to augment this detail; the implications for research are presented below.

6.6 IMPLICATIONS FOR RESEARCH

The Lens Model would seem to provide a particularly strong basis for a more detailed examination of the judgement processes of critical care nurses, including the accuracy of their judgements. One important further implication of the approach taken concerns possible instructional processes for improving the judgement processes of critical care nurses in the context of the ventilated patient in the immediate phase post cardiac surgery. There has been a lot of research on the value of cognitive feedback, based on Lens Model analyses, for improving the quality of judgemental processes. Research has shown that improvement is secured by providing cognitive feedback on parameters of the Lens Model system itself, including cue weights and consistency (Cooksey et al. 1990). The goal would be to increase awareness of those cues that are more likely to determine the critical care nurses’ errors in the context of the
ventilated patient in the immediate phase post cardiac surgery. This study demonstrated that the Social Judgement Theory (SJT) using the single system design can make explicit the judgement processes of critical care nurses in the natural habitat of the ventilated patient in the immediate phase post cardiac surgery. Hammond et al. (1977) have shown that because people often are not aware of or cannot verbalise their own policy systems, an important step in the application of SJT should be the provision of cognitive feedback to the critical care nurse; this could be the approach taken by another researcher incorporating the left side of the Lens Model. There were two occasions on which the researcher's and critical care nurses' pain cues did not match, i.e. in time one pain and time two pain incident. In these two cases, an overt motor pain behaviour cue, 'grimace' and a pain behaviour cue, 'chewing on ET Tube' were not verbalised by both critical care nurses. At this particular point in time, the researcher had also documented her unease in her field notes. Cognitive feedback at that particular time may have heightened awareness of the omissions in order to enhance learning in the context of the ventilated patient who exhibited these pain cues. Moreover, the researcher could have utilised a retrospective interview to locate an explanation for these omissions. Another interesting research approach would be to examine why critical care nurses' judgement policies are not more similar.

Another implication of this research is that the think aloud method can, and could be, used to examine the judgement process of critical care nurses' with ventilated patients in their natural habitat, as the judgement is happening during care provision. Although think aloud method will not provide a complete description of the judgement process, this study has demonstrated that its use in the critical care environment may contribute to a fuller description of how critical care nurses make a judgement; this was collaborated by the simultaneous observations of the ventilated patients' pain behaviours by the researcher. Therefore the within-method data triangulation provided a more complete picture of the judgement process of the critical care nurses in the context of the ventilated patient in the immediate phase post cardiac surgery.

6.7 IMPLICATIONS OF DATA TRIANGULATION

The purpose of combining two data sources was to provide a more holistic, and better, understanding of the phenomenon under study and to guard against a single researcher's biases. This triangulated approach required the researcher to link each individual think aloud data set with an observation set, collected concurrently, fitting them together like the pieces of a puzzle to obtain a comprehensive understanding of the phenomenon, i.e. critical care nurses' judgement process in the context of the ventilated patient in the immediate phase post cardiac surgery. Moreover, the role of triangulation was to increase the researcher's confidence so that the findings might be better imparted to the audience, and to lessen recourse to the assertion of privileged insight (Fielding & Fielding 1986).

The derived meanings of the pain behaviours were triangulated with the think aloud data protocols of the critical care nurses. Triangulation within this qualitative inquiry was used as an approach for justifying and underpinning knowledge by acquiring additional knowledge which was pertinent to this naturalistic case study. Furthermore, the most important advantage of using multiple sources of evidence in a case study design is to allow the researcher to identify different
realities (Stake 2005) and to develop converging lines of inquiry (Yin 2003, 2005), which regularly sends us back to the drawing board (Stake 1995). In doing this naturalistic case study, evidence was presented via an array of data, through tables, charts, diagrams and figures, to allow the reader to judge independently the interpretation of the data. The rationale for this process was guided by Yin (2005), who recommends this approach in order to provide the strength of evidence for such insights by readers in order not to mix evidence with interpretation. Therefore the structure of the array needs to reflect an overarching concern for presenting data fairly.

Triangulation facilitated the confirmation of accessible versus inaccessible cues which were absent on the think aloud transcripts. There were, for example, several critical care nurses who utilised a specific pattern of pain cues and, in contrast, few pain cues were sought by a small number of nurses. There could be an assumption that, due to the incompleteness of verbal reports, such data was seen but not reported, or was not visible and therefore, not reported. In this instance, the researcher matched both data-sets which revealed the existence of the pain cue which was accessible, but not reported. More importantly, triangulation of data-sets allowed the researcher to confirm non-verbal behaviour when it was absent from the think aloud data. This process was especially important as the patient was ventilated and communication was a one way verbal process on the think aloud transcripts. In this instance, the critical care nurse articulated ‘okay, I will sort it out’, for example, where in fact at the bedside the ventilated patient exhibited a positive response pertinent to their pain state. Therefore, data analysis was also facilitated during this process. More importantly, triangulation completed the picture in many cases, for example, where several important explanations for respiratory rate were afforded by the critical care nurse and thus situated the alterations of physiological cues in context. This detail was essential as the researcher was observing the ventilated patient’s pain behaviours as the critical care nurse was thinking aloud at the bedside.

6.8 CONCLUSION

Critical care nurses use patterns of pain cues to make a judgment of the ventilated patient’s pain in the immediate phase post cardiac surgery. Furthermore, a judgement structure is employed which comprises of two stages. In the initial stage, the pattern of cues are comprised of physiological, technical, behavioural general, overt motor pain behaviour, covert behaviour, paraclinical, mechanical, knowledge, physical and pain descriptor cues. These cues are utilised and integrated into a small number of intermediate judgements which operate as second order cues. Consequently, the second order cues are combined in order to make a final judgement of the ventilated patient’s pain state in the immediate phase post cardiac surgery, i.e. ‘(s)he is in acute pain’ or ‘(s)he is not in acute pain’. Dissimilarities across critical care nurses arise at the initial stage within each cue category, which involves numerous first order cues. Similarities are evident in the subsequent stage, which entails a small number of second order cues.

In addition, critically ill ventilated patients convey a pattern of pain cues to the critical care nurses which comprise of physiological, behavioural general, overt motor pain behaviour cues, patient ventilator dysynchrony cues and verbal subjective pain behaviour cues. Dissimilarities
occur across patients within the pattern of cue categories exhibited in the immediate phase post cardiac surgery. However, the pattern of cues expressed by the ventilated patient may be influenced by numerous factors in an unpredictable and delicate surgical trajectory and chief among those factors is haemodynamic instability. Furthermore, the critical care must make sense of all of this to gain access to the pattern of cues.
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APPENDIX I

CASE ONE

PARTICIPANT 1

THINK ALOUD TRANSCRIPT
Appendix 1
Case One Participant 1 – Think-Aloud Transcript

Case One

<table>
<thead>
<tr>
<th>Participant 1 Think Aloud Transcript</th>
<th>Researcher Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MO = Nurse</td>
<td></td>
</tr>
<tr>
<td>M = Patient</td>
<td></td>
</tr>
<tr>
<td>R = Researcher</td>
<td></td>
</tr>
<tr>
<td>A = Anaesthetist</td>
<td></td>
</tr>
<tr>
<td>I = Intensivist</td>
<td></td>
</tr>
</tbody>
</table>

Introduction

R: In this study I am interested in what you say to yourself as you care for this ventilated patient in pain in the immediate phase after cardiac surgery. Therefore, I will ask you to talk aloud as you care for the patient at the bedside. What I mean by talk aloud is that I want you to say out loud everything that you say to yourself silently. Just act as if you are alone in the unit speaking out loud to yourself. If you are silent for any length of time I will remind you to keep talking. Do you understand what I want you to do. I have explained the study to you & have given you a practice run with the miniature microphone. Is that okay?

MO: Yes. You might have to edit some of this now, you know. I’d better not curse, huh?

R: Ah, you can, yes. One thing I want to say to you, that’s all. I’m not watching you, I’m only watching the patient. Is that okay?

MO: Yes. That’s fine.

R: If visitors come, I’ll take the equipment off you.

MO: The visitors actually will be coming shortly, they’re on their way. I’ll say they’ll be here in about an hour.

R: When they come, I will take the microphone off you. and if you’re unhappy just let me know, that’s it. I have gone through the consent with you in detail.

MO: I am clear on that, so off we go.
<table>
<thead>
<tr>
<th>S1/1: MO: Well, I’ll put in the gas right now</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1/2: MO: You see, here we are, twenty to four, putting in the gas</td>
</tr>
<tr>
<td>[music begins in the background]</td>
</tr>
</tbody>
</table>

| S1/3: MO: I’ve plenty of time now as she’s still fairly zonked |
| S1/4: MO: She hasn’t said anything yet. |
| She has not moved |
| [Machine beeping, music playing] |

| S1/5: MO: That line is a bit damp, I will flush it. |

| S1/6: Colleague: You’re patient’s output in OT was 2,600. |
| [Loud voices in the background] |

| S1/7: Perfusionist OT: There’s two of the empty blood packets from OT & plus one unit |
| MO: Thank you. The blood for M: oh probably it’s in the chart. |
| M to ‘N, you wouldn’t drop that unit of blood down to the fridge for me, would you? |
| [pause] |
| [Voices in the background, activity nearby] |
| [monitor alarming, phone rings] |

| S1/8: MO: I had better fill in a few dots. |
| [more activity by M] |

| S1/9: MO: Now, what time is it now? Back since two thirty, |
| Mean blood pressure 65 |
| Pressure is fine. |
| [Pause for a few seconds] |

| S1/10: MO: Just writing in her observations |

| S1/11: MO: They’re quite stable. Haemodynamic wise |

| S1/12: MO: CVP 10 |
| That’s fine for her now. |

<p>| S1/13: MO: Rhythm of 75 |</p>
<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker</th>
<th>Dialogue</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1/14</td>
<td>MO</td>
<td>Support is - Adrenaline is running at 2</td>
<td>Cue Interpretation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[Very noisy in background: bleeps, monitors alarming, ventilators alarming]</td>
<td></td>
</tr>
<tr>
<td>S1/15</td>
<td>MO</td>
<td>GTN that’s running at .1 for LIMA support</td>
<td>Cue Interpretation</td>
</tr>
<tr>
<td>S1/16</td>
<td>MO</td>
<td>Solution 18 with 20KCL maintenance fluid at 80mls per hour.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>[Shouting and activity in the background]</td>
<td></td>
</tr>
<tr>
<td>S1/17</td>
<td>MO</td>
<td>Core temperature is 32. Peripheral temperature is 25</td>
<td></td>
</tr>
<tr>
<td>S1/18</td>
<td>MO</td>
<td>CVP 13</td>
<td></td>
</tr>
<tr>
<td>S1/19</td>
<td>MO</td>
<td>Oxygen Saturation 100</td>
<td></td>
</tr>
<tr>
<td>S1/20</td>
<td>MO</td>
<td>Yes, I need morphine for M, would you have time to make it up N and I will check it with you.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes.</td>
<td></td>
</tr>
<tr>
<td>S1/21</td>
<td>MO</td>
<td>Now, chest drainage. 50 in last 15 minutes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MO</td>
<td>that doesn’t look too bad from chest drains.</td>
<td></td>
</tr>
<tr>
<td>S1/22</td>
<td>MO</td>
<td>That’s 150. It was 100 coming in the door. Chest drainage 100 plus 50. So she’s minus 150</td>
<td></td>
</tr>
<tr>
<td>S1/23</td>
<td>MO</td>
<td>and no blood running yet.</td>
<td></td>
</tr>
<tr>
<td>S1/24</td>
<td>MO</td>
<td>ACT is 156 so parameters bit high (baseline 125-135)</td>
<td></td>
</tr>
<tr>
<td>S1/25</td>
<td>MO</td>
<td>I am going to give her 50mgs of protamine sulphate IV slowly which was ordered by the anaesthetist</td>
<td></td>
</tr>
<tr>
<td>S1/26</td>
<td>MO</td>
<td>She was a little bit oozy in theatre</td>
<td></td>
</tr>
<tr>
<td>S1/27</td>
<td>MO</td>
<td>Now, E would you check this now. Protamine sulphate 50mgs. 10mgs per mil, so 5 mls. Expiry date X.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>[Phone rings]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>[Loud background noise]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>[M was asked by colleague about beds 1 &amp; 1]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>[Background conversations taking place]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>[Phone rings again]</td>
<td></td>
</tr>
<tr>
<td>S1/28</td>
<td>MO</td>
<td>I have a good line here to give the protamine sulphate, she is bleeding</td>
<td>Judgement</td>
</tr>
</tbody>
</table>
## Appendix 1

Case One Participant 1 – Think-Aloud Transcript

<table>
<thead>
<tr>
<th>S1/29: MO: Her blood pressure is gone up a bit with a mean of 89, acute rise, twenty to four</th>
<th>Cue</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1/30: Turned for X-ray</td>
<td>Cue</td>
</tr>
<tr>
<td>S1/31: She is experiencing discomfort</td>
<td>Cue Interpretation</td>
</tr>
<tr>
<td>S1/32: MO: Mean blood pressure is just that little bit high, baseline 70-80</td>
<td>Cue Interpretation</td>
</tr>
<tr>
<td>S1/33: She is hypertensive</td>
<td>Judgement</td>
</tr>
<tr>
<td>S1/34: MO: I'll see how asleep she is.</td>
<td>Hypothesis</td>
</tr>
<tr>
<td>S1/35: MO: She mightn't be that asleep now</td>
<td>Cue Interpretation</td>
</tr>
<tr>
<td>S1/36: MO: Maybe she is feeling a bit of pain</td>
<td>Cue</td>
</tr>
<tr>
<td>S1/37: That would bring her blood pressure up too</td>
<td>Cue Interpretation</td>
</tr>
<tr>
<td>S1/38: Her previous mean was 65, so this sudden rise is significant</td>
<td>Cue</td>
</tr>
<tr>
<td>S1/39: MO: The GTN is going 3 to get down the pressure and we just need 1 adrenaline support as mean too high</td>
<td>Cue Interpretation</td>
</tr>
<tr>
<td>S1/40: MO: M, let me see how she feels, M. Are you awake, no response, zonked, not awake yet</td>
<td>Cue</td>
</tr>
<tr>
<td>S1/41: MO: Her eyes are closed. She is asleep</td>
<td>Cue Interpretation</td>
</tr>
<tr>
<td>S1/42: She's sound asleep.</td>
<td>1st Order Judgement</td>
</tr>
<tr>
<td>S/43-47: I need to get organised here and sort out her lines. There is central, triple lumen, swan ganz, peripheral</td>
<td></td>
</tr>
<tr>
<td>S1/48: MO: A little bit more of the protamine now.</td>
<td>Cue</td>
</tr>
<tr>
<td>S1/49: MO: She was oozy in theatre, that blood pressure cannot be helping either,</td>
<td>Cue Interpretation</td>
</tr>
<tr>
<td>S1/50: MO: Chest drainage, 170, so 100mls for this time</td>
<td>Cue</td>
</tr>
<tr>
<td>[machine beeping]</td>
<td>Cue Interpretation</td>
</tr>
<tr>
<td>S/51: Excessive there last quarter</td>
<td></td>
</tr>
<tr>
<td>S/52: Just giving Protamine slowly</td>
<td></td>
</tr>
<tr>
<td>S/53: I don't want to effect her haemodynamics</td>
<td></td>
</tr>
<tr>
<td>S/54: So she bled when turned there.</td>
<td></td>
</tr>
<tr>
<td>S/55: MAP too high</td>
<td></td>
</tr>
<tr>
<td>[Talking +++ in background]</td>
<td></td>
</tr>
</tbody>
</table>

### Appendix 1, Page 4
S/56: I am just giving another bit of Protamine slowly there

[Machine beeping again]

S/57: Just calibrating my lines

S1/58: MO: She had CABG X3 with LIMA, recent MI

S1/59: Could you chart that for me thanks

S1/60: MAP too high, could burst a graft

S1/61: She is oozy

S1/62: She is oozy now, I better get that sorted there

S1/63: MO: Haemodynamically, she is unstable now

S1/64: MO: I might even move up the GTN up a little bit more.

MO: GTN up to three from 1

MO: Her adrenaline is stopped, that’s fine

[Siren going off]

S1/65: MO: Now. Let me check my drugs now.

MO: Protamine sulphate 2 mgs IV slowly and will be having Zantac 2mgs IV 8 hourly, & I will start that and antibiotics[activity][machine beeping], I’ll just see what time she had her Vancomycin[machine beeping] & her Netilin in OT. The Vancomycin is due at four in the morning one and Netilin was given in theatre at 10 o’clock so it will be due to be given at 10 o’clock tonight 150mgs BD

MO: Now. I’m going to put up her oxygen a bit

S1/66: MO: Her oxygen is only 9.5, hypoxia, bit low for the myocardium

MO: I will put it up to 60% as she is on 50%.

M to N: Thanks for the morphine.

[Alarms ++++]
### Appendix I

#### Case One Participant 1 – Think-Aloud Transcript

<table>
<thead>
<tr>
<th>[Machine beeping]</th>
<th>[another machine beeping]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sl/68: MO: Haemoglobin, 8.0, A bit low due to blood loss</td>
<td></td>
</tr>
<tr>
<td>MO: but I will just observe it for the time being</td>
<td></td>
</tr>
<tr>
<td>MO: Now, her potassium is 3.9 so I’m going to give twenty of KCL bolos for that &amp; I will let it run in over an hour</td>
<td></td>
</tr>
<tr>
<td>MO: CO2 is a bit high</td>
<td></td>
</tr>
<tr>
<td>Sl/69: MO: Haemodynamically, she is acidotic, also very cold so I am putting up the minute volume to 7 to blow of the CO2</td>
<td></td>
</tr>
<tr>
<td>[Machine beeping, alarms beeping]</td>
<td></td>
</tr>
</tbody>
</table>

| Sl/70: MO: Urine output in theatre was 2600 |
| MO: That’s a lot of urine, she had a diuretic in theatre |
| MO: And another two hundred of urine for this hour. |
| [pause] |
| MO: I am giving the 20kcl in 20 mls of solution 18 over the hour. |
| [Alarms ++++] |

| S1/71: MO: CVP is 4, low, volume depleted |
| MO: I better look at the anaesthetic sheet, it was 14-16 in theatre so it was higher so needs higher filling pressures |
| MO: I will give the team a ring |
| [machine beeping] |
| S1/72: MO: She had no spinal morphine in theatre, |
| S1/73: So she will be sore as I found it great when patients had it in theatre. |
| S1/74: MO: She had Fentanyl 1mg in theatre so she will be uncomfortable, it is short acting |
| S1/75: MO: I will just fix this ryles tube in situ here |
| S1/76: I just want to make it a bit secure in case it dislodges, we’ll take it out later when you’re fully awake |

| Cue & Cue Interpretation |
| Cue Interpretation |
| Cue Interpretation |
| Cue |
| Cue Interpretation |
| Cue |
| Cue Interpretation |
| Cue |

*Appendix I, Page 6*
## Appendix I

**Case One Participant 1 – Think-Aloud Transcript**

<table>
<thead>
<tr>
<th>S1/77: MO</th>
<th>I will check your drainage bag just to see how much is coming from the ryles tube</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1/78:</td>
<td>She is leaking around it there, better check</td>
</tr>
<tr>
<td>S1/79:</td>
<td>Peripheries are cool but all well</td>
</tr>
<tr>
<td>S1/80:</td>
<td>MO: M can you hear me. No response</td>
</tr>
<tr>
<td>S1/81:</td>
<td>MO: Heart rate 105, sinus tachycardia, baseline 74, was 75 earlier</td>
</tr>
<tr>
<td>S1/82:</td>
<td>MO: Fast heart rate is due to soreness, but bleeding as HB is only 8grms/dl or aware underneath as she hears me calling her name, also cold and low volume CVP 4mmHg</td>
</tr>
<tr>
<td>S1/83:</td>
<td>MO: She must be in pain</td>
</tr>
<tr>
<td>S1/84:</td>
<td>MO: She must be in pain</td>
</tr>
<tr>
<td>S1/85:</td>
<td>Okay I am just going to sort out the arterial line</td>
</tr>
<tr>
<td>S1/86:</td>
<td>Not reading great there very positional</td>
</tr>
<tr>
<td>S1/87:</td>
<td>I am just reading her other gas, not much better, I better check with her to see</td>
</tr>
<tr>
<td>S1/88:</td>
<td>MO: M, M, can you hear me, no yet, are you awake, no</td>
</tr>
<tr>
<td>S1/89:</td>
<td>M, M, are you awake, no</td>
</tr>
<tr>
<td>S1/90:</td>
<td>M, M, have you any pain, no response</td>
</tr>
<tr>
<td>S1/91:</td>
<td>MO: She is not responding to verbal stimuli at all at the moment, but she could be awake underneath</td>
</tr>
<tr>
<td>S1/92:</td>
<td>MO: Did you see the gas, yes I changed that</td>
</tr>
<tr>
<td>S1/93:</td>
<td>MO: M, M, are you awake there, no budge</td>
</tr>
<tr>
<td>S1/94:</td>
<td>MO: She is not moving but that could be because she is too sore to move or just not awake or not in pain, not that useful sometimes I find because it can mean very different things and only the patient can clarify that for me, but not at the moment</td>
</tr>
<tr>
<td>S1/95:</td>
<td>MO: She is also experiencing pain even though there is no response yet as she is not awake</td>
</tr>
<tr>
<td>S1/96:</td>
<td>MO: Her MAP is up in the 95’s now since I started talking to her</td>
</tr>
<tr>
<td></td>
<td>[Alarms +++++ lot of talking]</td>
</tr>
<tr>
<td></td>
<td>[Bleeping sound+++++]</td>
</tr>
<tr>
<td>S1/97:</td>
<td>MO: I have just increased the GTN to 10 to get</td>
</tr>
</tbody>
</table>

**Cue & Cue interpretation**

- **Cue**
- **Cue Interpretation**
- **1st Order Judgement**

*Appendix I, Page 7*
<table>
<thead>
<tr>
<th>Line</th>
<th>Transcript</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1/98: MO</td>
<td>She is also hypertensive due to pain but also may be awake underneath because the MAP went up when I was talking to her, just before that it was 89, so it continues to rise</td>
</tr>
<tr>
<td>S1/99: MO</td>
<td>There is no reason why her mean is so high, she must be in pain</td>
</tr>
<tr>
<td>S1/100: MO</td>
<td>So the MAP is rising</td>
</tr>
<tr>
<td>S1/101: MO</td>
<td>I am just checking my lines just to make sure there are no kinks</td>
</tr>
<tr>
<td>S1/102: MO</td>
<td>I need to check I have no kinks under all the dressing here</td>
</tr>
<tr>
<td>S1/103: MO</td>
<td>My output is filling there so that is good</td>
</tr>
<tr>
<td>S1/104: MO</td>
<td>Do you want to give her something for that</td>
</tr>
<tr>
<td>S1/105: MO</td>
<td>I need to document this before it all goes pear shaped, don’t worry, all done, okay</td>
</tr>
<tr>
<td>S1/106: MO</td>
<td>She is in pain even though she did not respond</td>
</tr>
<tr>
<td>S1/107: MO</td>
<td>She is sound asleep but could be awake underneath</td>
</tr>
<tr>
<td>S1/108: MO</td>
<td>Her haemodynamic status is altered so she is haemodynamically unstable</td>
</tr>
<tr>
<td>S1/109: MO</td>
<td>In particular her mean arterial blood pressure and heart rate</td>
</tr>
<tr>
<td>S1/110: MO</td>
<td>She has acute pain, acute I would say</td>
</tr>
<tr>
<td>S1/111: MO</td>
<td>So I will let her sleep away there</td>
</tr>
<tr>
<td>MO</td>
<td>I will give her the morphine now, so that she won’t have any pain when she starts to wake up.</td>
</tr>
<tr>
<td>S1/112: MO</td>
<td>Your nose is bleeding a bit there, M.</td>
</tr>
<tr>
<td>S1/113: Dr to M</td>
<td>How is she doing</td>
</tr>
<tr>
<td>S1/114: M to DR</td>
<td>She’s had morphine</td>
</tr>
<tr>
<td>S1/115: MO</td>
<td>She’s not awake yet but she is sore I would say</td>
</tr>
</tbody>
</table>
### Appendix I

Case One Participant 1 – Think-Aloud Transcript

<p>| S1/116: M to DR: Is morphine okay then, YES |  |
| S1/117: MO: I will suction this lady now, it is just 5pm | Cue |
| MO: M, can you hear me, Oh, Can you hear me, M. |  |
| MO: She is waking up a bit, moving her hands there |  |
| MO: I’m going to give you a couple of big breaths here to see if you have any phlegm in your chest. |  |
| MO: Doesn’t seem to be too much there M | [pause] |
| [getting equipment ready] |  |
| MO: Here we go, M, this is going to make you cough. |  |
| MO: If there’s any phlegm there just give a big old cough. Okay, M relax, I know it is uncomfortable, so must be sore |  |
| MO: No cough, huh |  |
| MO: Too sleepy to cough, poor cough reflex, not awake, wakefulness level. She is sound asleep |  |
| MO: Nothing much there at all. A little bit of blood stained saliva, that’s about all it is really |  |
| MO: The saturation is 100%, that is pretty excellent. [pause] |  |
| MO: Back on with the alarms. |  |
| S1/118: MO: Mean 90, another acute rise | Cue |
| S1/119: MO: I better get some morphine, I would say she is uncomfortable with the suctioning, also aware underneath |  |
| S1/120: MO: She is a bit on the hypertensive side |  |
| S1/121: MO: I would say she is uncomfortable with the suctioning |  |
| S1/122: MO: Also aware underneath |  |
| MO: Okay, I think I will turn up the GTN, up to 4, see how we go from there. [some activity going on] |  |
| S1/123: MO: She should not be that hypertensive |  |
| S1/124: MO: I have just suctioned her via the ETTube, uncomfortable with procedure so must be sore |  |</p>
<table>
<thead>
<tr>
<th>MO: The adrenaline has been turned off because she was a bit hypertensive earlier.</th>
<th>[alarm going off]</th>
<th>[Sounds like ventilator alarm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1/125: MO: I will work with the GTN &amp; try and get that down.</td>
<td>[alarm going off]</td>
<td>[Sounds like ventilator alarm]</td>
</tr>
<tr>
<td>S1/129: MO: She has a rate of 100.</td>
<td>[alarm going off]</td>
<td>[Sounds like ventilator alarm]</td>
</tr>
<tr>
<td>S1/132: MO: CVP 3 so low in volume as baseline 14-16</td>
<td>[alarm going off]</td>
<td>[Sounds like ventilator alarm]</td>
</tr>
<tr>
<td>S1/133: MO: Central temperature 35.7 so warming slowly.</td>
<td>[alarm going off]</td>
<td>[Sounds like ventilator alarm]</td>
</tr>
<tr>
<td>S1/134: MO: Lips bluish</td>
<td>[alarm going off]</td>
<td>[Sounds like ventilator alarm]</td>
</tr>
<tr>
<td>S1/135: MO: Left ventricular ejection fraction 50% so good left ventricular function despite positive family history</td>
<td>[alarm going off]</td>
<td>[Sounds like ventilator alarm]</td>
</tr>
<tr>
<td>S1/136: MO: Pupils normal size</td>
<td>[alarm going off]</td>
<td>[Sounds like ventilator alarm]</td>
</tr>
<tr>
<td>S1/139: MO: Mean response to analgesia</td>
<td>[alarm going off]</td>
<td>[Sounds like ventilator alarm]</td>
</tr>
<tr>
<td>S1/140: Mean was 68 post morphine so must be experiencing discomfort as look at the mean now, comfort impaired, also aware</td>
<td>[alarm going off]</td>
<td>[Sounds like ventilator alarm]</td>
</tr>
<tr>
<td>S1/141: But she was also on GTN and low in volume at that time</td>
<td>[alarm going off]</td>
<td>[Sounds like ventilator alarm]</td>
</tr>
<tr>
<td>S1/142: MO: She grimaced when suctioned earlier</td>
<td>[alarm going off]</td>
<td>[Sounds like ventilator alarm]</td>
</tr>
<tr>
<td>S1/144: MO: Haemodynamically, her mean is high, cold, on support</td>
<td>[alarm going off]</td>
<td>[Sounds like ventilator alarm]</td>
</tr>
<tr>
<td>S1/145: MO: She must be waking up a bit underneath</td>
<td>[alarm going off]</td>
<td>[Sounds like ventilator alarm]</td>
</tr>
</tbody>
</table>

**Case One Participant 1 – Think-Aloud Transcript**
Appendix 1
Case One Participant 1 – Think-Aloud Transcript

Even though she is not awake really
S1/146: She is awake underneath
S1/147: MO: Her haemodynamics are altered,
S1/148: MO: Haemodynamically she unstable
S1/149: MO: Filling pressures low.
S1/150: MO: She is in acute pain even though she did not respond to verbal stimuli. It is now 6pm.
S1/151: MO: I will give her morphine
    [machine beeping, alarm going off]
    [pause]
[Lots of noise and activity going on in the background]
    [Machine beeping]
S1/152: MO: I have plenty of lines to play around with, I can use this nice little line in her hand.
S1/153: MO: I have given her 4mgs Morphine
    [alarms++++
S1/154: A to MO: Have you heard of our new thought? Apparently, the heart’s, last week or this week, the pain control wasn’t adequate. So they were all sore in the immediate post operative period. So, the plan from the intensivist is to give them all a fentanyl infusion.
S1/155: M to A: So we are going to give fentanyl.
S1/156: M to A: Right. The only thing is that he was here ten minutes ago and knew that I had already given morphine because it had been ordered just a little before that, and he said to go ahead with that.
S1/157: A to M.: Morphine
S1/158: M to A: Yes. The anaesthetist coming back from the theatre had said she was to be given morphine.
S1/159: A to MO: Okay, we will wait & while on the round we will ask him again, he may want to use fentanyl.
S1/160: A to MO: So how are we doing here? We are not on any adrenaline & we are on 4 GTN
S1/161: MO to A: No, we had to stop it, due to her blood pressure. She was on two coming back.
| S1/162: MO to A: She is on 4 of GTN as the mean is a bit high. |
| S1/163: MO to A: I just put up her oxygen a little bit there on that, and I put up the minute volume to seven |
| S1/164: MO to A: She’s actually got minimal secretions which are a little blood stained from ETT tube. |
| S1/165: A to MO: Is it. Oh yes I can see it. |
| S1/166: MO to A: Yes. And some from her nose as well, yes. But very little. |
| S1/167: A to MO: Maybe it is just from there as there was a problem with the ryles tube in theatre. You never know |
| S1/168: MO: Her mean pressure is 70 Which is fine now after the morphine |
| S1/169: MO: I want to attach a bag. I want to put on a bag to that ryles tube and I need to get a little connection for it., oh now better do that |
| S1/170: MO: There’s nothing in that ryles tube |
| [Loud voices in the background, activity going on] |
| S1/171: MO: She’s really putting out a lot of urine, isn’t she |

| S1/172: Manager to MO: |
| [machine beeping] |
| What was the A saying about the pain? |
| S1/173: M to manager: They were just saying, they had a discussion recently and they felt that the patients weren’t getting enough pain relief, that they really should on the first and second day post op, and they felt that if they gave them a good whack of the fentanyl immediately post operative, it would kind of help. |

| S1/174: MO: Chest drainage is minimal, oh good. |
| [pause] |

| S1/175: MO: Now, I have to change that old tape around her mouth. |
| [pause] |
| S1/176: MO: I’m changing this old tape here because it’s gone all bloody and stained and it is pretty tight too |

Appendix I, Page 13
**Appendix 1**

*Case One Participant 1 – Think-Aloud Transcript*

<table>
<thead>
<tr>
<th>Line</th>
<th>Transcript</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1/177: MO</td>
<td>Where is the balloon on the ETT tube gone to?</td>
</tr>
<tr>
<td>S1/178: MO</td>
<td>I will have to be careful not to get the balloon when I am cutting the tape off, otherwise the patient will run into trouble.</td>
</tr>
<tr>
<td>S1/179: MO</td>
<td>Look at her mouth too, there is a bit of blood in the back of her mouth.</td>
</tr>
<tr>
<td>S1/180: MO</td>
<td>Now, let me see, have we a swan introducer here, yes we have, and I'm using that for her fluids, 6 o'clock time is flying.</td>
</tr>
<tr>
<td></td>
<td>[machine beeping]</td>
</tr>
<tr>
<td></td>
<td>[Lot of activity]</td>
</tr>
<tr>
<td></td>
<td>[pause]</td>
</tr>
<tr>
<td>S1/181: MO</td>
<td>She's starting to wake up there now, look.</td>
</tr>
<tr>
<td></td>
<td>[pause]</td>
</tr>
<tr>
<td>S1/182: MO</td>
<td>Now, M, I'm going to get you something for your mouth.</td>
</tr>
<tr>
<td></td>
<td>[pause]</td>
</tr>
<tr>
<td></td>
<td>[noise of activity by M]</td>
</tr>
<tr>
<td></td>
<td>[Lot of activity]</td>
</tr>
<tr>
<td></td>
<td>[Pause]</td>
</tr>
<tr>
<td>S1/183: MO</td>
<td>M, I'll just wipe your mouth out for you as it is a bit dry.</td>
</tr>
<tr>
<td>S1/184: MO</td>
<td>A little bit of blood clot at the back of the mouth.</td>
</tr>
<tr>
<td>S1/185: MO</td>
<td>There is quite a bit of blood there at the back of the mouth, isn't there.</td>
</tr>
<tr>
<td></td>
<td>[activity going on]</td>
</tr>
<tr>
<td>MO</td>
<td>I am just clearing the back of your throat.</td>
</tr>
<tr>
<td>S1/186: MO</td>
<td>Now M, if there is any old stuff there in the back of your throat, I will get all that stuff out.</td>
</tr>
<tr>
<td></td>
<td>[sound of equipment and lots of noise]</td>
</tr>
<tr>
<td>S1/187: MO</td>
<td>Breathe a bit, M.</td>
</tr>
<tr>
<td></td>
<td>[phone rings]</td>
</tr>
</tbody>
</table>
| S1/188: MO | I will suction just a little bit more stuff in the
## Appendix I  
### Case One Participant 1 - Think-Aloud Transcript

| S1/189: MO | No, no. We’ve had a chest X-ray here already. [noise of activity by M] |
| S1/190: M to Anaesthetist (A): Okay, so the chest X-ray is okay. |
| M to A: ETT Tube in position and all the rest of it |
| A to MO: Yes, the tube is in good position & trachea is in the centre. |
| S1/191: M to A: She’s not really awake yet, but we’re getting there. |
| A to MO: Is she warming |
| M to A: Peripherally 27.4 and centrally is 35.6 |
| A to MO: Great, thank you. |
| S1/192: MO | Now, M. Are you awake, M? |
| S1/193: MO | I am just milking the tubes, it is okay M. |
| S1/194: Sorry for irritating you there M, I am just securing your drains. |
| S1/195: MO | Can you open your eyes, not yet? Are you awake, M? Alright, just go back to sleep then. It is 6.30pm. Your operation is over and it is now about four hours since you came to the intensive care, well done. |
| S1/196: MO | She is waking up a bit moving her hands okay to command |
| S1/197: MO | She felt the drains being tugged |

---

*Cue Interpretation*
### Appendix 1

**Case One Participant 1 – Think-Aloud Transcript**

<table>
<thead>
<tr>
<th>[Phone ringing, bell ding dongs]</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[a lot of background noise and voices]</td>
<td></td>
</tr>
<tr>
<td>[Door bell]</td>
<td></td>
</tr>
</tbody>
</table>

S1/198: MO: It’s just that it has a few little spots on the pillow here, it’s just the pillow I’m going to turn here, just a few spots of blood on it. That’s fine

S1/199: MO: Just the pillow because we turned her earlier on when we were doing the X-ray,

S1/200: MO: and her back is a small little bit red, but it is not too bad.

MO: M you are still not really awake, are you

S1/201: MO: She is obeying some commands

[more activity by M]

S1/202: MO: Chest drainage is still moderate, 220.

[Pause]

S1/203: MO: She’s starting to wake up even though she’s not responding much other than to drains milked

S1/204: MO: When I know she’s awake I’ll give her a small little bit of Hypnoval & let her sleep

S1/205: MO: That arterial line is a bit damp, isn’t it? I am talking to myself here, I feel as if I need psychiatric help

S1/206: MO: Keep your arm straight for a minute, M.

S1/207: MO: She is moving her arms a bit now

S1/208: She is more awake

S1/209: Anxious I would think also

S1/210: Bit agitated as if she is trying to tell me she is sore

S1/211: MO: Let me see now.

S1/212: I am just catching up on my charting

[Pause]

S1/213: MO: Her blood pressure 120 over 60 with a mean of 89 acute rise of MAP

S1/214: MO: Mean blood pressure is a bit high.

S1/215: MO: MAP is climbing up again, she must be experiencing soreness, baseline 70-80

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*Appendix 1, Page 15*
### Appendix 1

**Case One Participant 1 – Think-Aloud Transcript**

| S1/216 | MO: | But she is also awake underneath |
| S1/217 | MO: | She is also anxious |
| S1/218 | MO: | and fighting the ventilator |
| MO: | GTN up to 5 to reduce that blood pressure |
| MO: | CVP is 3. |
| MO: | Low volume, baseline 14-16 |
| MO: | Peripheral temperature is 27.4 |
| MO: | Central temperature is 36.0 |
| S1/219 | MO: | She still feels cool peripherally but slowly warming centrally |
| S1/220 | MO: | Okay, M. |

[Pause]

+++ writing stuff

Okay, M X. Age X. years. Today is the 23rd. Hospital number?

S1/221 MO: Family history, sister had grafts aged 60, and her brother had grafts as well. M past medical history; 81 major RTA 14 weeks in hospital, fractured hip and pelvis, cholecystectomy in the 60s and an appendectomy in 50’s.

S1/222: MO: Stable angina for the past month.

S1/223: MO: That’s the patient’s history done

[Voices talking in the background]

S1/224: MO: Okay M, just relax, you’re doing fine now

S1/225: MO: You are restless, agitated, trying to sit up in the bed

S1/226 MO: Also sore, heart rate up

S1/227: MO: She is fighting the ventilator

S1/228: MO: She is apprehensive there and frightened. M; You’re doing fine.

S1/229: MO: This little tube in your mouth is

[machine beeping]

part of a ventilator, so don’t chew on it, it will be there for just for another hour until you’re more awake

S1/230: MO: M, can you feel that old tube in your mouth

Cue Interpretation

Cue Interpretation

Cue Interpretation

Cue

Cue Interpretation

Cue

Cue

Cue Interpretation

Cue

Cue

Cue Interpretation

Cue

Cues

Cues

Cue

Cues

Appendix I. Page 16
### Appendix 1

#### Case One Participant 1 - Think-Aloud Transcript

| S1/231: MO: You don’t like that tube in your mouth, we’ll have to leave it in a bit longer |
| S1/232: MO: She is chewing on the tube |
| S1/233: She is fighting the ventilator, her rate is up, anxious there, also awake |
| S1/234: MO: She also finds the tube uncomfortable |
| S1/235: MO: She is also awake and her heart rate is up |
| S1/236: MO: Now, you just go back to sleep for another few hours, till the anaesthetic wears off properly |
| S1/237: MO: you will be able to sit up then, and we’ll be able to take the tube out of your mouth. |
| S1/238: MO: Shaking her head from side to side, she is anxious and uneasy |
| S1/239: MO: Which means she is anxious and also more awake and uncomfortable, distressed on the ventilator |
| S1/240: MO: Her heart rate has also increased |
| S1/241: MO: So her haemodynamics are askew at the moment also |
| S1/242: MO: She hasn’t really woken up yet. |
| MO: Are you awake? M? |
| MO: Eyes are open |
| MO: The operation is over just after 6.30pm |
| MO: You can open your eyes, Good girl |
| [Pause] |
| [Machine beeping] |
| [voices in the background, alarm sounding] |
| [alarms ++++] |
| S1/243: MO: M you starting to wake up a bit there now, M? AH, you are waking up a bit there now |
| S1/244: MO: Can open your eyes now. |
| S1/245: MO: Can you stick out your tongue a little bit, |
| S1/246: MO: Can you squeeze my hand, M? |
| MO: Can you open your eyes at all? |
| S1/247: MO: Oh, you’re very sleepy still. |
## Appendix 1
### Case One Participant 1 – Think-Aloud Transcript

<table>
<thead>
<tr>
<th>S1/248: MO: Your eyes are kind of stuck together, aren’t they?</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MO: The operation is over, M</td>
<td></td>
</tr>
<tr>
<td>S1/249: MO: It’s now quarter to seven in the evening.</td>
<td></td>
</tr>
<tr>
<td>MO: You’re back down a little over four hours.</td>
<td></td>
</tr>
<tr>
<td>MO: Back down in the intensive care</td>
<td></td>
</tr>
<tr>
<td>S1/250: MO: You’re squeezing my hand here, are you?</td>
<td></td>
</tr>
<tr>
<td>S1/251: MO: Can you move your feet, M? That’s it, good girl. That’s it.</td>
<td></td>
</tr>
<tr>
<td>MO: Oh, and the feet are perished cold, aren’t they?</td>
<td></td>
</tr>
<tr>
<td>S1/252: MO: Keep you covered with the blankets to keep you warm there. M. Okay</td>
<td></td>
</tr>
</tbody>
</table>

| [Bell ding dongs, machine beeping] |  |
| [lots of background noise] |  |
| [pause++++] |  |

| MO: [some activity documenting & reading the chart.] |  |
| Admission date X so all written down now. |  |
| [Family Visited] |  |

| S1/253: MO: She is fighting the ventilator at the moment |  |
| She is awake |  |
| She also finds the tube uncomfortable, very anxious |  |
| S1/254: MO: Can you hear me alright, M? |  |
| S1/255: MO: Yes, you’re nodding your head, good girl. |  |
| [machine beeping] |  |
| that’s fine. |  |
| MO: You’re waking up a bit, aren’t you. |  |
| S1/256: MO: I’d say she still has a bit of pain. |  |
| S1/257: MO: Do you have any pain, M? You do have a bit of pain |  |
| S1/258: MO: She nodded her head confirming that she was uncomfortable |  |
| S1/259: MO: She grimaced when I milked her drains, feeling pain written all over her face |  |

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*Appendix 1. Page 18*
<table>
<thead>
<tr>
<th>S1/260: MO</th>
<th>She has pain</th>
<th>Intermediate Judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1/262: MO</td>
<td>M is in pain</td>
<td>Intermediate Judgement</td>
</tr>
<tr>
<td>S1/263: MO</td>
<td>She is more awake</td>
<td>Intermediate Judgement</td>
</tr>
<tr>
<td>S1/264: M</td>
<td>Is haemodynamically unstable</td>
<td>Intermediate Judgement</td>
</tr>
<tr>
<td>S1/265: MO</td>
<td>Haemodynamics are unstable</td>
<td>Intermediate Judgement</td>
</tr>
<tr>
<td>S1/266: MO</td>
<td>She is fighting the ventilator</td>
<td>Final judgement</td>
</tr>
<tr>
<td>S1/267: MO</td>
<td>So she is in acute pain</td>
<td>Decision</td>
</tr>
<tr>
<td>MO: Okay, I’ll get you some painkiller</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MO: I’m going to give her the morphine.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MO: It seems like a lot, but it doesn’t seem to be doing a lot for her pain so far.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S1/268: MO</td>
<td>Chest drains are fine, only a small amount of drainage I am bladdering away to myself here</td>
<td>Cue</td>
</tr>
<tr>
<td>S1/269: MO</td>
<td>Your family were on the phone a little while ago, they are coming in to see you shortly</td>
<td></td>
</tr>
<tr>
<td>MO: I’ve given you some more painkiller, alright there? That will take effect shortly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S1/270: MO</td>
<td>I’m going to give her a little bit of Hypnoval now</td>
<td></td>
</tr>
<tr>
<td>[machine beeping]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M to colleague: Hypnoval expiry X, now 7.30pm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MO: Thank you.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[sound of activity]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Pause]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Voices in the background]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[alarm going off]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S1/271: MO</td>
<td>Are you alright there, M?</td>
<td>Cue Interpretation</td>
</tr>
<tr>
<td>S1/272: MO</td>
<td>Can you feel that old tube in your mouth? M</td>
<td></td>
</tr>
<tr>
<td>You don’t like that tube in your mouth, I’d say, we’ll have to leave it in a little bit longer. She is chewing on the tube</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S1/273: MO</td>
<td>She is restless fighting the ventilator</td>
<td></td>
</tr>
<tr>
<td>MO: I’ll give you something that will help you sleep and relax for another while until your anaesthetic wears off. Okay?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MO: It’s a bit soon to take you off the ventilator, alright.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix I
Case One Participant 1 – Think-Aloud Transcript

<table>
<thead>
<tr>
<th>Alarms +++++ &amp; noise in the background</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1/274: Intensivist (I) to MO: How are things?</td>
</tr>
<tr>
<td>M to I: Morphine, would you believe it? 6mgs, and she had pain</td>
</tr>
<tr>
<td>M to I: Would you believe it that she had pain?</td>
</tr>
<tr>
<td>M to I: I asked her if she had pain and she nodded</td>
</tr>
<tr>
<td>M to I: So, I’ll gave her a small little bit of morphine</td>
</tr>
<tr>
<td>I to MO: Yes, but make sure she is extubated by the morning.</td>
</tr>
<tr>
<td>M to I: Long before the morning, she’s moved the toes and squeezed my hand and all that sort of stuff.</td>
</tr>
<tr>
<td>M to I: Oh yes. I expect her to be extubated long before morning.</td>
</tr>
<tr>
<td>S1/274: MO: A small little bit of Hypnoval here to help you sleep. Okay M?</td>
</tr>
<tr>
<td>S1/275: MO: Now, I will put down the GTN a bit.</td>
</tr>
<tr>
<td>[machine beeping]</td>
</tr>
<tr>
<td>[lot of activity]</td>
</tr>
<tr>
<td>S1/276: I to MO: This is just an assessment time of 9 o’clock, six hours post return from theatre, so that everybody has a focus on, this being a operative recovery period, if they’re still intubated from this point onwards, just make sure there is a good definition as to why that is the case</td>
</tr>
<tr>
<td>MO: Why that is the case. Yes. What time is six hour forward? 9 o’clock tonight?</td>
</tr>
<tr>
<td>I: Yes.</td>
</tr>
<tr>
<td>M to I: Would you be hoping to have her extubated by then?</td>
</tr>
<tr>
<td>I to MO: I can accept that it mightn’t necessarily be feasible but, if it’s not feasible, then at least we’re all going to know why it’s not the case.</td>
</tr>
<tr>
<td>M to I: In other words, don’t be giving her too much Hypnoval or morphine (laughs).</td>
</tr>
<tr>
<td>S1/277: MO: I better turn that GTN down a bit</td>
</tr>
<tr>
<td>[machine beeping]</td>
</tr>
<tr>
<td>S1/278: M to I: She’s has had a bit of morphine on board</td>
</tr>
</tbody>
</table>
really.

M to I: but she still seemed to have pain when she woke up, you know

MO: See she needs a little bit of volume.

S1/279: MO: to I: Sorry, would I give her a little bit of volume as her CVP is dropping

M to I: Her blood pressure had been high, that’s why I gave her the morphine and stuff,

M to I: but I think she does need a little bit of gel

I to MO: Her HB; Her haemoglobin, Well, it was eight

M to I: Give her gel anyway, and I’ll get the cardiothoracic team.

S1/280: MO: Okay, Just for a minute I’ll stop the GTN until we get the pressure up.

S1/281: MO: CVP was quite low

S1/282: MO: but, because she was hypertensive, I didn’t want to be giving her volume.

S1/283: MO: I didn’t want to give her volume

S1/284: MO: her CVP is 3 Which is a bit low for her

S1/285: MO: Well, that Hypnoval I gave her certainly drops the pressure a bit, doesn’t it?

S1/286: MO: But she’s was quite awake.

S1/287: MO: She wouldn’t open her eyes at all

S1/288: MO: but she’s was nodding her head confirming that she was uncomfortable

[alarm beeping]

S1/289: MO: and she seemed to have pain

[Lot of noise in background]

S1/290: MO: Well, blood pressure mean 60. The BP is sensitive, isn’t it? So this time the blood pressure response is related to low volume and sedative and rather than analgesia

S1/291: MO: Well, especially when the CVP is low, Hypnoval can it drop very quickly

S1/292: MO: That won’t be for long now, I’ll am giving this volume pretty smartly.
S1/293: MO: This line hasn’t been used in a while so it probably needs a small little bit of a flush.

S1/294: MO: That’s a good big line, there should be no problems with the volume going in there now.

S1/295: MO: And if we get the CVP up there, we’ll be flying, it will come up in a minute.

S1/296: MO: Getting my own pumps here as these were used in theatre just in case we need the adrenaline.

S1/297: MO: I’m leaving just a hint of GTN until the pressure comes right up again.

S1/298: MO: She won’t need adrenaline but I’ll keep it here anyway.

S1/299: MO: Sure, the CVP is coming up there now.

S1/300: MO: Anyway sure that was a lot of morphine for her and it wasn’t touching her.

S1/301: MO: she was fighting the ventilator, she was not compliant on the ventilator. It was only when she started shaking her head a little bit and I wanted her to be ventilated properly, I gave her 2mgs of Midazolam but that dropped her blood pressure, it certainly dropped her pressure.

S1/302: MO: So I have had to give her some volume.

S1/303: MO: There is only 200mls gone in of the gelofusion and that brought her CVP up from 3 to 8.

S1/304: MO: I will turn it down a little bit now.

S1/305: MO: I don’t need the adrenaline now but we might need it later so it’s no harm to have it.
<table>
<thead>
<tr>
<th>[Voices in the background]</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>S1/306: MO: Her pulse oximetry keeps alarming, because she is still cool peripherally.</td>
<td>Cue</td>
</tr>
<tr>
<td>S1/307: MO: Her hands are cold</td>
<td>Cue</td>
</tr>
<tr>
<td>S1/308 MO: I'll do another blood gas on her in a few minutes</td>
<td>Cue</td>
</tr>
<tr>
<td>MO: The last saturation were pretty good on her blood gas</td>
<td>Cue</td>
</tr>
<tr>
<td>[pause]</td>
<td>Cue Interpretation</td>
</tr>
<tr>
<td>MO: Good. I'll just keep the GTN running in the background</td>
<td>Cue</td>
</tr>
<tr>
<td>MO: I'll just have it going on at .5, because I don't want to take it off altogether.</td>
<td>Cue Interpretation</td>
</tr>
<tr>
<td>MO: CVP is coming up now as well, it was only like three, four, now it's seven</td>
<td>Cue</td>
</tr>
<tr>
<td>S1/309: MO: Oxygen saturations 99%</td>
<td>Cue</td>
</tr>
<tr>
<td>So saturations are fine</td>
<td>Cue Interpretation</td>
</tr>
<tr>
<td>MO: And the little bit of gelofusion will help too.</td>
<td>Cue</td>
</tr>
<tr>
<td>[Talk ++++ in background]</td>
<td>Cue</td>
</tr>
<tr>
<td>[pause]</td>
<td>Cue Interpretation</td>
</tr>
<tr>
<td>[machine beeping]</td>
<td></td>
</tr>
<tr>
<td>MO: Mean blood pressure of 75</td>
<td>Cue</td>
</tr>
<tr>
<td>MO: Urine output 200. There is a lot of urine</td>
<td>Cue &amp; Cue Interpretation</td>
</tr>
<tr>
<td>MO: Chest drainage which is up to 250</td>
<td>Cue</td>
</tr>
<tr>
<td>Which is okay too.</td>
<td></td>
</tr>
<tr>
<td>MO: At 7pm I put up 100 mls gelofusion because of her drop in blood pressure after the hypnoval, CVP had been low anyway.</td>
<td>Cue</td>
</tr>
<tr>
<td>MO: Normal sinus rhythm at rate 80, pretty good</td>
<td>Cue Interpretation</td>
</tr>
<tr>
<td>[alarm sounding]</td>
<td></td>
</tr>
<tr>
<td>MO: CVP has come up to 7, in a couple of minutes after giving her the gelofusion</td>
<td>Cue</td>
</tr>
<tr>
<td>MO: That old art line is pretty damp, it's not a great curve</td>
<td>Cue</td>
</tr>
<tr>
<td>S1/310: MO: The mean pressure is 79</td>
<td>Cue</td>
</tr>
<tr>
<td>Which is beginning to climb</td>
<td>Cue Interpretation</td>
</tr>
<tr>
<td>S1/311: MO: There now, she's starting to wake up a bit</td>
<td>Cue</td>
</tr>
</tbody>
</table>
again now., it is half seven at night now M.

MO: She is moving there a bit, restless

S1/312: MO: So, I'd say she'll be uncomfortable enough so

S1/313: MO: Also anxious

S1/314 MO: She is moving quite a bit there

S1/315: MO: She is also awake and uncomfortable there

S1/316: MO: I want to help with pain.

S1/317: MO: I had better write that in now, I'm way behind. Now.

S1/318: MO: Fluid is running nicely, 50 mls in buretrol

[machine beeping]

S1/319: MO: She's starting to wake up a little bit.

S1/320: MO: Are you alright there, M

S1/321: MO: Peripheral Temperature.

[pause]

S1/322: MO: So she's warming up nicely centrally and peripherally.

[Alarms ++++] So haemodynamically she is stable

S1/323: MO: I'm going to do another blood gas on her now.

[activity]

S1/324: MO: She doesn't need suctioning, I just want to see if the change in ventilation helped at all.

S1/325: MO: I will just turn my alarms off.

S1/326: MO: So, I might as well repeat the old ACT as well while I'm doing the blood gas. --- Might as well repeat the ACT

S1/327: MO: She has started to wake up actually

S1/328: MO: She's just that little bit restless.

S1/329: MO: She is anxious

[alarms +++]

S1/330: MO: So I will actually, see what this blood gas is
S1/331: MO: I might put on this IMV valve on the ventilator if the gas is good
S1/332: MO: I will put in ACT first, even though she is not bleeding
S1/333: MO: but her chest drainage is very little there. MO: 60% oxygen IPPV airway pressure is between 15 and 20.
   [pause]
S1/334: MO: Respiratory rate 20, she’s taking some breaths on her own now, some respiratory effort, half seven now
S1/335: MO: I’d say she’d be ready for the IMV valve in a minute.
S1/336: MO: So she is waking up a little bit. She is also anxious, plus fighting the ventilator, chewing on the tube
S1/337: MO: Her SATS are excellent at 100%, you couldn’t get much better than that.
   [pause, activity]
MO: I’m putting this IMV valve on anyway, no matter what the gas are saying.
S1/338: MO: She’s taking some breaths there on her own, isn’t she?
MO: She’s light enough though considering how heavily sedated she was when she came back. She is also awake. Also anxious
S1/339: MO: Just adding the IMV valve here to the ventilator to allow her take some breaths on her own and get some oxygen while she is doing that. Okay. Back again.
   [machine beeping]
   [tapping something]
   [Some activity in the background]
   [people walking around, talking]
   [machines beeping]
   [pause++++]
Perfusionist to MO: Can I see the nursing record sheet
Appendix I
Case One Participant 1 – Think-Aloud Transcript

M to Perfusionist: The nursing record sheet is here.

Perfusionist to MO: She's white in the face

M to Perfusionist: She's not that at all, she's just acidotic.

MO: The magnesium is fine

MO: They like to have it over point seven five or eight postoperatively.

S1/341: MO: She is also sore I would say

MO: She's waking up a bit there

S1/342: MO: She is trying to talk via the ETTube she is awake

S1/342: MO: Right. 'Are you awake, M?'

S1/343: MO: Can you open your eyes? M?

S1/344: MO: You're awake, are you?

S1/345: MO: Are you thirsty, M? Yes, I'll get you some water for your mouth, alright, just a little bit of water on a sponge, but you won't be able to drink it, okay?

S1/346: MO: Try to open your mouth a little bit and I'll just wet your mouth for you, you can’t drink until the tube comes out, you know?

S1/347: MO: Have you a taste in your mouth? You have a little bit of blood in your mouth from earlier on,

S1/348: MO: I will clean that out. That's the girl

S1/349: MO: I will keep her now on the IMV valve until she's ready to be T-pieced.

S1/350: MO: And the intensivist said that we will give her about six hours and then, at that point, they will want to know why she is still intubated

MO: If she needs it fair enough, I will have to make a decision, and keep her intubated because of this, this, this and this.

MO: Otherwise I will be aiming for, like, in six hours she should be warm enough to be put on a T-Piece.

CVP 9 baseline 14-16, responded to volume, vasodilated

S1/351: MO: So she is to be fast tracked, so wake, warm and wean

S1/352: MO: Trying to tell me she is uncomfortable with

Intermediate Judgement

Cue

Cue

Cue Interpretation

Cue

Cue Interpretation

Cue

Cue & Cue Interpretation

Cue & Cue Interpretation
## Appendix I

### Case One Participant 1 – Think-Aloud Transcript

<table>
<thead>
<tr>
<th>Speaker</th>
<th>Time</th>
<th>Transcript</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1/353</td>
<td>MO:</td>
<td>She is obeying all verbal commands as she is awake and light</td>
</tr>
<tr>
<td>S1/354</td>
<td>MO:</td>
<td>Trying to talk via the ETTube, she is awake</td>
</tr>
<tr>
<td>S1/355</td>
<td>MO:</td>
<td>M, you are pointing there, you are nodding your head, have you a pain in your chest or anything, yes</td>
</tr>
<tr>
<td></td>
<td>[pause]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[Activity ++++]</td>
<td></td>
</tr>
<tr>
<td>S1/356</td>
<td>MO:</td>
<td>M, is awake</td>
</tr>
<tr>
<td>S1/357</td>
<td>MO:</td>
<td>Try and open your mouth a little bit and I will wet it for you again there, is your mouth sore, causing some discomfort there</td>
</tr>
<tr>
<td>S/1 358</td>
<td>MO:</td>
<td>Is your throat sore, yes</td>
</tr>
<tr>
<td>S/1 359</td>
<td>MO:</td>
<td>Your throat is sore too</td>
</tr>
<tr>
<td>S/1 360</td>
<td>MO:</td>
<td>That tube annoying you, it is uncomfortable, your throat, oh I know that M, chewing on tube there</td>
</tr>
<tr>
<td>S/1 361</td>
<td>MO:</td>
<td>Just relax, M, she is agitated with the tube, MAP is also starting to climb</td>
</tr>
<tr>
<td>S/1 362</td>
<td>MO:</td>
<td>Okay, M take it easy there</td>
</tr>
<tr>
<td></td>
<td>[alarms+++++]</td>
<td></td>
</tr>
<tr>
<td>S/1 363</td>
<td>MO:</td>
<td>She's certainly getting a bit restless there now, Okay M, relax</td>
</tr>
<tr>
<td>S/1 364</td>
<td>MO:</td>
<td>She seems anxious and uncomfortable there, and fighting the ventilator</td>
</tr>
<tr>
<td>S/365</td>
<td>MO:</td>
<td>She is moving her hands and feet, very uneasy and anxious</td>
</tr>
<tr>
<td>S/366</td>
<td>MO:</td>
<td>She is shaking her head from side to side</td>
</tr>
<tr>
<td>S/367</td>
<td>MO:</td>
<td>Just uneasy in bed, okay M, relax there and anxious</td>
</tr>
<tr>
<td>S/368</td>
<td>MO:</td>
<td>Uncomfortable and awake</td>
</tr>
<tr>
<td>S/369</td>
<td>MO:</td>
<td>Plus fighting the ventilator</td>
</tr>
<tr>
<td>S/370</td>
<td>MO:</td>
<td>She is trying to sit up in the bed, uneasy in bed</td>
</tr>
<tr>
<td>S/371</td>
<td>MO:</td>
<td>She is fidgety plucking the bedclothes, very uneasy</td>
</tr>
</tbody>
</table>

### Cue Interpretation

- **Intermediate Judgement**
  - Cue
  - Cue Interpretation
  - Cue
  - Cue
  - Cue
  - Cue Interpretation
  - Cue
  - Cue Interpretation
  - Cue
  - Cue Interpretation
  - Cue
  - Cue Interpretation
  - Cue
  - Cue Interpretation
  - Cue
  - Cue Interpretation
  - Cue
  - Cue Interpretation
  - Cue
  - Cue Interpretation
  - Cue
### Appendix I

**Case One Participant 1 – Think-Aloud Transcript**

<table>
<thead>
<tr>
<th>S1/372: MO: She is very anxious</th>
<th>Cue Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>[alarms++++]</td>
<td></td>
</tr>
<tr>
<td>[Lots of voices in background]</td>
<td></td>
</tr>
<tr>
<td>S1/373: MO: She is sore I would say</td>
<td>1st Order Judgement</td>
</tr>
<tr>
<td>[pause]</td>
<td></td>
</tr>
<tr>
<td>[activity]</td>
<td></td>
</tr>
<tr>
<td>S1/374: MO: She is anxious</td>
<td>1st Order Judgement</td>
</tr>
<tr>
<td>S1/375: MO: I would say she is sore, I think she needs some morphine, 7.35 there</td>
<td>Cue</td>
</tr>
<tr>
<td>S1/376: MO: M, are you sore? You are sore, nodding your head, okay</td>
<td>Cue</td>
</tr>
<tr>
<td>S1/377: MO: She also may be uncomfortable due to her old injuries, serious hip injury in the past</td>
<td>Cue Interpretation</td>
</tr>
<tr>
<td>S1/378: MO: I know her by now. I know her inside out, last five hours or so</td>
<td>Cue</td>
</tr>
<tr>
<td>S1/379: MO: I know her now how she expresses her pain, how she grimaces, becomes distressed on the ventilator with chewing on the ET Tube</td>
<td>Cue Interpretation</td>
</tr>
<tr>
<td>S1/380: MO: You are sore, she knows exactly how sore she is.</td>
<td>Cue</td>
</tr>
<tr>
<td>S1/381: MO: She said she was sore so that is fine by me because I know her now</td>
<td>Intermediate Judgement</td>
</tr>
<tr>
<td>S1/382: MO: She is sore</td>
<td></td>
</tr>
<tr>
<td>S1/383: MO: Okay I need to calibrate that line</td>
<td></td>
</tr>
<tr>
<td>S1/384: Chest drainage is fine</td>
<td></td>
</tr>
<tr>
<td>S1/385: I am just checking that arterial line, bit damp</td>
<td></td>
</tr>
<tr>
<td>S1/386: MO: When the intensivist comes around, I wonder would the fentanyl be any better rather than morphine be better for pain control maybe not</td>
<td></td>
</tr>
<tr>
<td>S1/387: MO: Well that sedative I gave her certainly dropped her pressure</td>
<td></td>
</tr>
<tr>
<td>S1/388: MO: But she was quite awake</td>
<td></td>
</tr>
<tr>
<td>S1/389: MO: She was nodding her head confirming she was uncomfortable and she seemed to have pain, she grimaced too</td>
<td></td>
</tr>
<tr>
<td>S1/390 MO: Okay, M, all is well, don’t worry</td>
<td></td>
</tr>
<tr>
<td>S1/391: MO: Well MAP 60, it was sensitive, that time the</td>
<td></td>
</tr>
</tbody>
</table>

*Appendix I. Page 28*
<table>
<thead>
<tr>
<th>MAP response was related to low volume and sedative rather than morphine, especially when your CVP is low</th>
</tr>
</thead>
<tbody>
<tr>
<td>[alarms ++++]</td>
</tr>
<tr>
<td>[phone ringing]</td>
</tr>
<tr>
<td>S1/392: MO: So MAP response to previous analgesic, she was warming</td>
</tr>
<tr>
<td>S1/393: MO: I think it was definitely the sedative that dropped the blood pressure</td>
</tr>
<tr>
<td>S1/394: MO: she was also low volume, she was also uneasy</td>
</tr>
<tr>
<td>S1/395: MO: Okay, I am getting it sorted out now for you</td>
</tr>
<tr>
<td>S1/396: MO: So it was definitely not the morphine option that caused the MAP response</td>
</tr>
<tr>
<td>S1/401: MO: She is definitely in pain</td>
</tr>
<tr>
<td>S1/402: MO: All right, M. I’m giving you something else for pain now</td>
</tr>
<tr>
<td>S1/403: MO: She is awake</td>
</tr>
<tr>
<td>[alarms+++}</td>
</tr>
<tr>
<td>S1/404: She is anxious</td>
</tr>
<tr>
<td>S1/405: She is sore</td>
</tr>
<tr>
<td>MO: Right. Now, we’ll give the anaesthetist a little bit of a buzz.</td>
</tr>
<tr>
<td>S1/406: MO: She is haemodynamically more stable</td>
</tr>
<tr>
<td>S1/407: MO: She is fighting the ventilator</td>
</tr>
<tr>
<td>S1/408: MO: She is in pain</td>
</tr>
<tr>
<td>S1/409: MO: It’s going into a little vein in your neck, M, so you won’t even know it’s going in until you feel the effect of the pain relief, good girl, that is</td>
</tr>
<tr>
<td>MO: Your family are outside now, I’m going to let them into you in a few, you won’t be able to talk to them, but they’ll talk to you</td>
</tr>
<tr>
<td>MO: But, anyway, we know the saturations are good and I’m going to write the bits into her chart.</td>
</tr>
<tr>
<td>PH more or less the same 7.35, CO2 5.0, oxygen 19.1, that’s nice. Base minus 1.1 and lactate is the same, more or less, 3.1. Potassium is up to 4.5 after that</td>
</tr>
</tbody>
</table>
Appendix I
Case One Participant 1 – Think-Aloud Transcript

<table>
<thead>
<tr>
<th>S1/410: MO</th>
<th>The morphine is doing the trick</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[pause]</td>
</tr>
<tr>
<td></td>
<td>[Activity ++++]</td>
</tr>
</tbody>
</table>

S1/411: MO: I will get the anaesthetist
MO: Will you ring the intensive care unit at
S1/412: MO: She needs a little bit higher CVP anyway

Colleague: why are you talking to yourself M.

I’m talking into my machine. I want you to know the Academy awards are next week.

[bit laugh]

S1/413 MO: - Just to recap.

In theatre, CVP had been running as high as 18 and as low as 11. It is now 9, eight nine. On account of that I will let the rest of the gelofusion run in.

S1/414: M to A: Oh, is that you? This lady here, M. She’s back just over six hours. We gave her morphine for pain and a tiny little bit of GTN. She doesn’t need adrenaline at the moment as the pressure is very good. It’s just that she’s awake now a little bit, and she’s quite fidgety. She’s on IMV. She is warm. I gave her two of hypnoval a while back. And it dropped the pressure so we put up the gel infusion. I would like to put her on a T-Piece

[Activity ++++]  

S1/415: MO: Okay. Her husband is waiting outside, so with the morphine she is more comfortable.

S1/416: MO: Now it is 745pm Now, if somebody could check this for me.

Female Voice: Yes, seven left, expiry date.

[Background conversations+++++++]
[Voice calling out in the background]
[somebody talking to him]

S1/417: MO: She is warmer now
| MO: But the pressure's down a bit.       |
| MO: And the pressure is coming up, a mean of 77 |
| MO: That's pretty alright               |
| MO: CVP of eight.                       |
| MO: So now we can leave her family in.  |
| MO: Then on to the T-Piece.             |
APPENDIX Ia

CASE ONE TO THIRTY

DISPLAYS:

SEQUENCE AND DIAGRAMMATIC REPRESENTATION OF VERBAL PROTOCOL
APPENDIX 1A

Case 1 - Turned Chest X-Ray - Returned Theatre 2.30pm - Now 3.10pm - Sequence "Verbal Protocol"

Coes (1st Order Coes)
- Map 89 (acute rise)
- Turned chest X-ray
- Nitroglycerin 5
- Adrenaline 1
- Unable to obey verbal commands
- Eyes closed
- Oxy in theatre
- Chest drainage 100mls
- Last quarter
- CABG x 3 with LIMA
- PaO2 9.5 kPa
- Oxygen saturation 93%

Coe Interpretation
- May not be asleep
- Oxy,
- Gone up may be experiencing pain (baseline 70-80)
- Experiencing discomfort
- Conduit support, for MAP also, was at 2
- Inotropic support
- Heavily sedated, zonked
- Zonked, asleep
- May be sore underneath
- Bleeding
- Bleeding when turned, MAP too high
- Type of grafts: LAD, circumflex diagonal (recent M1), MAP too high, could burst grafts
- Hypoxia, bit low for myocardium
- Parameters low, also cold

Intermediate judgement (2nd Order Coes)
- Level of Wakefulness
- Altered Haemodynamics
- Risk for Impaired Comfort
- Risk for Impaired Comfort
- Altered Haemodynamics
- Altered Haemodynamics
- Level of Wakefulness
- Risk for Impaired Comfort
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics

Coes (1st Order Coes)
- High CVP in theatre
- No spinal morphine theatre
- Fentanyl 1mg in theatre
- Heart Rate 105
- No response to verbal stimuli
- Not moving
- Final Judgement
- Risk for Acute Pain
- Decision Analgesia

Coe Interpretation
- Needs high filling pressures which is related to her haemodynamic status
- Will experience soreness
- Short acting, will be uncomfortable
- Sinus Tachycardia (baseline 74)
- Bleeding, cold, CVP 4mmHg, HR 100s/dl.
- Sore
- Aware
- Even though no response take it that she is in pain, MAP 95 since I started talking to her...
- Also awake underneath, MAP up
- Hypertensive GTN 10
- That could mean she is too sore, or no pain
- Or not awake, not that helpful sometimes

Intermediate judgement (2nd Order Coes)
- Altered Haemodynamics
- Risk for Impaired Comfort
- Risk for Impaired Comfort
- Level of Wakefulness
- Risk for Impaired Comfort
- Level of Wakefulness
- Risk for Impaired Comfort
- Level of Wakefulness
- Risk for Impaired Comfort
- Level of Wakefulness
- Risk for Impaired Comfort
- Level of Wakefulness

Decision Analgesia
APPENDIX 1A

**Case 1 – Rest – 7.30pm (Approx. 1 Hour Prior To Extubation and 5 Hours Post-Op.) Sequence "Verbal Protocol"**

**Cues (1st Order Cues)**
- MAP 79 beginning to climb
- Moving quite a bit
- Restlessness
- Temperature central 37.1°C
- Temperature peripherally 33.3°C
- Respiratory rate 20
  - Fighting the ventilator
  - Some respiratory effort, awake
  - Anxious, Sore

**Cue Interpretation**
- Aware, Sore, Anxious, Fighting the ventilator
- Awake, Uncomfortable, Fighting the ventilator
- Warm centrally, Warmed peripherally
  - Some respiratory effort, awake
- Anxious, Sore

**Intermediate judgement (2nd Order Cues)**
- Level of Wakefulness, Impaired Comfort, Anxiety, Patient Ventilator Compliance, Level of Wakefulness, Impaired Comfort, Anxiety, Patient Ventilator Compliance, Altered Haemodynamics, Altered Haemodynamics, Level of Wakefulness, Anxiety, Impaired Comfort, Patient Ventilator Compliance

**Cues (1st Order Cues)**
- Trying to talk via ETTube
- Patient self report pain
- Obey all verbal commands
- Mouth sore
- Throat sore
- Fast Track
- Shaking head side to side
- ETTube annoying
- Trying to sit up bed

**Cue Interpretation**
- Awake, Trying to tell me uncomfortable with tube
- Noes head experiencing soreness
- Awake and light
- Experiencing discomfort mouth
- Complaining throat sore
- Wake warm weak
- Unconscious and anxious
- Uncomfortable
  - Fighting the Ventilator
  - Uncomfortable ETTube, chewing on the tube
- Agitated with tube
- MAP starting to climb
- Unconscious bed

**Intermediate judgement (2nd Order Cues)**
- Level of Wakefulness, Impaired Comfort, Impaired Comfort, Level of Wakefulness, Impaired Comfort, Level of Wakefulness, Anxiety, Impaired Comfort, Patient Ventilator Compliance, Impaired Comfort, Impaired Comfort, Anxiety, Anxiety, Impaired Haemodynamics

**Cues (1st Order Cues)**
- Heart rate 90
- Fidget, plucking at bedclothes
- MAP response previous analgesic
- Nitroglycerin
- Pain location chest
- Sore old injury
- Knowing the patient
- Final Judgement
  - Acute Pain

**Cue Interpretation**
- Regular sinus rhythm, no ectopics, responding to volume CVP
  - Pupil:
  - Volume depleted,
  - Also sedative response and uneasy ...
  - Conduct support
  - Experiencing pain chest, nods head
  - Fracture pelvis past may be causing discomfort
  - I know her now...she said she was sore, okay by me

**Intermediate judgement (2nd Order Cues)**
- Altered Haemodynamics, Anxiety, Altered Haemodynamics, Altered Haemodynamics, Impaired Comfort, Impaired Comfort, Impaired Comfort

**Decision**

**Analgesia**
APPENDIX 1A
Case 1 - Rest - 7.30pm (Approx. 1 Hour Prior To Exubation and 5 Hours Post-Op.) Diagrammatic Representation "Verbal Protocol"

Cues (1st Order Cues) → Cue Interpretation → Intermediate Judgement (2nd Order Cues) → Final Judgment

# MAP 79 beginning to climb
- Awake, sore, anxious

∗ Moving quite a bit
- Awake and uncomfortable

# Respiratory rate 20
- Some respiratory effort, awake, anxious, sore, fighting ventilator...

∗ Trying to talk via ETTube
- Aware, trying to tell me she is uncomfortable with the tube
- Awake and light

∗ Restlessness
- Anxious and uncomfortable, fighting ventilator

∗ Shaking head side to side
- Uneasy and anxious, uncomfortable, awake, fighting the ventilator

∗ Trying to sit up bed
- Uneasy bed

∗ Fidgety plucking bed clothes
- Very uneasy

✍ Pain location pain in chest
- Experiencing pain chest nods head

● Mouth sore
- Experiencing discomfort mouth

● Throat sore
- Complaining sore throat

● ETTube annoying
- Uncomfortable ETTube, chewing on it there, agitated with tube,
- MAP starting climb
- Nods head experiencing soreness

▲ Patient self-report pain
- I know her by now and how she expresses her pain, plus she grimaced and distressed on the ventilator, she said she was sore, okay by me
- Fracture pelvis past may be causing discomfort

≈ Sore old injury

# Heart rate 90
- Regular sinus rhythm, no ectopics, responding to volume, CVP 9mmHg

# Temperature central 37.1°C
- Warm centrally

# Temperature peripherally 33.3°C
- Warming peripherally

# MAP response previous analgesia
- Warming centrally and peripherally, volume depleted, then also sedative response and uneasy, not the morphine option (baseline 70-80)

■ Nitroglycerin 1
- Consult support

Level of Wakefulness

→ Anxiety

→ Impaired Comfort

→ Acute Pain

→ Altered Haemodynamics

→ Patient Ventilator Compliance

→ Decision

Analgesia

# Physiological cue
■ Mechanical cue
+ Technical cue
* Behavioural (general) cue
● Pain descriptor cue
□ Covert behaviour cue
◆ Overt motor pain behaviour cue
▲ Knowledge cue
≈ Physical cue
▲ Parachanical cue
APPENDIX 1A

Case 2 - Turned Chest X-Ray - Returned Theatre - 1pm - Now 2pm - Diagrammatic Representation "Verbal Protocol"

Cues (1st Order Cues) → Cue Interpretation → Intermediate Judgement (2nd Order Cues) → Final Judgement

- **MAP 78**
  - Normotensive (baseline 75-80) not pain moment, asleep

- **Heart rate 80**
  - Regular sinus rhythm frequent ventricular ectopics (baseline 72), not pain at moment, asleep

- **Respiratory rate 10**
  - Comfortable, compliant on ventilator, not distressed, asleep

- **Oxygen 1 mg in theatre**
  - Not excessive amount, will be sore, asleep

- **No spinal morphine in theatre**
  - May experience discomfort very soon, asleep

- **Turned chest x-ray**
  - May be sore due to turning

- **Breathing pattern normal**
  - Comfortable, not distressed ventilator, asleep

- **No response to verbal stimuli**
  - No response, not experiencing pain moment, but at risk for pain, asleep

- **Not moving**
  - No movement before, during or after we turned her, so not uncomfortable

- **Airway pressure 25cm**
  - Sound asleep, normal respiratory parameters, not choking on ET tube, recital on ventilator

- **No response to stimulation**
  - Still under anaesthetic, comfortable

- **Eyes closed**
  - Asleep

- **Grafts x 2 with LIMA**
  - Type of grafts, no problem in theatre, EF 40%

- **Adrenaline 3**
  - Inotropic support keeping him

- **Nitroglycerin 1**
  - Conduit support

- **Temperature central 35.4°C**
  - Cold centrally

- **Temperature peripheral 29.5°C**
  - Cool peripherally

- **Skin cool**
  - Correlates with temperature

↓

- **Risk for Impaired Comfort**
  - Level of Wakefulness

↓

- **Risk for Acute Pain**
  - Decision
    - No Analgesia

↓

- **Altered Haemodynamics**
  - Patient Ventilator Compliance

Legend:
- # Physiological cue
- ■ Mechanical cue
- + Technical cue
- * Behavioural (general) cue
- • Pain descriptor cue
- □ Covert behaviour cue
- ⊗ Overt motor pain behaviour cue
- † Knowledge cue
- ≈ Physical cue
- △ Paradoxical cue
APPENDIX 1A

Case 2 - ECG - 6pm (Approx. 1 Hour Prior To Extubation and 5 Hours Post-Operative) Diagrammatic Representation “Verbal Protocol”

Coess (1st Order Coes) → Cue Interpretation → Intermediate Judgement (2nd Order Cues) → Final Judgement

- Heart Check ECG
  - Uncomfortable, when pulling electrodes off chest, has arrhythmia, hands going toward chest
- Chewing on ETTube
  - Uncomfortable, not tolerating ETTube, distressed ventillator, agitated
- Breathing pattern shallow rate 18
  - Not comfortable, distressed on ventillator, bothered, white x-ray
- Knowing the patient
  - Everything is pointing towards pain, know her now, anxious, distressed, not happy on ventillator
- Grinace
  - Experiencing pain
- Patient self report pain
  - Nods, confirms in pain
- ETTube uncomfortable
  - Uncomfortable, confirms nods head, anxious with ET Tube, confirms this
- Pain location
  - Confirms very sore at chest surgery site

- Restlessness
  - Agitated and uncomfortable, awake, not in sync with ventillator
- Moving both arms and legs
  - Uneasy, awake
- Attempting to self extubate
  - Agitated, uncomfortable, awake
- Obey all verbal commands
  - Awake
- Eyes open
  - Awake but not maintaining eye contact, anxious

- Temperature central 37.0°C
  - Warm centrally
- Temperature peripheral 33.6°C
  - Warming peripherally
- Nitroglycerin 1
  - Conduit support
- MAP 70
  - Borderline MAP (baseline 75-80), warming, CVP 15mmHg
- Adrenaline 2
  - Inotropic support
- Heart rate 92
  - Regular sinus rhythm, occasional ectopies, not compromising blood pressure, bit anxious, sure, awake

Impaired Comfort → Acute Pain → Anxiety → Level of Wakefulness → Altered Haemodynamics → Patient Ventilator Compliance

- Physical cue
- Mechanical cue
- Technical cue
- Behavioural (general) cue
- Pain descriptor cue
- Covert behaviour cue
- Overt motor pain behaviour cue
- Knowledge cue
- Physical cue
- Paracausal cue
APPENDIX 1A


Cues (1st Order Cues) → Cue Interpretation → Intermediate Judgement (2nd Order Cues) → Final Judgement

# MAP 100 (shooting up) .......................................................... Uncomfortable but no response, MAP high (bit hypertensive) (baseline 70-80), agitated, not awake
+ Turned chest x-ray ................................................................. Experiencing soreness with the turn, on his face
■ Fentanyl 1 mg in theatre ......................................................... In pain, short-acting
■ No spinal morphine in theatre .............................................. Experiencing pain
○ Grunace when turned ............................................................ Experiencing discomfort
● He is rigid there ................................................................. He was rigid like a board during turn
★ Response to verbal stimuli .................................................. No response, not awake enough to be appropriate
# MAP response to analgesia and sedative ................................ Dramatic drop MAP 60, so sore, drop MAP nitride, also very anxious, GTN

▲ Ocry in theatre ................................................................. Bleeding in theatre, MAP not helping
■ Nicnide 5 ................................................................. Support vasodilator, MAP high
■ Nitroglycerin 15 ................................................................. Conduct support, MAP too high
● Chest drainage 100 last quarter ........................................... Bleeding, also turned, MAP up also, ACT abnormal
# Temperature central 35°C ....................................................... Cold centrally
# Temperature peripheral 25.0°C ............................................... Cold peripherally
# Heart rate 115 ................................................................. Sinus tachycardia, cold, shaky (baseline 75), agitated, uncomfortable, biting tube, fighting the ventilator, CVP 5mmHg, some ectopes

★ Eyes closed ................................................................. Sedated still under anaesthetic, sore underneath
★ Not obeying verbal commands ........................................... Heavily sedated
★ Restlessness ................................................................. Agitated, MAP up, heart rate fast, uncomfortable, not happy on ventilator
★ Fidgety, plucking bed clothes ........................................... Anxious, uncomfortable, not aware, MAP up, not happy on ventilator
□ Uneasy ................................................................. Bothered, bit distressed, shaking and shivery
★ Biting ETiube ................................................................. Not tolerating ventilator, distressed, in pain, agitated

Risk for Impaired Comfort → Process

Altered Haemodynamics

Risk for Acute Pain

Decision

Analgesia and Sedative

Level of Wakefulness

Anxiety

Patient Ventilator Compliance

# Physiological cue
■ Mechanical cue
+ Technical cue
★ Behavioural (general) cue
● Pain descriptor cue
□ Covert behaviour cue
● Overt motor pain behaviour cue
▲ Knowledge cue
⇌ Physical cue
△ Pseuodical cue
APPENDIX 1A
Case 3 – Rest – 5pm (Approx. 1 Hour Prior To Extubation and 5 Hours Post-Operative) Sequence “Verbal Protocol”

**Cues (1st Order Cues)**
- MAP 70
  - Comfortable
  - Normal sinus rhythm (not showing up)
  - Regular heart rate (88)
  - Eyes closed
  - Rectal
  - Risk for Impaired Comfort
  - Not shivering, relaxed
  - Not grinning

**Cue Interpretation**
- Comfortable
- Normal sinus rhythm
- Regular heart rate
- Not shivering
- No face
- Not grinning

**Intermediate judgement (2nd Order Cues)**
- Risk for Impaired Comfort
- Not shivering
- Not experiencing
- Not grinning

**Cues (1st Order Cues)**
- Respiratory rate 13
  - Tolerating
  - Restful
  - Comfortable
  - Conduit support
  - Patient Ventilator
  - Level of Wakefulness
  - Not shivering
  - Not grinning

**Cue Interpretation**
- Restful
- Comfortable
- Conduit support
- Patient Ventilator
- Level of Wakefulness
- Not shivering
- Not grinning

**Intermediate judgement (2nd Order Cues)**
- Risk for Impaired Comfort
- Not shivering
- Not grinning

**Cues (1st Order Cues)**
- No movement
  - Asleep
  - Not experiencing
  - Not shivering
  - Not grinning

**Cue Interpretation**
- Asleep
- Not experiencing
- Not shivering
- Not grinning

**Intermediate judgement (2nd Order Cues)**
- Level of Wakefulness
- Risk for Impaired Comfort
- Patient Ventilator
- Level of Wakefulness
- Risk for Impaired Comfort
- Patient Ventilator

**Final Judgement**
- Risk for Acute Pain
  - Decision Analgesia
Case 4 – Turned Chest X-Ray – Returned Theatre 1pm – Now 1.40pm – Sequence “Verbal Protocol”

Cues (1st Order Cues)
- MAP 93 (acute rise)
- Adrenaline
- Nitroglycerin
- Turned chest x-ray
- Restlessness
- Chewing on ETube
- Frowning looks distressed

Cue Interpretation
- Bit high experiencing sensations (baseline 70-80)
- Anxious
- May be awake underneath
- Hyperensive
- Inotropic support, control hypertension
- Graft support
- Experiencing discomfort
- Unsettled and uneasy
- Could be sore
- No response there
- Anxious
- Uncomfortable
- Rate has changed
- Fighting the ventilator
- Bothered and anxious, could be pain related

Intermediate judgement (2nd Order Cues)
- Impaired Comfort
- Anxiety
- Level of Wakefulness
- Altered Haemodynamics
- Altered Haemodynamics
- Impaired Comfort
- Anxiety
- Impaired Comfort
- Level of Wakefulness
- Anxiety
- Impaired Comfort
- Patient Ventilator Compliance
- Altered Haemodynamics
- Anxiety

Cues (1st Order Cues)
- Resisting movement there
- Eyes open drifts off sleep
- Obey some verbal commands
- CABG x 3 with LIMA
- Oozy in theatre
- Chest drainage 100
- Left ventricular ejection fraction 50%
- Fidgety (plucking bed clothes)
- Heart rate 100
- CVP manitig

Cue Interpretation
- Very stiff and rigid during turn
- Also scared
- Not maintaining eye contact, not awake yet
- Not fully awake or orientated yet
- Type of grafts, problem with RCA in theatre
- Bleeding in theatre
- Currently oozing, MAP up also ACT high
- Good left ventricular function (exclusion of angina) ...
- Very anxious and bothered
- Very anxious
- Not awake yet
- Sinus tachycardia
- Vital signs could be sore but
- Fighting the ventilator
- Volume depleted
- Baseline 10-12mm Hg, diuretic

Intermediate judgement (2nd Order Cues)
- Impaired Comfort
- Anxiety
- Level of Wakefulness
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Patient Ventilator Compliance
- Altered Haemodynamics

Cues (1st Order Cues)
- Temperature central 35.2°C
- Temperature peripheral 27.8°C
- No spinal
- Fentanyl
- Fast Track process
- Grimace when turned
- Patient self report pain
- MAP 60 post morphine

Cue Interpretation
- Cold centrally
- Cold peripherally
- Experiencing pain
- Experience pain, short acting
- Waits, mind the sedatives
- Warm, weak,
- Experiencing pain, on his face when turned
- Confirms pain
- MAP could be due to pain relief
- Also low on volume and on GTN

Intermediate judgement (2nd Order Cues)
- Altered Haemodynamics
- Altered Haemodynamics
- Impaired Comfort
- Impaired Comfort
- Level of Wakefulness
- Altered Haemodynamics
- Impaired Comfort
- Impaired Comfort
- Impaired Comfort
- Altered Haemodynamics

Final Judgement
- Acute Pain
- Decision Analgesia
APPENDIX 1A


Cues (1st Order Cues)

- MAP 93 (acute rise)
- Turned chest x-ray
- Resistant movement there
- Heart rate 100
- No spinal morphine theatre
- Fentanyl 1 mg in theatre
- Grimace when turned
- Patient self report pain
- MAP 60 post morphine
- Restlessness
- Chewing an ET tube
- Frowning, looks distressed
- Fidgety (plucking bedclothes)
- Eyes open drifts off again
- Obeyes some verbal commands
- Fast Track process
- Adrenaline 1
- Nitroglycerin 4
- CAGB x 3 with LUMA
- Oxy in theatre
- Chest drainage 100 last quarter
- Left ventricular ejection fraction 50%
- CVP 5mmHg
- Temperature central 35.2°C
- Temperature peripheral 27.0°C

Cue Interpretation

- Experiencing soreness, bit high, hypertensive, (baseline 70-80), anxious, may be aware underneath, fighting the ventilator
- Experiencing discomfort
- Very rigid and stiff during turn, also scared
- Sinus tachycardia, bit fast (baseline 70) experiencing soreness, very bothered there, fighting ventilator
- Experiencing pain
- Experiencing pain, short acting
- Experiencing pain, on his face when turned
- Confirms pain
- MAP could be due to pain relief, also low in volume and on GTN
- Unsettled and uneasy, could be sore, no response there
- Anxious, fighting the ventilator, uncomfortable, rate has changed
- Bothered and anxious, could be pain related
- Very anxious and bothered, not awake yet
- Not maintaining eye contact, not awake yet
- Not fully awake or orientated yet
- Woke, warm, wear, mind the sedatives
- Inotropic support
- Graft support, control hypertension
- Type of grafts, problem with RCA theatre
- Bleeding in theatre
- Currently oozing, MAP up also, ACT high
- Good left ventricular function (exertional angina)...
- Volume depleted (baseline 10-12 mmHg), diuretic in theatre, heart rate is up, MAP is an issue
- Cold centrally
- Cold peripherally

Intermediate Judgement

(2nd Order Cues)

- Impaired Comfort
- Anxiety
- Level of Wakefulness
- Decision
- Analgesia

Final Judgement

- Acute Pain
- Altered Haemodynamics
- Patient Ventilator Compliance
Case 5 – Turned Chest X-Ray – Returned Theatre 2.10pm – Now 3pm – Sequence “Verbal Protocol”

**Causes (1st Order Causes)**
- Turned chest X-ray
- Fentanyl long in theatre
- Past Track
- CABG x 2 with LIMA
- Eyes closed
- Chest drainage 80 last quarter
- Not obeying verbal commands
- Pupils constricted reacting to light
- Temperature central 35.2°C

**Cause Interpretation**
- Could experience pain/discomfort
- Quite out of it at present
- Fentanyl induction, will be sore, short acting
- For extubation 6 hours no sedative if possible
- Good left ventricular function, no MI, just angiina so should do well
- May experience soreness major surgery
- Still under anaesthesia sedated
- Dumped out post turn, ACT abnormal not bleeding
- Heavily sedated
- Still sedated
- Comfortable
- Cold centrally

**Intermediate judgement (2nd Order Causes)**
- Risk for Impaired Comfort
- Level of Wakefulness
- Risk for Impaired Comfort
- Level of Wakefulness
- Altered Haemodynamics
- Risk for Impaired Comfort
- Level of Wakefulness
- Altered Haemodynamics
- Level of Wakefulness
- Risk for Impaired Comfort
- Altered Haemodynamics

**Causes (1st Order Causes)**
- Temperature peripheral 25.4°C
- Adrenaline 3
- Nitroglycerin .5
- No movement
- Heart rate 80
- MAP 70
- Final Judgement

**Cause Interpretation**
- Cold peripherally
- Inotropic support
- Graft support for LIMA
- Sedated asleep
- Not uncomfortable at present
- Regular sinus rhythm (baseline 70)
- Not in pain at present
- Asleep
- Not in pain at present
- Normotensive baseline 70
- Asleep

**Intermediate judgement (2nd Order Causes)**
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Level of Wakefulness
- Risk for Impaired Comfort
- Altered Haemodynamics
- Risk for Impaired Comfort
- Level of Wakefulness
- Risk for Impaired Comfort
- Altered Haemodynamics
- Level of Wakefulness

Decision
- No Analgesia
- Risk for Acute Pain
**APPENDIX 1A**  

**Case 5 – Turned Chest X-ray – Returned Theatre 2.10pm – Now 3pm – Diagrammatic Representation “Verbal Protocol”**

### Cues (1st Order Cues)
- **Turned chest X-ray** ... Could experience pain/discomfort
- **CABG x 2 plus LIMA** ... May experience soreness major surgery
- **Heart rate 80** ... Regular sinus rhythm (baseline 70) not in pain at present, asleep
- **MAP 70** ... Not in pain, normotensive (baseline 70), asleep
- **Fentanyl 1mg in theatre** ... Quite out of it at present, fentanyl induction, will be sore, short acting
- **Fast Track** ... For extubation 6 hours, no sedative if possible, good left ventricular function, no M1, just angina so should do well
- **Eyes closed** ... Still under anaesthetic, sedated
- **Not obeying verbal commands** ... Heavily sedated
- **Pupils constricted, reacting to light** ... Still sedated and comfortable
- **No movement** ... Sedated, asleep, not uncomfortable at present
- **Chest drainage 80 lost quarter** ... Dumped out post turn, ACT abnormal, not bleeding
- **Temperature central 35.2°C** ... Cold centrally
- **Temperature peripheral 25.4°C** ... Cold peripherally
- **Adrenaline 3** ... Inotropic support
- **Nitroglycerin 5** ... Graft support for LIMA

### Intermediate Judgement (2nd Order Cues)
- **Risk for Impaired Comfort**
- **Risk for Acute Pain**
- **Level of Wakefulness**
- **Altered Haemodynamics**

### Final Judgement
- **Decision** No Analgesia
APPENDIX 1A

Case 5 - Rest - 7.15pm (Approx. 1 Hour Prior To Extubation and 5 Hours Post-Op.) Diagrammatic Representation “Verbal Protocol”

Cues (1st Order Cues) → Cue Interpretation → Intermediate Judgement (2nd Order Cues) → Final Judgement

# MAP 85 climbing
In some discomfort (baseline 70), awake

# MAP previous response to analgesia
MAP 60 post morphine, must be pain

• Patient self-report pain
Experiencing pain, patient told me

* Eyes open
Maintaining eye contact, awake

* Obey all verbal commands
Awake and orientated

# Bilateral chest expansion
Effective breathing pattern relaxed, even though awake, tolerating ventilator

# Respiratory rate 18
Some respiratory effort, tolerating ventilator even though awake, trying to communicate

# Heart rate 90
Bit fast, ST depression with T wave inversion, not as marked, may be sore with rate of 90

■ Nitroglycerin 4
Graft support, MAP high

■ Adrenaline 1
Inotropic support

# Temperature central 37.1°C
Warm centrally

# Temperature peripheral 33.9°C
Warming nicely peripherally

+ Airway pressure 22cm
Not chewing an ET tube so not fighting the ventilator

Impaired Comfort

Acute Pain

Level of Wakefulness

Decision Making

Analgesia

Altered Haemodynamics

Patient Ventilator Compliance

Physiological cue
Mechanical cue
Technical cue
Behavioral (general) cue
Pain descriptor cue
Covert behaviour cue
Overt motor pain behaviour cue
Knowledge cue
≈ Physical cue
△ Paraclinical cue
Case 6 - Turned Chest X-Ray - Returned Theatre 12 Noon - Now 12.30pm - Sequence "Verbal Protocol"

MAP 95 (acute rise)
- Experiencing pain, MAP acute rise (baseline 70-80), awake, anxious, problem for haemodynamics

Grimace
- Experiencing discomfort, she is going against me

No spinal morphine in theatre
- Experiencing discomfort

Fentanyl 1 mg theatre
- Low dose, short acting, experiencing pain

Patient self-report pain
- Experiencing pain

ETTube uncomfortable
- Experiencing discomfort

Respiratory rate 16
- Speed up because she is busy trying to tell me she is in pain plus also awake and agitated

Adrenaline 2
- Inotropic support

Single graft plus LIMA
- Straightforward case, stable intra-operatively, good left ventricular function

Heart rate 105
- Sinus tachycardia (baseline 74), uncomfortable, apprehensive, awake

Nitroglycerin 2
- Conduit support

Temperature central 35.4°C
- Cold centrally

Temperature peripheral 27.0°C
- Cold peripherally

Lips moving
- Beginning to lighten

Obeying verbal commands
- Awake, bit early to be awake

Eyes open
- Making eye contact, looks frightened, telling me 'sara'

Chewing ET Tube
- Awake, agitated, trying to tell me uncomfortable, not helping her MAP

Restlessness
- Awake, becomes agitated when wakers, uncomfortable

Moving both arms a bit
- Uneasy, awake and uncomfortable

Impaired Comfort

Altered Haemodynamics

Acute Pain

Level of Wakefulness

Anxiety

Decision
Analgésia
Case 7 - Turned Chest X-Ray - Returned Theatre 2.15pm - Now 3pm - Diagrammatic Representation "Verbal Protocol"

Cues (1st Order Cues) → Cue Interpretation → Intermediate Judgement (2nd Order Cues) → Final Judgement

- **Turned chest X-ray**... Experiencing discomfort
- **CABG x 3 with LMA**... Experiencing soreness, major surgery
- **Very stiff**... Like a board when turned because she is sure, afraid also
- **ETTube bothersome**... Complaining ETTube uncomfortable, more aware, tube causing anxiety
- **Pain Location**... Confirms sore chest incision
- **Pain intensity**... Confirms experiencing severe soreness

- **Open eyes but drifts off**... Beginning to lighten, but not maintaining eye contact, very cold still
- **Observe some verbal commands**... Started to wake up
- **Respiratory rate 16**... Beginning to surface, bit distressed there on ventilator, frightened, sore
- **Fast Track Policy**... Extubated early, young, good chest, good IV function

- **Restlessness**... Uneasy, fighting the ventilator, uncomfortable
- **Fidgety**... Unsettled, plucking at the bed clothes
- **Chewing ETTube**... Bit distressed, ventilator intolerance, uncomfortable with tube

- **MAP 61**... Just creeping up, adequately perfused, filling pressures are fine, (baseline 70-75), uncomfortable, anxious, waking up a bit
- **Heart rate 100**... Sinus tachycardia, no ectopies (baseline 70), anxious, uncomfortable, waking up a bit, distressed ventilator, more aware
- **Adrenaline 1**... Inotropic support
- **Nitroglycerin 2**... Graft support
- **Temperature peripheral 25.5°C**... Cold peripherally
- **Temperature central 35.4°C**... Cold centrally

- **Anxiety**
- **Altered Hemodynamics**
- **Patient Ventilator Compliance**

**Decision:
Analgesia and Sedative**

# Physiological cue
■ Mechanical cue
+ Technical cue
★ Behavioural (general) cue
● Pain descriptor cue
☑ Covert behaviour cue
🔗 Overt motor pain behaviour cue
△ Knowledge cue
≈ Physical cue
△ Paraclinical cue
## Case 7 - Rest - 7pm (Approx. 1 Hour Prior to Extubation and 5 Hours Post-Op.) Sequence “Verbal Protocol”

### Cases (1st Order Cases)
- Eyes closed
- Not moving
- Not fidgety
- Relaxed facial expression
- Respiratory rate 14
- Not biting on ETTube

#### Interpretation
- Sleeping
- Comfortable at present
- Therefore not in pain at moment
- Comfortable, not in pain
- Sleeping nicely
- Respiratory effort
- Not distressed like before, on the ventilator
- Comfortable at present
- Sleeping
- Synchronising with ventilator
- Comfortable at present

#### Intermediate judgement (2nd Order Cases)
- Level of Wakefulness
- Risk for Impaired Comfort
- Level of Wakefulness
- Risk for Impaired Comfort
- Risk for Anxiety
- Level of Wakefulness
- Altered Haemodynamics
- Patient Ventilator Compliance
- Risk for Impaired Comfort
- Level of Wakefulness
- Patient Ventilator Compliance
- Risk for Impaired Comfort

### Cases (1st Order Cases)
- MAP 74
- Heart rate 86
- Nitroglycerin .5
- Temperature central 36.9°C
- Temperature peripheral 33.0°C

#### Interpretation
- Not in pain, comfortable
- Normotensive, normal filling pressures
- Not anxious like before
- Comfortable at moment
- Regular sinus rhythm
- Not agitated like before
- Asleep, I will not disturb her
- Graft support
- Warming centrally
- Warming peripherally

#### Intermediate judgement (2nd Order Cases)
- Risk for Impaired Comfort
- Altered Haemodynamics
- Risk for Anxiety
- Risk for Impaired Comfort
- Altered Haemodynamics
- Risk for Impaired Comfort
- Level of Wakefulness
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics

### Cases (1st Order Cases)
- Knowing the patient
- Final Judgement
- Risk for Acute Pain

#### Interpretation
- Know her by now, not in pain, but will be
- Asleep, I will not disturb her
- Relaxed on ventilator
- Not frightened or anxious
- Vitals are stable
- Decision Analgesia
Case 8 – Turned Chest X-Ray – Returned Theatre 1pm – Now 2pm – Diagrammatic Representation “Verbal Protocol”

APPENDIX 1A

Cue Interpretation

- Turned chest X-ray
  - Experiencing discomfort, usually sore with turn, not awake yet
- No grimace
  - Not experiencing soreness at the moment
- No response to verbal stimuli
  - No response, not experiencing pain at present but will
- Eyes closed
  - Still under anaesthetic
- Eyelids not flickering
  - Asleep, not in pain presently
- Not obeying any commands
  - Still under effects of anaesthetic
- No movement
  - Out for the count, not sore at present

Intermediate Judgement

- MAP 55 sudden dip
  - Hypotension due to arrhythmias, blood pressure seems to drop with them (baseline 70-75), not pain related
- Heart rate 100
  - Sinus tachycardia with frequent PVCs and APCS, compromising the MAP (baseline 70), not pain related at present, lab of ecotopics, electrolyte related, CVP fine on support, could be awake underneath
- Breathing pattern unequal
  - Left lung not lifting

Final Judgement

- Chest X-ray
  - Chest X-ray; ETube right bronchus
- Adrenaline 6
  - Inotropic support, helping MAP but not heart rate
- Nitroglycerin 1
  - LMA support
- Temperature peripheral 29.7°C
  - Cold peripherally
- Temperature central 35.2°C
  - Cold centrally
- Left ventricular ejection fraction 35%
  - Fair left ventricular function, unstable engine, no MI
- CABG x 3 plus LMA
  - No problems in theatre despite ejection fraction 35% and 4 grafts

Intermediate Judgement

- Risk for Impaired Comfort

Decision

No Analgesia
Case 8 – Rest – 6pm (Approx. One Hour Prior to Extubation and 5 Hours Post-Operative) Sequence “Verbal Protocol”

**Cues (1st Order Cues)**
- Mean arterial blood pressure 72
- Heart rate 88
- Eyes closed
- No movement
- Temperature central 37.0°C
- Temperature peripheral 33.8°C
- Nitroglycerin
- Fast Track Strategy

**Cue Interpretation**
- Not experiencing pain, MAP stable
- Asleep
- Regular sinus rhythm (baseline 80)
- Asleep
- Sleeping
- Comfortable at present
- Warming centrally
- Warming peripherally
- Conduit support
- Wake warm and wean, soon for weaning

**Intermediate judgement (2nd Order Cues)**
- Risk for Impaired Comfort
- Level of Wakefulness
- Risk for Impaired Comfort
- Altered Haemodynamics
- Level of Wakefulness
- Level of Wakefulness
- Level of Wakefulness
- Risk for Impaired Comfort
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Level of Wakefulness
- Altered Haemodynamics

**Cues (1st Order Cues)**
- Respiratory rate 14
- Patient self-report pain
- No Grinace
- Final Judgement

**Cue Interpretation**
- Breathing on her own there
- Will be able to wean
- Comfortable at the minute
- Confirms not in pain at the moment
- Not experiencing pain at the minute but will later

**Intermediate judgement (2nd Order Cues)**
- Level of Wakefulness
- Altered Haemodynamics
- Risk for Impaired Comfort
- Risk for Impaired Comfort
- Risk for Impaired Comfort

**Decision**
- Analgesia

**Risk for Acute Pain**
Case 8 - Rest - 6pm (Approx. 1 Hour Prior to Extubation and 5 Hours Post-Op.) Diagrammatic Representation "Verbal Protocol"

Cues (1st Order Cues) → Cue Interpretation → Intermediate Judgement (2nd Order Cues) → Final Judgement

- Mean arterial blood pressure 72
  - Painfree, mean stable, asleep
- Heart rate 88
  - Not in pain at present, regular sinus rhythm (baseline 80), asleep
- Patient self-report pain
  - Confirms not in pain at the moment
- No grimace
  - Not experiencing pain at the minute, but will later

- Temperature central 37.0°C
  - Warming centrally
- Temperature peripheral 33.8°C
  - Warming peripherally
- Nitroglycerin 1
  - Conduit support

- Eyes closed
  - Asleep
- No movement
  - Sleeping, comfortable at present
- Fast Track Strategy
  - Wake warm and wean, soon for weaning, careful LV function
- Respiratory rate 14
  - Breathing on her own there, asleep, will be able to wean soon, comfortable at the minute

Risk for Impaired Comfort → Risk for Acute Pain

Altered Haemodynamics → Decision Analgesia

Level of Wakefulness

Symbols:
- # Physiological cue
- ■ Mechanical cue
- ++ Technical cue
- * Behavioural (general) cue
- ● Pain descriptor cue
- □ Covert behaviour cue
- > Overt motor pain behaviour cue
- ▲ Knowledge cue
- ≈ Physical cue
- Δ Parachnical cue

Cues (1st Order Cues) → Cue Interpretation → Intermediate Judgement (2nd Order Cues) → Final Judgement

MAP 102 (sudden jump)
- Experiencing pain, hypertensive (baseline 65-80), also oozing due to MAP or turn

Turned chest X-ray
- Experiencing discomfort with turn

Fentanyl 1 mg theatre
- Quite a lot of Fentanyl in theatre, does not appear to be in pain

No grimace when turned, but saying that...
- Not experiencing soreness, not sure

No response to verbal stimuli
- No response, hard to assess, must be sore

MAP still > 100
- Must be sore, still hypertensive

MAP response to analgesia
- So must be sore, also on nitrates, and GTN

Nitroglycerin 10
- Graft support, MAP very high, also an GTN OT, hypertensive in OT, no history of high BP

Oxygen saturation 93%
- Abnormal values, desaturating, very cold

Respiratory pattern shallow
- Respirations very shallow, not ventilating adequately, may be sore

Chest drainage 100 last quarter
- Bleeding, MAP high, ACT 156

Left ventricular ejection fraction 29%
- Poor left ventricular function, two MI’s, bleeding now is a problem

CVP 15mmHg
- Gone up (baseline 10-12mmHg) in theatre, output good, bleeding

Temperature central 35.2°C
- Cold centrally

Temperature peripheral 25.8°C
- Cold peripherally

Heart rate 90
- Regular sinus rhythm with occasional ectopics (baseline 60), potassium low, sore, hard to know, bit fast for him

Nitrates 10
- Vasodilator support, MAP up

Eyes closed
- Asleep, not sore, hard to assess

Not obeying verbal commands
- Heavily sedated

Not moving
- Heavily sedated, not uncomfortable

Risk for Impaired Comfort

Altered Haemodynamics

Risk for Acute Pain

Decision: Analgesia

Physical cue
- Mechanical cue
- Technical cue
- Behavioural (general) cue
- Pain descriptor cue
- Covert behaviour cue
- Overt motor pain behaviour cue
- Knowledge pain behaviour cue
- Physical cue
- Paradoxical cue

Level of Wakefulness
Case 10 - Turned Chest X-Ray - Returned Theatre 3.30pm - Now 4pm - Sequence "Verbal Protocol"

**Coeees (1st Order Coeees)**
- Turned chest X-ray
- MAP B3
- Large amount of support
- CABG x 3 with LIMA
- Eyes closed
- Chest drainage 100 last quarter

**Coee Interpretation**
- Experiencing discomfort
- Borderline, comfortable at present (baseline 70-80)
- Asleep
- MAP controlled by GTN
- Tolerating the ventilator during turn
- May be uncomfortable
- If GTN turned off may be hypertensive GTN 15
- Experiencing soreness with type of surgery
- Asleep
- Oozy at present also turned, abnormal ACT result

**Intermediate judgement (2nd Order Coeees)**
- Risk for Impaired Comfort
- Level of Wakefulness
- Risk for Impaired Comfort
- Level of Wakefulness
- Risk for Impaired Comfort
- Patient Ventilator Compliance
- Risk for Impaired Comfort
- Risk for Impaired Comfort
- Risk for Impaired Comfort
- Level of Wakefulness
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics

**Coeees (1st Order Coeees)**
- No movement
- Heart rate B0
- Temperature 35.0°C central
- Temperature 25.4°C peripheral
- Oozy in theatre
- Respiratory rate 10

**Coee Interpretation**
- Still under anaesthesia
- Comfortable at present
- Not fast, not uncomfortable then (baseline B0)
- Regular sinus rhythm
- Asleep
- Cold centrally
- Cold peripherally
- Bit prone to ooziness in theatre which necessitated blood products
- No breathing by herself, asleep
- Comfortable at moment
- Just moving with the ventilator during turn, airway pressure not rising

**Intermediate judgement (2nd Order Coeees)**
- Level of Wakefulness
- Risk for Impaired Comfort
- Level of Wakefulness
- Risk for Impaired Comfort
- Risk for Impaired Comfort
- Patient Ventilator Compliance

**Coeees (1st Order Coeees)**
- No response, when I am talking to her
- No grimace
- Final Judgement

**Coee Interpretation**
- Heavily sedated
- Comfortable at present
- No response in facial expression when turned, not in pain at present

**Intermediate judgement (2nd Order Coeees)**
- Level of Wakefulness
- Risk for Impaired Comfort
- Risk for Impaired Comfort

**Final Judgement**
- Risk for Acute Pain

**Decision**
- No Analgesia
APPENDIX 1A

Case 10 — Turned Chest X-Ray — Returned Theatre 3.30pm — Now 4pm — Diagrammatic Representation “Verbal Protocol”

Cues (1st Order Cues) → Cue Interpretation → Intermediate Judgement (2nd Order Cues) → Final Judgement

• Turned chest X-ray
  - Experiencing discomfort, may be awake

# MAP 83
  - Borderline, just above baseline, comfortable at present (baseline 70-80), asleep, MAP controlled by GTN, tolerating the ventilator during turn

△ Large amount of support
  - May be uncomfortable, if GTN turned off may be hypertensive, GTN 15

△ CABG x 3 with LIMA
  - Experiencing soreness with type of surgery

# Heart rate 80
  - Not fast, not uncomfortable then, regular sinus rhythm (baseline 80), asleep

+ No grimmace
  - No response in facial expression when turned, not in pain at present

[Red square] Nitroglycerin 15
  - Vasodilator support

[Red triangle] Chest drainage 100 last quarter
  - Occy at present also turned, MAP high, abnormal ACT result

# Temperature 35.0°C central
  - Cold centrally

# Temperature 25.4°C peripheral
  - Cold peripherally

△ Occy in theatre
  - Bit prone to ooziness in theatre which necessitated blood products

[Green star] Eyes closed
  - Asleep

[Green cross] No movement
  - Still under anaesthesia, comfortable at present

# Respiratory rate 10
  - No breathing by herself, asleep, comfortable at present, just moving with the ventilator during turn, airway pressure not rising

[Green cross] No response when I am talking to her
  - Heavily sedated, comfortable at present

Risk for Impaired Comfort → Altered Haemodynamics → Risk for Acute Pain

Decision
No Analgesia

- Physiological cue
- Mechanical cue
- Technical cue
- Behavioural (general) cue
- Pain descriptor cue
- Covert behaviour cue
- Overt motor pain behaviour cue
- Knowledge cue
- Physical cue
- Paradoxical cue
APPENDIX 1A

Case 10 - Rest - 8.20pm (Approx. 1 Hour Prior to Extubation and 5 Hours Post-Op.) Diagrammatic Representation "Verbal Protocol"

Cues (1st Order Cues) → Cue Interpretation → Intermediate Judgement (2nd Order Cues) → Final Judgement

* Chewing on ETubing: Experiencing soreness, going against ventilator, awake, very frightened

# MAP 95: She's definitely feeling it the MAP is so high (baseline 70-80), pain related, on lot of vasodilators, anxious, awake, going against ventilator

● Patient self-report pain: Experiencing soreness confirmed by patient

* Eyes open: Wide awake

* Obeys verbal commands: Awake

# Respiratory rate 20: More aware, breathing on her own, also bit bothered, fighting the ventilator, uncomfortable with tube

- Nipride 5: Vasodilator support

- Nitroglycerin 5: Vasodilator support

# Heart rate 84: Regular sinus rhythm, no ectopics (baseline 80)

# Temperature 36.9°C central: Warming centrally

# Temperature 31.9°C peripheral: Slowly warming peripherally

* Moving around a bit in the bed: Bit bothered there

* Restlessness: Apprehensive and agitated, awake, tube is annoying her, it is uncomfortable

- Unweary: Anxious and unsettled at the moment

Impaired Comfort → Level of Wakefulness → Altered Haemodynamics → Anxiety

Acute Pain → Decision Analysis

- Physiological cue
- Mechanical cue
- Technical cue
- Behavioural (general) cue
- Pain descriptor cue
- Covert behviour cue
- Overt motor pain behaviour cue
- Knowledge cue
- Physical cue
- Paradigm cue
Case 11 – Rest – 7.45pm (Approx. 1 Hour Prior to Extubation and 5 Hours Post-Op.) Sequence “Verbal Protocol”

**Cases (1st Order Cases)**
- Moving tongue either side
- Eyes open
- Pointing to ET tube
- Grin
- Mean 60 still
- Temperature 37.0°C central
- Temperature 32.7°C peripheral
- Adrenaline 3
- Nitroglycerin .5

**Case Interpretation**
- Exploring ET tube, awake
- Annoying him, causing discomfort
- Maintaining eye contact
- Not as frightened as before, startle look gone
- Experiencing pain
- Vasodilating and warming (baseline 70-75), no dysrhythmia, CVP low despite blood products, poor LV function
- Warming centrally
- Warming peripherally
- Inotropic support
- Graft support

**Intermediate judgement (2nd Order Cases)**
- Level of Wakefulness
- Impaired Comfort
- Level of Wakefulness
- Risk for Anxiety
- Impaired Comfort
- Impaired Comfort
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics

**Cases (1st Order Cases)**
- Respiratory rate 18
- Trying to communicate via ET tube
- Not biting the ET tube
- Alveolar pressure 24cm
- Heart rate 94
- Patient self-report pain

**Case Interpretation**
- Awake
- Respiratory effort but not anyway distressed as before
- Synchronising with ventilator
- Wide awake
- Does not feel anxious
- Not anxious at present ...
- Restful on ventilator
- Normal parameters, restful on ventilator at long last
- Still fast, bit low volume, on support (baseline 86), warming nicely
- Bitt sore
- Not anxious
- Experiencing pain, I believe him

**Intermediate judgement (2nd Order Cases)**
- Level of Wakefulness
- Risk for Anxiety
- Patient Ventilator Compliance
- Level of Wakefulness
- Risk for Anxiety
- Risk for Anxiety
- Patient Ventilator Compliance
- Patient Ventilator Compliance
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics

**Cases (1st Order Cases)**
- Pain location
- Final Judgement

**Case Interpretation**
- Chest sore at surgery site

**Intermediate judgement (2nd Order Cases)**
- Impaired Comfort
- Decision Analgesia

**Acute Pain**
Case 11 - Rest - 7.45pm (Approx. 1 Hour Prior to Extubation and 5 Hours Post-Op.) Diagrammatic Representation "Verbal Protocol"

Cues (1st Order Cues) -> Cue Interpretation -> Intermediate Judgement (2nd Order Cues) -> Final Judgement

- Moving tongue either side ET tube: Exploring ET tube, awake, canary him, causing discomfort
- Eyes open: Maintaining eye contact, not as frightened as before, startle look gone
- Respiratory rate 18: Awake, good respiratory effort but not any more distressed as before, synchronising with ventilator
- Trying to communicate via ET tube: Wide awake, does not feel anxious
- Pointing to ET tube: ET tube causing some discomfort
- Grimace: Experiencing pain
- Patient self-report pain: Experiencing pain, I believe him
- Pain location: Chest sore at surgery site
- Mean 60 still: Vasodilating and warming, no dips mean (baseline 70-75), CVP low despite blood products, poor LV function
- Temperature 37.0°C central: Warming centrally
- Temperature 32.7°C peripheral: Warming peripherally
- Adrenaline 3: Inotropic support
- Nitroglycerine 0.5: Graft support
- Heart rate 94: Still bit fast, bit low volume, on support (baseline 88), bit sore warming nicely, not anxious
- Not biting ET tube: Not anxious at present plus he told me, restless on ventilator
- Airway pressure 24cm: Normal parameters, restless on ventilator at long last

Level of Wakefulness

Impaired Comfort

Acute Pain

Decision
Analgiesis

Altered Haemodynamics

Risk for Anxiety

Patient Ventilator Compliance

Physiological cue
Mechanical cue
Technical cue
Behavioural (general) cue
Pain descriptor cue
Covert behaviour cue
Overt motor pain behaviour cue
Knowledge cue
Physical cue
Paraclinical cue
Case 12 – Turned Chest X-Ray – Returned Theatre 12.45pm – Now 1.10pm – Sequence “Verbal Protocol”

**Cues (1st Order Cues)**

- MAP 90
- GTN 10
- Restlessness
- Not obeying verbal commands

**Cue Interpretation**

- MAP high (baseline 70-80), hypertensive, lot of GTN
- Very anxious
- Bit on the lively side, not easy with ventilator
- Uncomfortable
- Acknowledged under the table, not appropriate yet, respiratory rate 14
- Sedated, not moving appropriately yet but she is perfectly aware of me calling her, not doing anything purposeful yet

**Intermediate judgement (2nd Order Cues)**

- Risk for Impaired Comfort
- Altered Haemodynamics
- Anxiety
- Level of Wakefulness
- Risk for Impaired Comfort
- Level of Wakefulness
- Level of Wakefulness
- Anxiety

**Cues (1st Order Cues)**

- Heart rate 105
- Chest drainage 190 last quarter
- Temperature central 35.4C
- Temperature peripheral 25.2C
- Not easy in theatre
- Eyes closed
- Turned chest X-ray
- No response verbal stimuli

**Cue Interpretation**

- Anxious
- Sore, maybe with the turn
- Cold centrally
- Intra-operatively no excessive blood loss
- Heavily sedated, not awake but aware of me talking to her, MAP reflects this
- Could have experienced soreness with the turn, you could see it with turn
- Not responding when asked about pain

**Intermediate judgement (2nd Order Cues)**

- Anxiety
- Altered Haemodynamics
- Risk for Impaired Comfort
- Level of Wakefulness
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Level of Wakefulness
- Risk for Impaired Comfort
- Risk for Impaired Comfort

**Final Judgement**

- Risk for Acute Pain
APPENDIX 1A

Case 12 - Turned Chest X-Ray - Returned Theatre 12.45pm - Now 1.10pm - Diagrammatic Representation “Verbal Protocol”

Cues (1st Order Cues) → Cue Interpretation → Intermediate Judgement (2nd Order Cues) → Final Judgement

# MAP 90: May be experiencing soreness, MAP high (baseline 70-80), hypertensive, very anxious, hears me talking to her

+ Turned chest X-ray: Could have experienced soreness with the turn, you could see it with the turn

* No response verbal commands: Not responding when asked about pain

■ GTN 10: Vasodilator support for MAP up

+ Chest drainage 190 last quarter: Excessive drainage chest tubes, ACT abnormal, could be as a result of the turn, MAP high

# Temperature central 35.4°C: Cold centrally

# Temperature peripheral 25.2°C: Cold peripherally

△ Not oozing in theatre: Intra-operatively no excessive blood loss

* Restlessness: Bit on the lively side, not easy with ventilator, uncomfortable, awake underneath but not appropriate yet, respiratory rate 14

* Fidgety: Anxious

# Heart rate 105: Anxious (baseline 64), sinus tachycardia, sore, maybe with the turn, change in chest drainage, awake even though appears asleep

* Not obeying any commands: Sedated, not moving appropriately yet, not doing anything purposeful yet but she is perfectly aware of me calling her

* Eyes closed: Heavily sedated, not awake but aware of me talking to her, MAP reflects this

Risk for Impaired Comfort → Altered Haemodynamics → Risk for Acute Pain

Decision
Analgesia and Sedative

# Physiological cue
■ Mechanical cue
+ Technical cue
* Behavioural (general) cue
● Pain descriptor cue
□ Covert behaviours cue
крыт motor pain behaviour cue
■ Knowledge cue
= Physical cue
△ Paraclinical cue
APPENDIX 1A

Case 12 - Rest - 5.50pm (Approx. 1 Hour Prior to Extubation and 5 Hours Post-Op.) Diagrammatic Representation "Verbal Protocol"

Causes (1st Order Cues) → Cue Interpretation → Intermediate Judgement (2nd Order Cues) → Final Judgement

* Restlessness ..................................................... Anxious and uncomfortable, awake

☐ Looks worried ................................................... Anxious, frightened and uncomfortable, said she was afraid, wide awake

* Trying to pull at lines .......................................... Vary uneasy

* Trying to self-extricate ........................................ Agitated there, just does not like the tube, the minute she wakes she goes for the tube...

☐ Pointing to ET tube .............................................. Experiencing discomfort with ET tube

● Patient self-report pain ....................................... Experiencing soreness, nods her head

* Eyes open, looking around .................................. Wide awake, anxious looking, everytime she wakes up she gets hostile

* Obeys all commands .......................................... No neurological problems, but not relaxed, when you disturb her just very nervous

# MAP 67 .......................................................... MAP slowly coming up, responding to volume challenge (baseline 70-80), vasodilating

# Heart rate 90 ................................................... Still bit fast, but decreasing with volume (baseline 68), at 90 for last while

# Temperature central 37.0°C .................................. Warm centrally

# Temperature peripheral 32.8°C ............................ Warming peripherally

■ GTN .5 .......................................................... Vasodilator support

Decision Analgesia

# Physiological cue
■ Mechanical cue
+ Technical cue
* Behavioural (general) cue
● Pain descriptor cue
☐ Covert behaviour cue
☐ Overt motor pain behaviour cue
▲ Knowledge cue
≤ Physical cue
▼ Paracrinical cue
Case 13 — Turned Chest X-Ray — Returned Theatre 12.20pm — Now 1.15pm — Sequence "Verbal Protocol"

**Coes (1st Order Coes)**
- Grimace when turned
- Heart rate 107
- MAP 60
- CABG x 2 with LIMA
- Adrenaline 5
- GTN 0.5
- Eyes closed
- No movement

**Case Interpretation**
- Experiencing symptoms during turn
- Sinus tachycardia, pain related
- Also oozey (baseline 60), on support
- May be aware
- Hypotensive, bit oozey (baseline 70-75), reduced her support, sensitive to support, filling pressures low also
- Could be sore
- Major surgery, 3 chest drains, so she will be uncomfortable, no spinal, Fentanyl approach
- Inotropic support, drop MAP when reduced it
- Graft support
- Sedated
- Sleeping comfortably
- Sometimes sore, do not move

**Intermediate judgement (2nd Order Coes)**
- Risk for Impaired Comfort
- Risk for Impaired Comfort
- Altered Haemodynamics
- Level of Wakefulness
- Altered Haemodynamics
- Risk for Impaired Comfort
- Altered Haemodynamics
- Altered Haemodynamics
- Level of Wakefulness
- Level of Wakefulness
- Risk for Impaired Comfort

**Coes (1st Order Coes)**
- No response to any commands
- Chest drainage 90 last quarter
- Temperature central 35.5°C
- Temperature peripheral 26.0°C
- Pupils pin point
- No response to verbal stimuli

**Case Interpretation**
- Heavily sedated
- Bit oozey, ACT abnormal, oozey in theatre
- Cold centrally
- Cold peripherally
- Heavily sedated
- Still has Fentanyl on board
- No response, difficult to assess, grimace when turned

**Intermediate judgement (2nd Order Coes)**
- Level of Wakefulness
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Level of Wakefulness
- Risk for Impaired Comfort
- Risk for Impaired Comfort

**Final Judgement**
- Risk for Acute Pain

**Decision Analysis**
Case 13 – Rest – 5.30pm (Approx. 30 Minutes Prior to Extubation and 5 Hours Post-Op.) Sequence “Verbal Protocol”

**APPENDIX 1A**

**Cues (1st Order Cues)**
- Coughing ETTube
- Pointing to ETTube
- Eyes open, looking around
- MAP 85
- Heart rate 90
- GTN 1

**Cue Interpretation**
- Awake
- Smoker, plenty of secretions
- Tube is irritating her
- Uncomfortable with ETTube
- Wides awake
- Borderline Hypotensive (baseline 70-75)
- Sore coughing on tube
- Wides awake
- Stiff fast for her with occasional PVC’s (baseline 60), not electrolyte related, filling pressures fine
- Uncomfortable with tube
- Wide awake but calm
- Graft support

**Intermediate judgement (2nd Order Cues)**
- Level of Wakefulness
- Altered Haemodynamics
- Impaired Comfort
- Level of Wakefulness
- Altered Haemodynamics
- Impaired Comfort
- Level of Wakefulness
- Altered Haemodynamics
- Impaired Comfort
- Level of Wakefulness
- Altered Haemodynamics
- Impaired Comfort
- Level of Wakefulness
- Altered Haemodynamics
- Impaired Comfort
- Level of Wakefulness
- Altered Haemodynamics
- Impaired Comfort

**Cues (1st Order Cues)**
- Pointing to chest
- Grin
- Trying to communicate via ETTube
- Temperature central 37.2°C
- Temperature peripheral 33.6°C
- Mouth very dry
- Pain severity
- Pain pattern
- Final Judgement

**Cue Interpretation**
- Experiencing pain chest
- Experiencing pain, shown on her face
- Fully with it and aware of surroundings
- Drawing on my hand – sore and wants tube out
- Warm centrally, ready for weaning
- Warming peripherally, ready for weaning
- Not judging her discomfort
- Confirms experiencing severe pain
- Pain was exacerbated with coughing

**Intermediate judgement (2nd Order Cues)**
- Impaired Comfort
- Impaired Comfort
- Level of Wakefulness
- Impaired Comfort
- Altered Haemodynamics
- Altered Haemodynamics
- Impaired Comfort
- Impaired Comfort
- Impaired Comfort

**Final Judgement**
- Acute Pain
- Decision Analgesia
Case 13 - Rest - 5.30pm - (Approx. 30 Minutes Prior to Extubation and 5 Hours Post-Op.) Diagrammatic Representation “Verbal Protocol”

**Case 13**

**Cues (1st Order Cues)**

- **Coughing ET tube**
  - Awake, smoker, plenty of secretions, tube is irritating her

- **Eyes open, looking around**
  - Wide awake

- **Trying to communicate via ET tube**
  - Fully with it and aware of surroundings, drawing on my hand - sore and wants tube out

- **Pointing to ET tube**
  - Uncomfortable with ET tube

- **Pointing to chest**
  - Experiencing pain chest

- **Grimace**
  - Experiencing pain, shows on her face

- **Mouth very dry**
  - Not helping her discomfort

- **Pain severity**
  - Confirms experiencing severe pain

- **Pain pattern**
  - Pain was exacerbated with coughing

**Intermediate Judgement**

- **Level of Wakefulness**
  - Impaired Comfort

**Final Judgement**

- **Altered Haemodynamics**
  - Borderline hypertensive (baseline 70-75), sore with coughing on the tube, wide awake
  - Still fast for her with occasional PVC's (baseline 60), uncomfortable, wide awake but calm
  - Graft support
  - Warm centrally, ready for weaning
  - Warming peripherally, ready for weaning

**Physiological cue**
- Physiological cue
- Mechanical cue
- Technical cue
- Behavioural (general) cue
- Pain descriptor cue
- Covert behaviour cue
- Overt motor pain behaviour cue
- Knowledge cue
- Physical cue
- Paramedical cue
Case 14 – Turned Chest X-Ray – Returned Theatre 3pm – Now 3.30pm – Sequence "Verbal Protocol"

**Caes (1st Order Caes)**

- MAP 95 (all of a sudden)
- Turned chest X-ray
- Grimace when turned
- Rigid there
- CABG x 3 with LIMA
- Pressure areas red
- ETTube uncomfortable
- Patient self-report pain
- Eyes open
- Moving tongue either side of ETTube
- Big lady 81kg weight
- Respiratory rate 16
- Restless
- Chewing ETTube
- Apprehensive
- Nitroglycerin 1
- Dobutamine 5
- Adrenaline 4
- Temperature central 35.0°C
- Temperature peripheral 25.0°C
- Heart rate 100

**Caes Interpretation**

- Sore, hypertensive, (baseline 70-80), on support, aware, anxious
- Experiencing soreness
- Experiencing soreness, evidence on her face when turned
- Resisting the turn, sore
- May be uncomfortable, major surgery, sick heart, ejection fraction 27%
- Feeling uncomfortable, pressure areas very red
- Experiencing discomfort with ETTube, nod head
- Experiencing soreness at present, confirmed by the patient
- Quite awake bit too early
- Awake, quite light, uncomfortable with tube
- Too early to surface, not sedated enough, her weight is the issue, pain relief
- Breathing up a bit, awake, uncomfortable I am sure
- Anxious, light, discomfort
- Agitated, not helping saturations 94%, uncomfortable, awake
- Looks anxious
- Graft support
- Inotropic support, help for cardiac index, sick lady
- Inotropic support
- Cold centrally
- Cold peripherally
- Sinus tachycardia, no ectopics (baseline 76), on support, anxious, pain, awake, filling pressures adequate, poor LV function

**Intermediate Judgement (2nd Order Caes)**

- Impaired Comfort

**Final Judgement**

- Level of Wakefulness
- Acute Pain
- Anxiety
- Altered Haemodynamics

**Other Notes**

- Physical cve
- Mechanical cve
- Technical cve
- Behavioural (specific) cve
- Pain descriptor cve
- Covert behaviour cve
- Overt motor pain behaviour cve
- Knowledge cve
- Physical cve
- Parachronic cve

**Decision Analytics and Sedative**
Case 14 - Rest - 8pm (Approx. 1.5 Hours Prior to Extubation and 5 Hours Post-Operative) Sequence "Verbal Protocol"
Case 15 – Turned Chest X-Ray – Returned Theatre 12.55pm – Now 1.30pm - Sequence “Verbal Protocol”

Cues (1st Order Cues)
- Turned chest X-ray
- No grime
- No spinal morphine in theatre
- Fentanyl 1.5mg in theatre
- CABG x 4 with LIMA
- MAP 50 sudden dip
- Heart rate 110

Cue Interpretation
- Usually experience discomfort when turned
- No evidence of pain at the moment
- Usually experience pain
- Short acting, will experience pain
- Fast tracking
- Major surgery, will have pain
- Ejection fraction 35%
- Hypotensive, low volume (baseline 70-75), not bleeding CVP 1mmHg
- Could be sore, sudden dip during turn
- Sinus tachycardia, low volume (baseline 79)
- Could be uncomfortable

Intermediate judgement (2nd Order Cues)
- Risk for impaired comfort

Cues (1st Order Cues)
- Eyes closed
- No movement
- Not restless
- Not biting on ET tube
- GTN .1
- Adrenaline 2

Cue Interpretation
- Still under the effects of anaesthesia
- Heavily sedated only back from theatre
- More than likely not sore
- Comfortable and settled
- Relaxed on ventilator
- Asleep
- Comfortable for the present
- Not fighting the ventilator
- Sound asleep
- Conduit support
- Inotropic support, MAP low, volume related, CVP very low

Intermediate judgement (2nd Order Cues)
- Level of wakefulness
- Risk for impaired comfort
- Patient ventilator compliance
- Level of wakefulness
- Risk for impaired comfort
- Patient ventilator compliance
- Level of wakefulness
- Altered haemodynamics
- Risk for impaired comfort

Cues (1st Order Cues)
- Temperature central 35.4°C
- Temperature peripheral 25.0°C
- Respiratory rate 10
- No response to verbal stimuli
- Final Judgement

Cue Interpretation
- Cold centrally
- Cold peripherally
- No respiratory effort, asleep
- Just moving with the ventilator
- No response to my questions about pain

Intermediate judgement (2nd Order Cues)
- Altered haemodynamics
- Altered haemodynamics
- Level of wakefulness
- Patient ventilator compliance
- Risk for impaired comfort

Decision Analgesia
- Risk for acute pain
Case 15 - Rest - 5.50pm (Approx. 1 Hour Prior to Extubation and 5 Hours Post-Operative) Sequence "Verbal Protocol"

**Cues (1st Order Cues)**
- Eyes wide open
- Obey all verbal commands
- MAP 68
- Heart rate 90
- Temperature central 37.4°C
- Temperature peripheral 33.8°C
- GIN 5

**Cue Interpretation**
- Awake, maintaining eye contact
- Awake, orientated
- MAP borderline (baseline 78-75), vasodilating
- No longer anxious
- Warm centrally
- Conduit support

**Intermediate judgement (2nd Order Cues)**
- Level of Wakefulness
- Risk for Anxiety
- Risk for Anxiety
- Risk for Anxiety
- Risk for Anxiety
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics

**Cues (1st Order Cues)**
- Grimacing
- Sore mouth
- ETTube uncomfortable
- Respiratory rate 16
- Patient self-report pain
- Pain intensity
- Pain chest incision
- Pain chest drain sites
- Sore when moves bed

**Cue Interpretation**
- Experiencing soreness when shifts in bed as if trying to get comfortable
- Uncomfortable, mouth dry
- ETTube very uncomfortable
- Good breathing effort, awake
- Calm, no longer distressed
- Ready for T-piece, gas excellent
- Experiencing soreness, pain is what the patient says it is
- Sore, but not as severe
- Experiencing soreness chest incision-pain location
- Experiencing soreness chest drain sites-pain location
- Tries to get comfortable, sore

**Intermediate judgement (2nd Order Cues)**
- Impaired Comfort
- Impaired Comfort
- Impaired Comfort
- Level of Wakefulness
- Risk for Anxiety
- Altered Haemodynamics
- Impaired Comfort
- Impaired Comfort
- Impaired Comfort
- Impaired Comfort
- Impaired Comfort

**Cues (1st Order Cues)**
- Previous pain medicine
- Final Judgement
- Acute Pain

**Cue Interpretation**
- Does not know if it helped

**Intermediate judgement (2nd Order Cues)**
- Impaired Comfort
- Decision Analgesia
Case 16 - Turned Chest X-Ray - Returned Theatre 11.45am - Now 12.30pm - Sequence "Verbal Protocol"

**Coes (1st Order Coes)**
- No movement
- Eyes closed
- No grimace
- Not biting ET tube

**Coe Interpretation**
- Not experiencing pain
- Asleep
- Heavily sedated, still under anaesthesia
- No pain
- Not experiencing pain at present, no change facial expression despite morining ...
- Asleep
- Not sore
- No response when turned, still under anaesthesia
- Asleep

**Intermediate judgement (2nd Order Coes)**
- Risk for Impaired Comfort
- Level of Wakesfulness
- Risk for Impaired Comfort
- Risk for Impaired Comfort
- Level of Wakesfulness
- Risk for Impaired Comfort
- Altered Haemodynamics
- Risk for Impaired Comfort

**Cases (1st Order Coes)**
- Heart rate 80
- Fullness
- Chest drainage 150 last quarter
- Respiratory 10
- Breathing pattern regular

**Coe Interpretation**
- Regular sinus rhythm, ST elevation, las pacing wires (Baseline 78)
- Not in pain at present
- Restful
- Bleeding in theatre which necessitated blood products
- Osy at present, abnormal ACT parameters, turned for chest x-ray
- Sound asleep
- Tolerating ventilator
- Comfortable
- Asleep
- Chest expansion equal both sides
- Not sore but will be
- Ventilator synchrony, not trying to communicate

**Intermediate judgement (2nd Order Coes)**
- Altered Haemodynamics
- Level of Wakesfulness
- Altered Haemodynamics
- Patient Ventilator Compliance
- Risk for Impaired Comfort
- Altered Haemodynamics
- Risk for Impaired Comfort
- Patient Ventilator Compliance

**Cases (1st Order Coes)**
- GTN 3
- Adrenaline 1
- Temperature 35.2°C central
- Temperature 24.5°C peripheral
- First track approach
- No response to verbal stimuli
- Final Judgement
- Risk for Acute Pain

**Coe Interpretation**
- Conduit support, ST elevation
- Inotropic support
- Cold centrally
- Cold peripherally
- Move, move, move, good UV function, EF 50%
- No response, appears quite comfortable
- Asleep

**Intermediate judgement (2nd Order Coes)**
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Risk for Impaired Comfort
- Level of Wakesfulness
- Risk for Impaired Comfort
- Level of Wakesfulness
Case 16 — Rest — 5.05pm (Approx. 1 Hour Prior to Extubation and 5 Hours Post-Op.) Sequence "Verbal Protocol"
**Case 16 – Rest – 5.05pm (Approx. 1 Hour Prior to Extubation and 5 Hours Post-Op.) Diagrammatic Representation “Verbal Protocol”**

**Cues (1st Order Cues)**

# Acute rise MAP 90
- Sudden rise in MAP, experiencing pain (baseline 70-80), awake, anxious

# Respiratory pattern altered
- Experiencing pain, breath stacking, way of communicating his pain, anxious, awake, not happy on ventilator

# Respiratory rate 18
- Increased respiratory rate, trying to communicate pain, wide awake, frightened

quipease

* Biting ETube
- Uncomfortable, only way to communicate pain as foreign body present, awake, uneasy, not ventilator compliant at present, bit distressed on ventilator

△ Support requirements
- Experiencing pain, no adrenaline, MAP high, on vasodilator, GTN 6, MAP could be higher

● Patient self-report pain
- Patient confirms that he is experiencing pain

● Pain chest incision
- Experiencing pain surgical incision, confirms that

● Pain chest drains
- Experiencing discomfort chest drain sites, confirms that

● Pain leg
- Some leg pain at the minute

▲ Knowing the patient
- Know him for past five hours, sore, awake, anxious, response of vital signs to analgesia, not complaint ventilator, know how he expresses his pain...

* Tongue moving either side of ETube
- Working up working out what the tube is about, trying to tell me causing discomfort

* Obives all verbal commands
- Awake, orientated, also anxious

* Eyes open
- Maintaining eye contact

# Heart rate 100
- Sinus tachycardia with few PVC's (baseline 78), sore, anxious, awake

# Temperature 37.0°C central
- Warm centrally

# Temperature 33.4°C peripheral
- Warming nicely peripherally

■ Nitroglycerine 6...
- Conduit support, high MAP

**Intermediate Judgement (2nd Order Cues)**

**Final Judgement**

**Impaired Comfort**

**Acute Pain**

**Level of Wakefulness**

**Decision**

**Analgesia**

**Physiological cue**
- Mechanical cue
- Technical cue
- Behavioural (general) cue
- Pain descriptor cue
- Covert behaviour cue
- Overt motor pain behaviour cue

▲ Knowledge cue
≈ Physical cue
△ Perceptual cue

Cues (1st Order Cues) → Cue Interpretation → Intermediate Judgement (2nd Order Cues) → Final Judgement

+ Turned chest X-ray
  - Experiencing discomfort with turning, may be aware underneath

△ CABG x 3 with LIMA
  - Type of surgery, should be sore, sick heart 2M’s this year

★ No response to verbal stimuli
  - No pain at present, hard to know at the moment, out for the count

# MAP 50
  - Hypotensive MAP dipping, sick heart (baseline 70-75), was 65 before turn, ejection fraction 27%

△ Intra-operative status
  - Dips MAP in theatre which responded to volume and support

■ Noradrenaline 10
  - Inotropic support

■ Adrenaline 5
  - Inotropic support

■ Nitroglycerin 1
  - Graft support

# Heart rate 117
  - Sinus tachycardia, low volume, also support related (baseline 67) awake underneath, maybe sore

# Temperature 35.2°C central
  - Cold centrally

# Temperature 24.4°C peripheral
  - Cold peripherally

★ Eyes closed
  - Sound asleep

★ No purposeful response to any commands
  - Heavily sedated

★ No movement
  - Fast asleep, not sore at present

Risk for Impaired Comfort

Altered Hemodynamics

Risk for Acute Pain

Decision
No Analgesia

- Physiological cue
- Mechanical cue
+ Technical cue
★ Behavioural (general) cue
● Pain descriptor cue
□ Covert behaviour cue
○ Overt motor pain behaviour cue
△ Knowledge cue
≈ Physical cue
△ Paraclinical cue
Case 17 – Rest – 5.15pm (Approx. 1.5 Hours Prior to Extubation and 5 Hours Post-Op.) Sequence “Verbal Protocol”

**APPENDIX 1A**

**Eyes open** — MAP 70 — Obays all verbal commands — Position bed uncomfortable — Heart rate 89 — Adrenaline 3 — GTN 1

**Case Interpretation**

Awakens easy to any sound or voices — MAP within normal parameters at last (baseline 70-75), filling pressure fine, CVP 12mmHg — Getting on top of pain hopefully — Not anxious at present — Awake and calm — No longer anxious — Stiff and sore lying in this position — Regular sinus rhythm (baseline 67) — Not anxious like before — Looks comfortable — Inotropic support, being weaned — Graft support LIMA

**Intermediate judgement**

Level of Wakesfulness — Altered Haemodynamics — Impaired Comfort — Anxiety — Level of Wakesfulness — Risk for Anxiety — Impaired Comfort — Altered Haemodynamics — Risk for Anxiety — Impaired Comfort — Altered Haemodynamics — Altered Haemodynamics

**Cases (1st Order Cases)**

Fast track policy — Respiratory rate 16 — Temperature 36.9°C central — Temperature 30.7°C peripheral — Patient self-report pain — Pain chest incision — ET tube causing discomfort — Final Judgement

**Case Interpretation**

Wake, warm and wean, he is getting there now, they did not think he would — Taking some breaths himself, more aware — Not wheezy, had nebuliser — Relaxed, not agitated — Warming centrally — Starting to warm peripherally — Patient says he is sure, so he must be — Sore around the chest incision — Hates ETTube — Nearly ready for T-piece

**Intermediate judgement**

Level of Wakesfulness — Level of Wakesfulness — Altered Wakesfulness — Risk for Anxiety — Altered Wakesfulness — Altered Wakesfulness — Impaired Comfort — Impaired Comfort — Impaired Comfort — Altered Haemodynamics — Decision Analgesia
**APPENDIX 1A**

**Case 17 - Rest - 5.15pm (Approx. 1.5 Hours Prior to Extubation and 5 Hours Post-Op.) Diagrammatic Representation "Verbal Protocol"**

<table>
<thead>
<tr>
<th>Coes (1st Order Cues)</th>
<th>Cue Interpretation</th>
<th>Intermediate Judgement (2nd Order Cues)</th>
<th>Final Judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>✴ Eyes open</td>
<td>Awake and easy to any sounds or voices</td>
<td>Level of Wakefulness</td>
<td></td>
</tr>
<tr>
<td>✴ Obey all verbal commands</td>
<td>Awake and clear, no longer anxious</td>
<td></td>
<td></td>
</tr>
<tr>
<td>△ Fast Track policy</td>
<td>Wake, warm and wear, he is getting there now, they did not think he would</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☑ Respiratory rate 16</td>
<td>Taking some breaths himself, relaxed, more aware, not wheezy, had no bother, not agitated</td>
<td></td>
<td></td>
</tr>
<tr>
<td># MAP 70</td>
<td>MAP within normal parameters at last (baseline 70-75), filling pressures now, CVP 12mmHg, getting top of pain, hopefully no nausea at present</td>
<td></td>
<td></td>
</tr>
<tr>
<td># Heart rate 89</td>
<td>Regular sinus rhythm (baseline 67), not anxious like before, looks comfortable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>▲ Adenalin 3</td>
<td>Isotrope support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>▲ GTN 1</td>
<td>Gastric support LMA</td>
<td></td>
<td></td>
</tr>
<tr>
<td># Temperature 36.9°C central</td>
<td>Warming centrally</td>
<td></td>
<td></td>
</tr>
<tr>
<td># Temperature 30.2°C peripheral</td>
<td>Starting to warm peripherally</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Position bed uncomfortable</td>
<td>Stiff and sore lying in this position</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Patient self-report pain</td>
<td>Patient says he is sore, so he must be</td>
<td>Impaired Comfort</td>
<td></td>
</tr>
<tr>
<td>● Pain chest incision</td>
<td>Sore around the chest incision</td>
<td>Risk for Anxiety</td>
<td></td>
</tr>
<tr>
<td>● ET Tube causing discomfort</td>
<td>Hates that ET Tube, nearly ready for T-piece</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Case 18 - Turned Chest X-Ray - Returned Theatre 12 Noon - Now 12.30pm - Diagrammatic Representation "Verbal Protocol"

**Cues (1st Order Cues)**
- Turned chest X-ray
  - Experiencing discomfort with turning, cut cold
- Fentanyl 1.5mg in theatre
  - He will be sore as fentanyl short acting, want him extubated as soon as possible
- CABG x 3 with LIMA
  - Major surgery, so I expect him to be sore
- No response to verbal stimuli
  - No response in relation to pain at present, fast asleep

**Intermediate Judgement (2nd Order Cues)**
- Risk for Impaired Comfort
- Risk for Acute Pain

**Final Judgement**
- Decision
  - No Analgesia

**Cue Interpretation**
- MAP 54 sudden dip
  - MAP dipping, filling pressures low (baseline 70-80), not pain related at present, support and volume issue, HR 74 bpm, 8% O2, also asleep
- Adrenaline 6
  - Inotropic support, minimal support in theatre, EF 44%
- GTN 1
  - Graft support
- Temperature 29.8°C peripheral
  - Cold peripherally
- Temperature 35.2°C central
  - Cold centrally
- Heart rate 93
  - Regular sinus rhythm with occasional ventricular ectopics, lots of support, volume low (baseline 6L), not pain related, not reliable pointer, plus he is asleep
- Noradrenaline 5
  - Inotropic support

**Decision**
- Level of Wakefulness
- Level of Vitality

**Notes**
- Fast Track principle
  - Wake, warm and wean, no sedative if possible
- Eyelids not flickering
  - Heavily sedated
- Not obeying any commands
  - Still under anaesthesia
- No movement
  - Out for the count, extremely sleepy, not sore at present

**Legend**
- # Physiological cue
- Mechanical cue
- Technical cue
- Behavioural (general) cue
- Pain descriptor cue
- Covert behaviour cue
- Overt motor pain behaviour cue
- Knowledge cue
- Physical cue
- Paraclinical cue
APPENDIX 1A

Case 18 - Rest - 4.50pm (Approx. 1 Hour Prior to Extubation and 5 Hours Post-Op.) Sequence "Verbal Protocol"

**Cases**
- (1st Order Cues)
  - Eyes open
  - Respiratory rate 19
  - ETTube uncomfortable
  - MAP 65
  - GTN 1
  - Temperature 37.1°C central
  - Temperature 33.6°C peripheral
  - Patient self-report pain
  - Pain location

**Cue Interpretation**
- Maintaining eye contact
- Some spontaneous respirations, awake
- Bit uncomfortable there
- Experiencing discomfort with ETTube
- Fully awake now and aware
- Borderline MAP (baseline 70-80), CVP 6mmHg, warming vasodilating
- Graft support
- Warm centrally
- Warming peripherally
- Patient confirms he is experiencing pain
- Experiencing pain chest incision, points to the area

**Intermediate judgement**
- Level of Wakefulness
- Level of Wakefulness
- Impaired Comfort
- Impaired Comfort
- Level of Wakefulness
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Impaired Comfort
- Impaired Comfort

---

**Cases**
- (1st Order Cues)
  - Dry mouth
  - Trying to communicate
  - Heart rate 75
  - Leg pain
  - Pain severity
  - Pain pattern
  - No movement
  - Final Judgement
  - Acute Pain

**Cue Interpretation**
- Patient expressing mouth causing some discomfort
- Fully awake and with it
- Trying to tell me that the tube is uncomfortable
- Regular sinus rhythm (baseline 66)
- Not pain, just bit of discomfort
- Patient confirms pain is severe
- Fine when he is still but when he moves very sore and there all the time then
- Lying very still, afraid have pain if he moves

**Intermediate judgement**
- Impaired Comfort
- Level of Wakefulness
- Impaired Comfort
- Altered Haemodynamics
- Impaired Comfort
- Impaired Comfort
- Impaired Comfort
- Impaired Comfort
- Decision Analgesia
Case 18 - Rest - 4.50pm (Approx. 1 Hour Prior to Extubation and 5 Hours Post-Op.) Diagrammatic Representation "Verbal Protocol"

**Cues (1st Order Cues)**
- * Eyes open there ................................................................. Maintaining eye contact
- # Respiratory rate 19......................................................... Some spontaneous respirations, awake, bit uncomfortable there with tube
- * Trying to communicate via ET tube ................................ Fully awake and with it, trying to tell me that the tube is uncomfortable
- ● ET tube uncomfortable ...................................................... Experiencing discomfort with ET tube, fully awake now and aware
- ● Patient self-report pain ..................................................... Patient confirms he is experiencing pain
- ● Pain location ...................................................................... Experiencing pain chest incision, points to the area
- ● Dry mouth .......................................................................... Patient expressing mouth causing some discomfort
- ● Pain severity ........................................................................ Patient confirms pain is severe
- ● Leg pain ............................................................................ Not pain, just bit of discomfort
- ● Pain pattern ......................................................................... Fine when he is still, but when he moves very sore, there all the time then
- * No movement ...................................................................... Lying very still, afraid have pain if he moves

**Intermediate Judgement (2nd Order Cues)**
- Level of Wakefulness
- Impaired Comfort
- Acute Pain
- Decision
- Analgesia

**Final Judgement**
- Altered Haemodynamics

**Cues (2nd Order Cues)**
- # MAP 65 ........................................................................... MAP borderline (baseline 70-80), vasodilating, warming, CVP 6mmHg
- ■ GTN 1 .............................................................................. Graft support
- # Temperature 37.1°C central .............................................. Warm centrally
- # Temperature 33.6°C peripheral ........................................ Warming peripherally
- # Heart rate 75 ..................................................................... Regular sinus rhythm (baseline 65)
APPENDIX 1A

Case 19 – Rest – 6.50pm (Approx. 1 Hour Prior to Extubation And 5 Hours Post-Op.) Sequence "Verbal Protocol"

**Cues (1st Order Cues)**
- Eyes open
- Obey verbal commands
- MAP 86
- Exploring the ETTube with his tongue
- Respiratory rate 20
- Heart rate 88
- Temperature 36.9°C control

**Case Interpretation**
- Awake following every score
- Awake
- MAP rising slowly, awake (baseline 70-80)
- Also sore
- Awake and looking at the tube
- Tube is uncomfortable
- Sore
- Ready for weaning
- Regular sinus rhythm, with atrial ectopics (baseline 84)
- Warm centrally

**Intermediate judgement (2nd Order Cues)**
- Level of Wakefulness
- Level of Wakefulness
- Impaired Comfort
- Level of Wakefulness
- Impaired Comfort
- Level of Wakefulness
- Impaired Comfort
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics

**Cues (1st Order Cues)**
- Temperature 32.9°C peripheral
- Nitroglycerin 3
- Patient self-report pain
- Patient self-report soreness (location)
- Knowing the patient
- Final Judgement

**Case Interpretation**
- Warming peripherally
- Conduit support LIMA
- He denies pain, not in pain but I feel he is knowing his MAP trend
- Chest drain sites confirm incision is in both areas not in pain
- I know him, even though he denied pain, I know he is sore but was sound and not pain
- Even though aware, always calm over last few hours
- His MAP was a reliable indicator of his pain, plus he grimaced which based on my experience is not always a good indicator post cardiac surgery...

**Intermediate judgement (2nd Order Cues)**
- Altered Haemodynamics
- Altered Haemodynamics
- Impaired Comfort
- Impaired Comfort
- Impaired Comfort
- Level of Wakefulness
- Altered Haemodynamics

**Decision Analysis**
- Acute Pain
Case 19 – Rest – 6.50pm (Approx. 1 Hour Prior to Extubation and 5 Hours Post-Op.) Diagrammatic Representation "Verbal Protocol"

## Cues (1st Order Cues)

- Eyes open: Awake, following every move
- Obays all verbal commands: Awake
- MAP B6 (gradual rise): MAP rising slowly, which means he is awake, also sore (baseline 70-80)
- Exploring the ET tube with his tongue: Awake, is probably wondering about the tube, tube is uncomfortable
- Respiratory rate 20: Awake, trying to communicate that he is awake and sore, ready for weaning

## Intermediate Judgement (2nd Order Cues)

- Heart rate 68: Regular sinus rhythm, with atrial ectopics (baseline 84)
- Temperature 36.9°C central: Warm centrally
- Temperature 32.9°C peripheral: Warm peripheral
- Nitroglycerin 3:

## Final Judgement

- Patient self-report pain: He denies pain, not in pain, but I feel he is knowing his MAP trend
- Knowing the patient: I know him, even though he denied pain, I know he was sore but uses word sore and not pain, even though aware always calm over last few hours, his MAP was a reliable indicator of his pain plus he grimaced, which based on my experience is not always a good index post cardiac surgery...
- Patient self-report of soreness (location): Chest drain sites and chest incision confirms sore in both areas, not pain

## Level of Wakefulness

- Altered Hemodynamics
  - Impaired Comfort
    - Decision Analysis
      - Physiological cue
      - Mechanical cue
      - Technical cue
      - Behavioural (cultural) cue
      - Pain descriptor cue
      - Covert behaviour cue
      - Overt motor pain behaviour cue
      - Knowledge cue
      - Physical cue
      - Parachasmatism cue
Case 20 — Turned Chest X-Ray — Returned Theatre 1pm — Now 1.35pm — Sequence “Verbal Protocol”

**APPENDIX 1A**

### Cases (1st Order Cases)
- **Turned chest X-ray**
- **NAP BD**
- **Adrenaline 6**
- **Nitroglycerin .5**
- **Heart rate 100**
- **Fast Track procedure**

#### Cues (Interpretation)
- **Experience discomfort with turning**
- **MAP a bit high** (baseline 65-70)
- **Uncomfortable**
- **Perhaps more aware underneath**
- **Isotopic support, sensitive to support**
- **Graft support**
- **Slows tachycardia** (baseline 66)
- **Uncomfortable**
- **Awake underneath**
- **Wake, careful with sedatives**
- **Warm and wean if possible within six hours**

#### Intermediate judgment (2nd Order Cases)
- **Risk for Impaired Comfort**
- **Altered Haemodynamics**
- **Risk for Impaired Comfort**
- **Altered Haemodynamics**
- **Altered Haemodynamics**
- **Risk for Impaired Comfort**
- **Level of Wakefulness**
- **Level of Wakefulness**
- **Level of Wakefulness**

### Cases (1st Order Cases)
- **CABG x 1** (LIMA)
- **Respiratory rate 10**
- **Eyes closed**
- **Temperature 35.9°C central**
- **Temperature 27.9°C peripheral**
- **No movement**
- **Not obeying any commands**

#### Cues (Interpretation)
- **Able to be extubated early**
- **One graft; no pre or intra-operative respiratory problems**
- **Painful surgery, expect pain**
- **No respiratory effort, isolated**
- **Chest rising and falling with ventilator**
- **Still very drowsy**
- **Cold centrally**
- **Cold peripherally**
- **Sound asleep**
- **Not sore at present**
- **Still very drowsy**

#### Intermediate judgment (2nd Order Cases)
- **Level of Wakefulness**
- **Altered Haemodynamics**
- **Risk for Impaired Comfort**
- **Altered Haemodynamics**
- **Level of Wakefulness**
- **Altered Haemodynamics**
- **Level of Wakefulness**
- **Risk for Impaired Comfort**
- **Level of Wakefulness**

### Cases (1st Order Cases)
- **Fentanyl 800 micrograms in theatre**
- **No grimmace when turned**
- **No response to verbal stimuli**
- **Final Judgement**
- **Risk for Acute Pain**

#### Cues (Interpretation)
- **I anticipate he will wake up soon, only small amount of Fentanyl**
- **Usually sore**
- **No reaction on his face when turned so no pain at present**
- **Difficult to assess pain**
- **Too drowsy**

#### Intermediate judgment (2nd Order Cases)
- **Level of Wakefulness**
- **Risk for Impaired Comfort**
- **Risk for Impaired Comfort**
- **Level of Wakefulness**

Decision: **No Analgesics**
Case 20 – Turned Chest X-Ray – Returned Theatre 1pm – Now 1.35pm – Diagrammatic Representation “Verbal Protocol”

Cues (1st Order Cues)

- Turned chest X-ray: Experience discomfort with turning
- No grimace when turned: No reaction on his face when turned so no pain at present
- No response to verbal stimuli: Difficult to assess pain, too drowsy

Intermediate Judgement (2nd Order Cues)

- MAP 80: MAP high (baseline 65-70), on support, uncomfortable, perhaps more aware underneath
- Adrenaline 6: isotropic support, sensitive to support
- Heart rate 100: Sineas tachycardia (baseline 64), uncomfortable, aware underneath
- Nitroglycerin 5: Good support
- Temperature 35.2°C central: Cold centrally
- Temperature 27.5°C peripheral: Cold peripherally

Risk for impaired comfort

Risk for Acute Pain

Decision: No analgesia

Cue Interpretation

- Fast Track procedure: Wake, warm and wean if possible within six hours, careful with sedatives
- CABG × 1 (LIMA): One graft: no pre or intra-operative respiratory problems, able to be extubated early, painful surgery
- Respiratory rate 10: No respiratory effort, sedated, chest rising and falling with the ventilator
- Eyes closed: Still very drowsy
- No movement: Sound asleep, not sore at present
- Not obeying any commands: Still very drowsy
- Fentanyl 800 micrograms in theatre: I anticipate he will waken up soon, only small amount of Fentanyl, usually sore

Level of Wackfulness

Altered Haemodynamics

Physiological cue
Mechanical cue
Technical cue
Behavioral (general) cue
Pain descriptor cue
Covert behaviour cue
Overt motor pain behaviour cue
Knowledge cue
Physical cue
Paracrinical cue
APPENDIX 1A

Case 20 – Suctioned – 5.45pm (Approx. 1.5 Hours Prior to Extubation and 5 Hours Post-Op.) Diagrammatic Representation “Verbal Protocol”

**Causes (1st Order Cues)**
- Eyes open, looking around
- Exploring ET tube
- Respiratory rate 22
- Trying to communicate via ET tube
- Suctioned ET tube
- ET tube uncomfortable
- Patient verbal report
- Grinning
- Patient self-report pain
- Pain intensity

**Cue Interpretation**
- Awake
- Aware of ET tube
- Respiratory effort, aware, suctioning made him uncomfortable, anxious since suctioning
- Fully alert, tube is very uncomfortable
- Uncomfortable, coughing made him sore, good cough reflex
- ET tube is causing the patient some discomfort, more alert now
- Not sure if he has pain
- Pain reflected in his face
- Patient responded positively that he is uncomfortable but not sure
- Patient responded that he is very uncomfortable
- MAP stable during bagging and suctioning, no dips (baseline 65-70), vasodilating, CVP only Sarmin, warming
- Sinus tachycardia (baseline 64), no arrhythmias during bagging and suctioning, fast though, anxious, sore, more awake
- Inotropic support
- Graft support
- Warm centrally
- Warming peripherally
- Anxiety
- Altered Hemodynamics
- Patient Ventilator Compliance
- Impaired Comfort
- Acute Pain

**Intermediate Judgement**
- **Final Judgement**

**Decision Analysis**
- Physiological cue
- Mechanical cue
- Technical cue
- Behavioral (general) cue
- Pain descriptor cue
- Covert behavior cue
- Overt motor pain behavior cue
- Knowledge cue
- Physical cue
- Paraclinical cue
APPENDIX 1A
Case 21 - Turned Chest X-Ray - Returned Theatre 12.15pm - Now 1pm - Sequence "Verbal Protocol"
Case 21 - Turned Chest X-Ray - Returned Theatre 12.15pm - Now 1pm - Diagrammatic Representation "Verbal Protocol"

Cues (1st Order Cues) → Cues Interpretation → Intermediate Judgement (2nd Order Cues) → Final Judgement

- Turned chest X-ray: May be experiencing soreness or discomfort
- MAP 105: May be experiencing soreness hypertensive (inked line / No GTN) (baseline 75-80), may be aware
- No response to verbal stimuli: No response, potential to have pain though

- Heart Rate 63: Sinus bradycardia (baseline 66)
- Nitroglycerin 15 (GTN): Vasodilator support for MAP and LIMA (inked line)
- Chest drainage 170 last quarter: Bit ooz, CVP 1 mean Hg, also turned
- Oozing in theatre: Moderate blood loss in theatre, bleeding
- Temperature central 34.9°C: Very cold centrally
- Temperature peripheral 24.5°C: Cold peripherally

- Eyes closed: Sedated
- Not obeying any commands: Still under anaesthesia
- No movement: Sedated and appears to be comfortable

Risk for Impaired Comfort → Decision: No Analgesia
Risk for Acute Pain → Altered Hemodynamics

# Physiological cue
■ Mechanical cue
▲ Technical cue
★ Behavioural (general) cue
● Pain descriptor cue
■ Covert behaviour cue
£ Overt motor pain behaviour cue
△ Knowledge cue
≈ Physical cue
△ Parasitcual cue
Case 21 - Rest - 5.15pm (Approx. 1 Hour Prior To Extubation and 5 Hours Post-Op.) Sequence "Verbal Protocol"

**Cues (1st Order Cues)**
- Eyes open spontaneously
- Obey all verbal stimuli
- MAP BS
- Nitroglycerin 5
- Temperature central 36.9°C
- Temperature peripheral 31.0°C
- Respiratory rate 18
- Glimpse
- Hands pointing to chest incision

**Cue Interpretation**
- Just having a good look around, awake
- Orientated there now
- MAP rising again (baseline 75-80) uncomfortable
- Awake
- Still on support, no history of hypertension
- Vasodilator support for MAP and LIMA
- Warmed centrally
- Beginning to warm peripherally
- Breathing up there, aware
- Uncomfortable with tube
- Hourly ready for weaning, warming nicely
- He is experiencing discomfort
- Experiencing pain surgical incision

**Intermediate judgement (2nd Order Cues)**
- Level of Wakefulness
- Level of Comfort
- Level of Wakefulness
- Altered Hemodynamics
- Altered Hemodynamics
- Altered Hemodynamics
- Level of Wakefulness
- Impaired Comfort
- Impaired Comfort
- Impaired Comfort

**Cues (1st Order Cues)**
- ET tube uncomfortable
- Heart rate 63
- ST elevation no longer evident
- Pain severity
- Final Judgement

**Cue Interpretation**
- Experiencing soreness with the tube
- Regular sinus rhythm, occasional ectopics (baseline 66), ST elevation no longer present
- Patient confirms pain is severe

**Intermediate judgement (2nd Order Cues)**
- Impaired Comfort
- Altered Hemodynamics
- Impaired Comfort

**Acute Pain**

**Decision Analysis**
APPENDIX 1A

Case 21 - Rest - 5.15pm (Approx. 1 Hour Prior To Extubation and 5 Hours Post-Op.) Diagrammatic Representation “Verbal Protocol”

<table>
<thead>
<tr>
<th>Cues (1st Order Cues)</th>
<th>Cues Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Eyes open spontaneously</td>
<td>Just having a good look around, awake</td>
</tr>
<tr>
<td>* Obays all verbal stimuli</td>
<td>Orientated</td>
</tr>
<tr>
<td># Respiratory rate 18</td>
<td>Respiratory effort, aware, uncomfortable with tube, newly ready for warming</td>
</tr>
<tr>
<td># MAP 85</td>
<td>MAP rising again (baseline 75-80), uncomfortable, awake, still on support, hypotension</td>
</tr>
<tr>
<td>□ Grinace</td>
<td>He is experiencing discomfort</td>
</tr>
<tr>
<td>□ Hands pointing to chest incision</td>
<td>Experiencing pain surgical incision</td>
</tr>
<tr>
<td>□ ETtube uncomfortable</td>
<td>Experiencing soreness with the tube</td>
</tr>
<tr>
<td>□ Pain severity</td>
<td>Patient confirms pain is severe</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cues Interpretation</th>
<th>Intermediate Judgement (2nd Order Cues)</th>
<th>Final Judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level of Wakefulness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Impaired Comfort</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Altered Hemodynamics</td>
<td></td>
</tr>
</tbody>
</table>

- Physiological cue
- Mechanical cue
- Technical cue
- Behavioural (general) cue
- Pain descriptor cue
- Cognate behaviour cue
- Overt motor pain behaviour cue
- Knowledge cue
- Physical cue
- Paramedical cue

Acute Pain

Decision Analysis

- Physiological cue
- Mechanical cue
- Technical cue
- Behavioural (general) cue
- Pain descriptor cue
- Cognate behaviour cue
- Overt motor pain behaviour cue
- Knowledge cue
- Physical cue
- Paramedical cue

Vasodilator support for MAP and LIMA

Warming centrally

Beginning to warm peripherally

Regular sinus rhythm, occasional ectopics (baseline 66), ST elevation no longer present
APPENDIX 1A

Case 22 – Turned Chest X-Ray – Returned Theatre 1.15pm – Now 1.45pm – Sequence "Verbal Protocol"

Coes (1st Order Coes)
- Turned chest X-ray
- CABG x 3 with LIMA
- MAP 80
- Nitroglycerin 7
- Intravenous fluids
- Eyes open
- Obey some commands
- Respiratory rate 15

Coe Interpretation
- Experiencing discomfort with turning
- Major surgery, I expect she would be sore, plus no spinal
- Lot of GTN could be sore
- MAP, abnormal parameters really (baseline 70-75), lot of GTN
- Looks anxious
- Also beginning to tighten
- Graft support and as a vasodilator
- No problems coming off bypass, required minimal support
- Awakening, but not maintaining eye contact
- Beginning to surface
- Some respiratory effort, aware underneath
- Trying to communicate her discomfort
- Apprehensive

Intermediate judgement (2nd Order Coes)
- Impaired Comfort
- Impaired Comfort
- Anxiety
- Impaired Comfort
- Altered Haemodynamics
- Anxiety
- Level of Wakefulness
- Altered Haemodynamics
- Level of Wakefulness
- Altered Haemodynamics
- Level of Wakefulness
- Impaired Comfort
- Anxiety

Coes (1st Order Coes)
- Airway pressure 40cm
- Heart rate 102
- Temperature 35.6°C central
- Temperature 29.9°C peripheral
- ET tube uncomfortable
- Moving both hands under covers
- Nervous pre-op history
- Support requirements

Coe Interpretation
- Chewing on ET tube, so anxious
- Trying to let us know she is uncomfortable...
- Smoker, chesty, needs to be suctioned
- Sustained hypotension, packed P wave, no ectopics, low volume (baseline 70), CVP 2mmHg
- Agitated
- Uncomfortable
- Awake underneath
- Cold centrally
- Cold peripherally
- ET tube causing discomfort for the patient
- Beginning to surface
- Bit fidgety
- This lady was very nervous before surgery which seems to manifest itself now
- If GTN reduced, MAP would be higher, so pain re-emerges

Intermediate judgement (2nd Order Coes)
- Anxiety
- Impaired Comfort
- Altered Haemodynamics
- Anxiety
- Impaired Comfort
- Altered Haemodynamics
- Altered Haemodynamics
- Impaired Comfort
- Level of Wakefulness
- Anxiety
- Impaired Comfort
- Altered Haemodynamics

Coes (1st Order Coes)
- Pain
- Grinace
- Rigid
- Final Judgement

Coe Interpretation
- Experiencing pain at present
- In some discomfort
- Rigid during turn

Intermediate judgement (2nd Order Coes)
- Impaired Comfort
- Impaired Comfort
- Impaired Comfort

Decision
- Analgesia

Acute Pain
Case 22 – Turned Chest X-Ray – Returned Theatre 1.15pm – Now 1.45pm – Diagrammatic Representation "Verbal Protocol"

**APPENDIX 1A**

<table>
<thead>
<tr>
<th>Cues (1st Order Cues)</th>
<th>Coe Interpretation</th>
<th>Intermediate Judgement</th>
<th>Final Judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turned chest X-ray</td>
<td>Experiencing discomfort with turning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CABG x 3 with LIMA</td>
<td>Major surgery, I expect she would be rare, plus no spinal, very nervous pre-op.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAP 80</td>
<td>MAC abnormal parameters only (baseline 70-75), lot of GTN, could be rare, looks anxious, also beginning to lighten</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ET tube uncomfortable</td>
<td>ET tube causing discomfort for the patient sensitive to support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support requirements</td>
<td>If GTN reduced, MAP would be higher, so pain related,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient self-report pain</td>
<td>Experiencing soreness at present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grimace</td>
<td>In some discomfort</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rigid</td>
<td>Rigid during turn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitroglycerin 7</td>
<td>Graft support and as vasodilator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intra-operative status</td>
<td>No problems coming off bypass, required minimal support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart rate 102</td>
<td>Sinus tachycardia, peaked P wave, no ectopics, low volume CVP 2mmHg (baseline 78), agitated, uncomfortable, awake underneath</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature 35.6°C control</td>
<td>Cold centrally</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature 29.0°C peripheral</td>
<td>Cold peripherally</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eyes open</td>
<td>Awakening, but not maintaining eye contact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obey some commands</td>
<td>Beginning to surface</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiratory rate 15</td>
<td>Some respiratory effort, aware underneath, trying to communicate her discomfort, apprehensive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trying to communicate via ET tube</td>
<td>Beginning to surface</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moving both hands under covers</td>
<td>Beginning to surface, bit fidgety</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Airway pressure 40ms</td>
<td>Choosing on ET tube, so anxious, causing airway pressure to rise because she is trying to let us know she is uncomfortable, needs to be suctioned, smoker, chesty</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nervous pre-op history</td>
<td>This lady was very nervous before surgery which seems to manifest itself now</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Decision Analysis**

- # Physiological cue
- ● Mechanical cue
- ▲ Technical cue
- ★ Behavioural (general) cue
- ● Pain descriptor cue
- □ Covert behaviour cue
- ◆ Overt motor pain behaviour cue
- ▲ Knowledge cue
- ≈ Physical cue
- △ Paracultural cue
Case 22 - Rest - 6.30pm (Approx. 1 Hour Prior to Extubation and 5 Hours Post-Operative) Sequence "Verbal Protocol"
**APPENDIX 1A**

**Case 23 - Turned Chest X-Ray - Returned Theatre 12 Noon - Now 12.35pm - Diagrammatic Representation 'Verbal Protocol'**

**CoEs (1st Order CoEs)**

- Turned chest X-ray
- CABG x 3 with LIMA
- Patient self-report
- Patient self-report pain
- Obeys some commands
- MAP 101 acute rise
- GIN 10
- Chest drainage 140 last quarter
- MAP falls theatre
- Heart rate 97
- Temperature 35.3°C central
- Temperature 28.1°C peripheral
- Starred look eyes
- Restless during turn
- Fidgety

**Coe Interpretation**

- I am sure he is experiencing discomfort during turn
- Major heart surgery, I expect he will be sore
- Patient said not sore
- Patient indicates pain at the moment but indicated earlier he had no pain
- Beginning to surface, but not really with it at the moment
- MAP bit high (baseline 80), minute he wakes up, becomes anxious, sore with turn, not helping bleeding, pressure low in theatre
- Vasodilator for mean pressure
- Dizzy at the moment, ACT abnormal
- MAP low OT, blood loss in theatre was large, on aspirin pre-operative
- Bit fast, from (baseline 74), wake up, speed up, anxious
- Cold centrally
- Cold peripherally
- Anxiety and hypothermia

**Intermediate Judgement**

**Final Judgement**

**Impaired Comfort**

**Level of Wakefulness**

**Acute Pain**

**Altered Haemodynamics**

**Anxiety**

**Decision Analysis**

- Analgesia and Sedative

**Physiological cue**
- Mechanical cue
- Technical cue
- Behavioural (general) cue
- Pain descriptor cue
- Covert behaviour cue
- Overt motor pain behaviour cue
- Knowledge cue
- Physical cue
- Paraclinical cue
Case 23 – Rest - 5pm (Approx. 1.5 Hours Prior to Extubation and 5 Hours Post-Op.) Sequence "Verbal Protocol"

Coex (1st Order Coex) → Moving a bit there → Eyes open → Pointing at ETube → Obey all commands → Apprehensive → MAP 65 → Heart rate 98 → Nitroglycerin 0.5

Coex Interpretation → Stirring there again, awake → Awakens easily, lot of noise in unit → Patient indicates that ETube is causing discomfort → He understands everything I am asking him to do → Still anxious → Awake → Uncomfortable with tube → Fighting the ventilator → MAP borderline, low volume (baseline 80), warming → Rate increased, low volume → Also anxious (baseline 74) → Uncomfortable → Graft support

Intermediate judgement (2nd Order Coex) → Level of Wakefulness → Level of Comfort → Level of Wakefulness → Anxiety → Level of Wakefulness → Impaired Comfort → Patient Ventilator Compliance → Altered Haemodynamics → Altered Haemodynamics → Anxiety → Impaired Comfort → Altered Haemodynamics

Coex (1st Order Coex) → Temperature 36.9°C control → Temperature 31.0K peripheral → Fidgety → Respiratory rate 19 → Trying to talk via ETube → Pulling at chest drains → Grinace

Coex Interpretation → Warming centrally → Warming peripherally → Still anxious, picking at bedclothes → Some spontaneous breathing bit shallow, awake → Tube is uncomfortable → Apprehensive → Bit distressed on ventilator → Very aware and responsive → Just becomes very anxious when awakens → Agitated → Sore chest drain sites → Is experiencing pain

Intermediate judgement (2nd Order Coex) → Altered Haemodynamics → Altered Haemodynamics → Anxiety → Level of Wakefulness → Impaired Comfort → Anxiety → Patient Ventilator Compliance → Level of Wakefulness → Anxiety → Anxiety → Impaired Comfort → Impaired Comfort

Coex (1st Order Coex) → Chewing ETube → Patient verbal report pain → Painting to chest drains → Final Judgement → Acute Pain

Coex Interpretation → Bit agitated → Fighting the ventilator → ET Tube uncomfortable → Wide awake → Patient indicates he has pain at the moment → Experiencing soreness chest, along incision site

Intermediate judgement (2nd Order Coex) → Anxiety → Patient Ventilator Compliance → Impaired Comfort → Level of Wakefulness → Impaired Comfort → Impaired Comfort → Decision Algorithm
Case 23 - Rest - 5pm (Approx. 1.5 Hours Prior to Extubation and 5 Hours Post-Op.) Diagrammatic Representation "Verbal Protocol"

Cues (1st Order Cues)
- Moving a bit there
- Eyes open
- Obeying all commands
- Respiratory rate 19
- Trying to talk via ETtube
- Pain at ETtube
- Grimace
- Patient self-report pain
- Pain at chest drains
- Apprehensive
- Fidgety
- Pulling at chest drains
- Chewing ETtube
- MAP 65
- Heart rate 98
- Nitroglycerin .5
- Temperature 36.9°C central
- Temperature 31.0°C peripheral

Cue Interpretation
- Awake, stirring there again
- Awakens easily, lot of noises in unit, becomes very anxious when awakens
- He understands everything I am asking him to do
- Some spontaneous breathing, bit shallow, awake, uncomfortable, bit distressed on the ventilator, apprehensive
- Very aware
- Patient indicates that ETtube is causing discomfort
- Is experiencing discomfort
- Patient indicates he has pain at the moment
- Experiencing soreness chest, along drain sites
- Still anxious, awake, uncomfortable, fighting the ventilator
- Still anxious, picking at bed clothes
- Agitated, sore chest drain sites
- Bit agitated, fighting the ventilator, ETtube uncomfortable, wide awake
- MAP borderline, low volume (baseline 80), warming
- Rate increased, low volume, also anxious (baseline 74), uncomfortable
- Graft support
- Warming centrally
- Slow to warm peripherally

Intermediate Judgement (2nd Order Cues)
- Alertness
- Patient Ventilator Compliance
- Level of Wakefulness
- Impaired Comfort
- Anxiety
- Altered Haemodynamics

Final Judgement
- Acute Pain
- Decision Analgesia

# Physiological cue
- Mechanical cue
- Technical cue
- Behavioural (general) cue
- Pain descriptor cue
- Covert behaviour cue
- Overt motor pain behaviour cue
- Knowledge cue
- Physical cue
- Parachute cue
Case 24 – Rest – 7.45pm (Approx. 1.5 Hours Prior to Extubation and 5 Hours Post-Op.) Sequence "Verbal Protocol"

Cues (1st Order Cues)

- Turned chest X-ray: Potential to experience soreness, sound asleep, no response
- No spinal morphine in theatre: May experience soreness later but not at the moment
- No response to verbal stimuli: No response, cannot assess his pain until he wakes up

Cue Interpretation

- MAP 70: Pressure is fine, comfortable at present (baseline 70-80), on same support, earlier pressure was dropping goods, MAP was 50 when he came back from OT, sensitive to support
- Adrenaline 6: Inotropic support, very sensitive to support
- Nitroglycerin .1: Vasodilator support
- Temperature peripheral 30.0°C: Cool peripherally
- Temperature central 35.4°C: Cold centrally
- Heart rate 90: Sinus rhythm (baseline 60), on inotropes, fast asleep, comfortable

Intermediate Judgement (2nd Order Cues)

- Risk for impaired comfort
- Altered homeodynamics
- Risk for acute pain
- Decision: No analgesia

Final Judgement

- Eyes closed: Asleep, sedated
- No movement: Sedated, comfortable, so does not appear to be in pain at present
- Not obeying any verbal commands: Asleep and unresponsive at present
- Fentanyl Teng in theatre: Not worn off yet, flat out asleep, comfortable at present, fast Fentanyl short acting

Level of Wakefulness

- Level of Wakefulness

Legend:
- #: Physiological cue
- #: Mechanical cue
- #: Technical cue
- #: Behavioural (general) cue
- #: Pain descriptor cue
- #: Cognitive cue
- #: Overt motor pain behaviour cue
- #: Knowledge cue
- #: Physical cue
- #: Perceptual cue
APPENDIX 1A

Case 25 - Rest 6:40pm (Approx. 1 Hour Prior to Extubation and 5 Hours Post-Op.) Diagrammatic Representation “Verbal Protocol”

I. Eyes open, looking round
   - Awake and alert

# Respiratory rate 21
   - Fair respiratory effort, awake now, bit uncomfortable there, ready for weaning but bit queasy

* Trying to talk via ET tube
   - Wide awake, uncomfortable, also queasy

△ Fast track strategy
   - Wake, warm, wean, no sedatives, the consultant...

# MAP 60
   - Hypotensive, low volume (baseline 70-80), CVP 6mmHg

# Heart rate 92
   - Still bit fast, occasional ectopic (baseline 60), volume related plus he is a bit queasy which is upsetting him

# Temperature central 37.1°C
   - Warm centrally

# Temperature peripheral 34.0°C
   - Warming peripherally

■ Adrenaline 3
   - Inotropic support

■ Nitroglycerine 1
   - Vasodilator support

● ET tube uncomfortable
   - Discomfort ET tube, also wide awake, also queasy

Patient self-report pain
   - Experiencing soreness at present

Grunace
   - Expressing pain

● Pain intensity
   - Experiencing moderate pain, not as severe as before

Intermediate Judgement
(2nd Order Cues)

Final Judgement

Level of Wakefulness

Altered Haemodynamics

Acute Pain

Decision Analysis

# Physiological cue
■ Mechanical cue
△ Technical cue
☆ Behavioural (general) cue
● Pain descriptor cue
□ Covert behaviour cue
Ο Overt motor pain behaviour cue
▲ Knowledge cue
≈ Physical cue
△ Paraclinical cue
Case 26 - Turned Chest X-Ray - Returned Theatre 3.15pm - Now 3.50pm - Sequence "Verbal Protocol"

CoE
(1st Order Cues)

Turned chest X-Ray
MAP 89
Blood pressure theatre sagging
Adrenaline 4
Noradrenaline 4
Left ventricular ejection fraction 29%
Nitroglycerin 2
Heart rate 105
Chest drainage 150 last quarter no air chest drains

CoE Interpretation
He could be uncomfortable
Could be in pain (baseline 70)
Bit high, on support
Sagging coming off bypass, RCA graft was a problem
Inotropic support
Inotropic support
Poor left ventricular function, recent MI plus L.H.D.
Veasodilator support, LUMA
Sinus tachycardia, (baseline 74) on minimal support, is oozing, CVP Pannuflly
Could be uncomfortable
Awake underneath
Bit oozing, turned chest X-ray, spilted out because it was 50, high ACT on pump fluid

Intermediate judgement
(2nd Order Cues)
Risk for impaired Comfort
Risk for impaired Comfort
Altered Haemodynamics
Level of Wakefulness
Altered Haemodynamics
Altered Haemodynamics
Altered Haemodynamics
Altered Haemodynamics
Altered Haemodynamics
Risk for impaired Comfort
Level of Wakefulness
Altered Haemodynamics

CoE
(1st Order Cues)

Not obeying verbal commands
Eyes closed
Temperature central 35.4°C
Temperature peripheral 24.5°C
CABG x 3 with LUMA
No movement
Final Judgement
Risk for Acute Pain

CoE Interpretation
Heavily sedated, still under the effects of anaesthesia
Appears sound asleep
Cold centrally
Cold peripherally
Risk for pain and discomfort, major surgery
Appears to be asleep
Asleep
Looks very uncomfortable at present since we turned him

Intermediate judgement
(2nd Order Cues)
Level of Wakefulness
Level of Wakefulness
Altered Haemodynamics
Altered Haemodynamics
Risk for Impaired Comfort
Level of Wakefulness
Level of Wakefulness
Risk of Impaired Comfort

Coes (1st Order Coes) → Cue Interpretation → Intermediate Judgement (2nd Order Coes) → Final Judgement

- Turned chest X-ray
  - May be experiencing pain
- MAP 89
  - Could be in pain (baseline 70), on support, could be awake underneath
- CABG x 3 with LIMA
  - Risk for pain and discomfort, major surgery, appears to be asleep

- Blood pressure theatre sagging
  - Suggesting the absence of hypnosis, RCA graft was a problem
- Adrenaline 2
  - Isotropic support
- Noradrenaline 4
  - Isotropic support
- Left ventricular ejection fraction 29%
  - Poor left ventricular function, recent MI plus I.H.D.
- Nitroglycerin 2
  - Vasodilator support, LIMA
- Heart rate 105
  - Suggests tachycardia, on minimal support (baseline 74), is oozing, CVP tamponade uncomfortable, awake underneath
- Chest drainage 150 last quarter, no air chest drains
  - Bit oozing, turned chest X-ray, spilled out because it was 50, high ACT, on pump fluid
- Temperature central 35.1°C
  - Cold central
- Temperature peripheral 24.5°C
  - Cold peripherally
- Not obeying verbal commands
  - Heavily sedated, still under the effects of anaesthesia
- Eyes closed
  - Appears sound asleep
- No movement
  - Asleep, looks very comfortable present

Risk for Impaired Comfort

Risk for Acute Pain

Altered Haemodynamics

Level of Wakefulness

Decision
No Anaesthesia

# Physiological cue
■ Mechanical cue
+ Technical cue
★ Behavioural (general) cue
● Pain descriptor cue
□ Cope adaptive cue
◆ Overt motor pain behaviour cue
▲ Knowledge cue
≈ Physical cue
△ Paraclinical cue
APPENDIX 1A

Case 27 – Turned Chest X-Ray – Returned Theatre 3.30pm – Now 4pm Diagrammatic Representation “Verbal Protocol”

Caes (1st Order Cues) → Cue Interpretation → Intermediate Judgement (2nd Order Cues) → Final Judgement

- Opening eyes, not focused
- Respiratory rate 18
- Moving heads a bit
- Turned chest X-Ray
- Looks uncomfortable
- Patient self-report pain

- Hypotensive (baseline 65-70) now MAP apparently been her best pressure, CVP 4mmHg, PCWP 6mmHg, very agitated, not sure if it is having some effect on the mean
- Dobutamine 10
- Adrenaline 6
- Nitroglycerine 1
- Heart rate 103
- Tachycardia coming off bypass – 90-100
- Left ventricular ejection fraction 28%
- Temperature central 35.4°C
- Temperature peripheral 27.0°C
- Chest drainage 100 last quarter
- Patient is uneasy

- Waking up a bit, waking up coming in the door from OT
- Some respiratory effort but shallow breaths, started to breathe on her own in theatre before coming over, seems uncomfortable there, high airway pressures, agitated
- Waking up a bit, very basale
- I am sure she is experiencing discomfort
- She told me she is uncomfortable
- Experiencing soreness – patient said sore

- Intracardiac adrenaline in theatre (picked up after that)
- Inotropic support as vasodilator
- Inotropic support
- Vasodilator support for LIMA
- Fast rate in theatre, (baseline 70)
- Poor left ventricular function (recent MI)
- Oozy with sputum, dumped out quite a bit since turn

- Level of Wakefulness
- Impaired Comfort
- Altered Haemodynamics
- Anxiety

#  Physiological cue
■  Mechanical cue
+  Technical cue
*  Behavioural (general) cue
●  Pain descriptor cue
□  Covert behaviour cue
ביר  Overt motor pain behaviour cue
△  Knowledge cue
≈  Physical cue
△  Paraclinical cue

Decision Analysis
APPENDIX 1A

Case 27 - Rest - 8.30pm (Approx. 2 Hours Prior to Extubation and 5 Hours Post-Op.) Diagrammatic Representation "Verbal Protocol"

Causes (1st Order Causes)

- Eyes open looking around
- Obey all verbal commands
- Respiratory rate 19
- Trying to talk via ETTube

Cue Interpretation

- Awake and alert
- More alert and appears orientated and responding to all commands
- Awake, good respiratory effort, calm, not distressed, not agitated like before, doesn't like the tube
- Aware, ETTube is annoying her, and asking me when will it be removed

Level of Wakefulness

Intermediate Judgement (2nd Order Causes)

- ETTube uncomfortable
- Grin
- Patient self-report pain

Confirmed ETTube uncomfortable
Experiencing soreness when moves in bed
Experiencing soreness at present, so she is sore

Impaired Comfort

Acute Pain

Risk for Anxiety

Altered Homeodynamics

Decision Analysis

# # Physiological cue
+ Mechanical cue
○ Technical cue
® Behavioural (general) cue
● Pain descriptor cue
箱 Covert behaviour cue
○ Overt motor pain behaviour cue
▲ Knowledge cue
≈ Physical cue
△ Paraclinical cue
Case 28 – Turned Chest X-Ray – Returned Theatre 2pm – Now 2.35pm – Sequence “Verbal Protocol”

**Coos (1st Order Coes)**
- Turned chest X-ray
- Grinorange (during turn)
- Mean arterial blood pressure (MAP) 80
- Blood pressure labile in theatre
- Noradrenaline 10
- Adrenaline 5
- Nitroglycerin 1
- Dobutamine 10
- Temperature central 34.5°C

**Coes Interpretation**
- May experience discomfort with the turn
- Seems she is experiencing discomfort now
- Mean arterial pressure 70-75, was 60 before the turn, lot of support
- Could be sore
- Maybe awoken underneath
- Blood pressure dropped coming off bypass
- Inotropic support, single strength, pass left ventricular function (due to recent myocardial infarction), E/I 27%
- No response to questions about pain
- Final Judgement

**Intermediate Judgement (2nd Order Coes)**
- Risk for Impaired Comfort
- Risk for Impaired Comfort
- Altered Haemodynamics
- Risk for Impaired Comfort
- Level of Wakefulness
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics

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**Coes (1st Order Coes)**
- Temperature peripheral 26.8°C
- Chest drainage 120 last quarter
- Heart rate 108
- No movement
- Eyes closed
- No response to questions about pain

**Coes Interpretation**
- Cold peripherally
- Oxy at present, ACT 151 (normal 125-135)
- Sinus tachycardia (not paced) (baseline 60), bit of support, oazy
- Some discomfort
- May be scared to move, hard to know sometimes, usually comfortable when they do not move
- Sounds asleep

**Intermediate Judgement (2nd Order Coes)**
- Altered Haemodynamics
- Altered Haemodynamics
- Altered Haemodynamics
- Risk for Impaired Comfort
- Level of Wakefulness
- Risk for Impaired Comfort
- Level of Wakefulness
- Risk for Impaired Comfort
- Level of Wakefulness
- Risk for Impaired Comfort

**Decision Analytics**
Case 28 - Rest - 7.30pm (Approx. 2 Hours Prior to Extubation and 5.5 Hours Post-Op.) Sequence "Verbal Protocol"

Cues (1st Order Cues)
- Moving hands under bedclothes
- Open eyes
- Gibs all verbal commands
- Grimaces when moves in bed
- MAP 76
- Heart rate 85
- Dobutamine 5
- Adrenaline 5
- Temperature central 36.9°C
- Temperature peripheral 31.0°C
- GTN 2

Cue Interpretation
- Awake
- Trying to get my attention to let me know she is uncomfortable
- Maintaining eye contact
- Awake and very responsive
- Experiencing soresness there when she moves in bed
- Normotensive (baseline 70-75) stable MAP at moment, filling pressures are improving, had 2 units blood, plus FFP and platelets
- Regular sinus rhythm with atrial ectopics (baseline 60)
- Inotropic support suiting her
- Inotropic support suiting her
- Warming centrally
- Warming peripherally
- Vasodilator support, for grafts in particular LIMA

Intermediate judgement (2nd Order Cues)
- Level of Wakefulness
- Impaired Comfort
- Level of Wakefulness
- Impaired Comfort
- Altered Hemodynamics
- Altered Hemodynamics
- Altered Hemodynamics
- Altered Hemodynamics
- Altered Hemodynamics
- Altered Hemodynamics
- Altered Hemodynamics

Cues (1st Order Cues)
- ETTube uncomfortable
- Respiratory rate 21
- Trying to talk via ETTube
- Patient self-report pain
- Pain location - self-report
- Final Judgement

Cue Interpretation
- Confirmed ETTube uncomfortable
- Wide awake
- Good respiratory effort, awake
- Warming nicely
- Uncomfortable with the tube
- Awake, trying to talk via ETTube
- Making a good effort of trying to tell me that the tube is uncomfortable
- Experiencing soresnesses, confirmed by patient
- Experiencing pain chest lesion confirmed by patient

Intermediate judgement (2nd Order Cues)
- Level of Wakefulness
- Impaired Comfort
- Level of Wakefulness
- Impaired Comfort
- Level of Wakefulness
- Impaired Comfort
- Level of Wakefulness
- Impaired Comfort
- Level of Wakefulness
- Impaired Comfort

Decision Analgesia

Acute Pain
Case 28 - Rest - 7.30pm (Approx. 2 Hours Prior to Extubation and 5.5 Hours Post-Op.) Diagrammatic Representation "Verbal Protocol"

**Cues (1st Order Cues)**

- Moving hands under bedclothes
- Open eyes
- Follows all verbal commands
- Respiratory rate 21
- Trying to talk via ETtube

**Cue Interpretation**

- Awake, trying to get my attention to let me know she is uncomfortable
- Maintaining eye contact
- Awake and very responsive
- Good respiratory effort, warming nicely, awake, uncomfortable with the tube
- Awake, trying to talk via the ETtube making a good effort of trying to tell me that the tube is uncomfortable

**Intermediate Judgement (2nd Order Cues)**

- Grinace when moves in bed
- ETtube uncomfortable
- Patient self-report pain
- Pain location - self-report

**Final Judgement**

- Experiencing soreness there, when she moves in bed
- Confirmed ETtube uncomfortable, wide awake
- Experiencing soreness, confirmed by patient
- Experiencing pain chest incision confirmed by patient

**Level of Wakefulness**

- Altered Hemodynamics
  - MAP 76
  - Heart rate 85
  - Dobutamine 5
  - Adrenaline 5
  - Temperature central 36.9°C
  - Temperature peripheral 31.3°C
  - GTN 2

- Hemodynamic (baseline 70-75), stable MAP at moment, had 2 units blood, plus FFP and plaslobol, filling pressures are improving, warming nicely
- Regular sinus rhythm with atrial ectopics (baseline 60)
- Inotropic support, sitting her
- Inotropic support, sitting her
- Warming centrally
- Warming peripherally
- Vasodilator support, for grafts, in particular LIMA

**Acute Pain**

- Impaired Comfort
- Decision Analysis

**Phases**

- # Physiological cue
- # Mechanical cue
- # Technical cue
- # Behavioural (general) cue
- # Pain descriptor cue
- # Covert behaviour cue
- # Overt motor pain behaviour cue
- # Knowledge cue
- # Physical cue
- # Parachloral cue
Case 20 – Turned Chest X-Ray – Returned Theatre 1.45pm – Now 2.30pm – Diagrammatic Representation "Verbal Protocol"
Case 30 - Turned Chest X-Ray - Returned Theatre 12.30pm - Now 1.10pm - Diagrammatic Representation "Verbal Protocol"

## Cores (1st Order Cores)
- **MAP 97 (brachial jump)**
  - MAP very high, could be feeling pain, as big jump from what was coming in the door (baseline 70-75).
  - Hypertensive, no history of high blood pressure, could be aware underneath
- **Turned chest X-ray**
  - Discomfort while being turned, rigid there
- **Heart rate 105**
  - Sinus tachycardia, which to me is pain related (baseline 69), also awake underneath, also ocyzy
- **Cardiac x4 with LIMA**
  - Major heart surgery, so I would expect he will be sure, moderate left ventricular function.
  - M1 one year ago and engine, EJ 40% should do well
- **No response to questions on pain**
  - No response from the patient, hard to know
- **Support requirements**
  - If the GTN was turned down the MAP would be higher, so he must be in sure even though no response
- **MAP analgesic response**
  - MAP 68 which means he is sure enough though no response, GTN 10, CVP has dropped
  - so could not say for certain it was the morphine
- **Eyes closed**
  - Heavily sedated
- **Respiratory rate 10**
  - Asleep, bit early to awaken
- **Not obeying verbal commands**
  - He is heavily sedated at the moment

## Cores (2nd Order Cores)
- **Gassy in theatre**
  - Lost a bit of blood as bleeding in theatre
- **Chest drainage 150 last quarter**
  - Currently he is a bit ozy, high ACT which is influencing ooziness (baseline 125-135), also he could clot
- **GTN 10**
  - Graft support, MAP high
- **Temperature 35.1°C central**
  - Cooling centrally, back only 40 minutes
- **Temperature 25.1°C peripheral**
  - Cooling peripherally

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**Intermediate Judgement**

**Final Judgement**

- **Risk for Impaired Comfort**
- **Level of Wakefulness**
- **Risk for Acute Pain**

**Decision Analytics**

- **Physiological cue**
- **Mechanical cue**
- **Technical cue**
- **Behavioural (general) cue**
- **Pain descriptor cue**
- **Covert behaviour cue**
- **Overt motor pain behaviours cue**
- **Knowledge cue**
- **Physical cue**
- **Paraclinical cue**
Case 30 - Rest - 5.35pm (Approx. 1 Hour Prior to Extubation and 5 Hours Post-Op.) Diagrammatic Representation "Verbal Protocol"

**APPENDIX 1A**

**Cases (1st Order Cases)**

- *Chewing on ETTube*  
  Anxiety, acting the ventilator, way of letting me know he is uncomfortable, also aware

- # Respiratory rate 20  
  Taking few breaths, anxiety related, acting the ventilator, trying to tell me the ETTube is uncomfortable, awake also

- *Restlessness*  
  Agitated, trying to sit up, tube is causing discomfort, acting the ventilator, and is aware of it all

- *Eyes open*  
  Awake

- # Obey all verbal commands  
  Awake and oriented despite being anxious

- △ Fast Track approach  
  Extubated within six hours, go easy on sedatives and analgesics if possible, ready for T-Piece shortly

- # MAP 60  
  MAP bit low, warming (baseline 70-75), CVP 5mmHg

- Nitroglycerin 1  
  Conduit support

- # Heart rate 91  
  Bit fast for him, with occasional atrial ectopics (baseline 69), anxiety related, also uncomfortable, also awake

- Adrenaline 2  
  Inotropic support

- # Temperature 37.0°C central  
  Warming centrally

- # Temperature 32.8°C central  
  Warming peripherally

- # Patient coughing sore at chest drains  
  Patient complaints sore at chest drains

- # Patient to ETTube  
  Experiencing a lot of discomfort with the ETTube

- Patient self-report pain  
  He said he was in sore, so I believe him

**Intermediate Judgement**

(2nd Order Cases)

- Anxiety
- Level of Wakefulness
- Acute Pain
- Altered Hemodynamics

**Final Judgement**

- Impaired Comfort
- Patient Ventilator Compliance

**Decision Analgesia**

- Physiological cue
- Mechanical cue
- Technical cue
- Behavioural (general) cue
- Pain descriptor cue
- Covert behaviour cue
- Overt motor pain behaviour cue
- Knowledge cue
- Physical cue
- Paraclinical cue
APPENDIX I_b

CASE ONE

RESEARCHER OBSERVATION

FIELD NOTES
Observer's comments:

**Time : 1.30 pm.**
This is my first period of observation. I went to the unit early this morning to meet with the manager. I was still apprehensive about the prospect of observing today in the unit. I feel prepared with my equipment so that is not an ordeal today. I met with the manager. This was a different manager from the last night. I explained the purpose of the research project again. She told me that she had understood the project the other day when I delivered a session to the managers at the request of the senior manager. She checked the white board on the wall and told me the patient I wished to observe would be back in about one hour. She also indicated that I could discuss the project with the nurse to see if she would do it, as she said they can get cold feet when the time comes to participate.

I checked with the nurse to make sure that all was okay to proceed. The nurse is willing to participate as I had already discussed the detail with her at an earlier session with the staff. I also placed a flier in the unit which seemed to have encouraged some participants as by this nurse’s comment; oh, I saw the poster, no problem.

**Time : 1.40pm**
I went through a practice session with the nurse at the bedside. The nurse talked aloud as she prepared a bed space. She required no probing. I again emphasised following the practice session that I would be observing the patient only. I also indicated to the nurse participant that I would remind her to ‘keep talking’ if there were any silent pauses and that is why I was also at the bedside.
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Notes</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00pm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I checked the bed number again and looked around the unit just to check my space and where was the most appropriate location for me so that I could observe the patient pain behaviours and also be in hearing distance of the nurse without being in her direct vision. There are five other patients in this side of the critical care unit. One patient is being repositioned by a team of nurses and there are many alarms sounding around me. There is another patient being transferred from a stryker bed so there is a lot of activity with that process. Each of the cubicles are full. There are five other patients on this side so there is a lot of activity at each bed station. The ratio in this unit is 1:1. My space is a bit tight as there are patients on either side and a door very near this bed space which appears to be the main door on this side of the unit.</td>
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<tr>
<td>2.10pm</td>
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<tr>
<td></td>
<td>I checked outside that door to see that one side of the theatre is directly opposite this door hence all the admission activity. There is one fresh heart back in the next bed and there is another fresh heart back on the other side of the unit. Therefore it seems that the patient I will be observing will be the third heart today with two more expected. The manager informed me that she would double check with the theatre nearer the time if all was well with the patient. I am hoping all will be well as I am psyched up at the moment to complete this period of observation in the hope that I will obtain data. The senior manager is approaching my direction. ‘How is the project proceeding?’ This is my first case so all is well at the moment. She checks with the manager that there are no problems. It seems she has some dignitaries with her.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time : 2.15pm</td>
<td>Activity</td>
<td>Notes</td>
<td>Category</td>
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<tr>
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<tr>
<td>I am conscious now that she is the gatekeeper and I hope that I have been very gracious in my response and that I do not demonstrate my hidden anxiety. Why am I anxious? The nurse participant asks me am I best friends with the senior manager. I must be careful here as I want to ensure that there is no misperception here that information or tales on my part are returning to the senior manager. I inform the nurse participant that I worked with the senior manager many moons ago so that is my story. I also emphasise that it was a professional relationship and that was always the way. I stressed again that confidentiality and privacy was a major issue with this project. I need to think this over as it may raise its head again at another time.</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time : 2.20 pm.</th>
<th>Activity</th>
<th>Notes</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>The manager is telling me that the patient is due back in a few minutes and there are no major problems so I can get myself organised. I locate myself on the left side of the patient out of view of the nurse participant and out of way of all the activity. It is now 2.30 pm. The patient comes in directly from the theatre surrounded by many personnel and much high tech equipment. While the patient is being organised by the team I check the chart swiftly. The patient has had three coronary artery bypass grafts with a LIMA, which means the patient had four grafts which would be major really. I will refer to the patient as M. M had the saphenous vein taken from her left leg as she has varicose veins in her right leg.</td>
<td></td>
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</tr>
<tr>
<td>Time</td>
<td>Activity</td>
<td>Notes</td>
<td>Category</td>
</tr>
<tr>
<td>--------------</td>
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</tr>
<tr>
<td>2.45pm</td>
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<tr>
<td>M is being organised by the team. Each member of the team is carrying out a specific activity to sort all the lines, monitor, equipment. M is covered in plenty of blankets now as her core temperature is 32 and peripheral temperature is 25. M appears to be asleep, eyes closed. She is well covered in blankets and both her hands are above the covers as there are lines in both hands and her left arm. There is much activity around the bed still with different personnel adding to the detail on the patient.</td>
<td>Rest</td>
<td>Cue</td>
<td></td>
</tr>
<tr>
<td>3.00pm</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>There is no response from the patient at present. I see on the monitor that her blood pressure is 113/60 with a mean of 65. Heart rate 75. M is not showing any signs of movement. She looks ghastly pale.</td>
<td>Rest</td>
<td>Cue</td>
<td></td>
</tr>
<tr>
<td>3.05pm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The radiographer arrives to do an X-ray. This X-ray machine is like a magnet as three nurses and a doctor come to the bedside to help with the X-ray plate. The radiographer calls all clear, X-ray in progress. I move out of the way also for this.</td>
<td></td>
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<tr>
<td>3.10 pm</td>
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<td></td>
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<tr>
<td>Once the X-ray is taken all help returns to the bedside as M is turned post the X-ray. I hear MO (nurse participant stating that pressure areas are red). Observers comments</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel guilty here not giving a helping hand. I am conscious that I want to observe the patient pain behaviours and feel that I may miss them if I participate. I have not been asked to help so why am I worrying here.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time: 3.10 pm.</td>
<td>Activity</td>
<td>Notes</td>
<td>Category</td>
</tr>
<tr>
<td>----------------</td>
<td>----------</td>
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</tr>
<tr>
<td>M blood pressure has risen quite smartly there; it is 131/71 mean 89. Her eyes are closed. M is not moving or showing any signs of waking there. Her hands or feet are not moving. The nurse has not taken her eyes from the monitor. I am sure she has seen that blood pressure rise. MO is asking the patient if she awake, but there is no response to this questioning from M. I hear MO saying that the patient is bleeding. There is a lot of activity at the bedside at present. The nurse is withdrawing blood from the patient, there is no reaction from the patient at present.</td>
<td>Turned for Chest X-ray</td>
<td>Cue</td>
<td>Physiological Cue</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Behavioral General Cue</td>
</tr>
<tr>
<td>Time: 3.10pm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M heart rate is 105, and her mean pressure is 89. The nurse is checking with M is she awake but there is no reaction as yet. The mean pressure is 89, heart rate 105. I see that the nurse is giving M something in her IV, I hear her say that the morphine will help as she must be in pain. I notice that MO talks to M all the time as she is carrying out any activity. There does not appear to be any reaction from M at the moment.</td>
<td>Post X-Ray turn</td>
<td>Cue</td>
<td>Physiological Cue</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Behavioral General Cue</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Physiological Cue</td>
</tr>
<tr>
<td>Time: 4.00pm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Her eyes are closed. She is not moving. Blood pressure is 120/60 mean 60. The anaesthetist has arrived and talks to the nurse about the patient.</td>
<td>Rest</td>
<td>Cue</td>
<td>Behavioral General Cue</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Physiological Cue</td>
</tr>
</tbody>
</table>
There is some discussion at the bedside about the analgesia.

Observer’s comments:
The nurse participant asked me would I mind staying with the patient for a minute as the manager wants her for something. Now what do I do here, I am pleased in one way that she has asked me but now my role is changing from researcher-observer to participant-observer. There is no easy way here. I want to be trusted as a researcher and it is all about building up rapport. Why did she ask me in the first place. I did not work with this nurse in the past but she did know about my credentials.

All is well at the moment.

M appears to be asleep, not moving at all, just lying quietly in the bed. I am looking at the patient and the monitor. The blood pressure is 128/70 mean 75. Heart rate is 90.

Oh dear I now notice some arrhythmias on the monitor, some atrial ectopics. I am wondering here what to do. M appears to be still asleep.

Her blood pressure is 120/71 mean 69. Heart rate is 90. What will I do now. I am very uneasy now and wonder is M on her way back. A minute here seems hours. The manager passes by and notices the monitor.

She sorts out a few drips and stays with me as MO is just coming in the door. Alleluia. I am so pleased to see M coming back in the door. I can feel the Goosebumps. I do not like this feeling. I need to come back to this ...

M is back at the bedside and the manager tells her that she has some ectopics.
Time: 5.00 pm.
I hear MO talking to the patient. 
M is moving her hands under the blankets. Her eyelids are flickering, but her eyes are closed.

There is a lot of activity at the bedside as the nurse is bagging and suctioning MO. There are a lot of alarms sounding at present.

There is no cough from M as she is being suctioned by MO.

M mean blood pressure is 90, 140/91.
I am very aware of this high blood pressure. I am uneasy with this at the moment. I know it is very high but I need to observe the indicators and not get involved with the actual outcome of this rise in blood pressure. I need to think of what hat I am wearing at the moment, that of researcher or participant. I wonder is it because I was asked to watch the patient while MO was away for a minute that I have not moved out of the role. I need to come back to this ...

(observers comments).

<table>
<thead>
<tr>
<th>Time: 5.00 pm.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I hear MO talking to the patient.</td>
</tr>
<tr>
<td>M is moving her hands under the blankets. Her eyelids are flickering, but her eyes are closed.</td>
</tr>
<tr>
<td>There is a lot of activity at the bedside as the nurse is bagging and suctioning MO. There are a lot of alarms sounding at present.</td>
</tr>
<tr>
<td>There is no cough from M as she is being suctioned by MO.</td>
</tr>
<tr>
<td>M mean blood pressure is 90, 140/91.</td>
</tr>
<tr>
<td>I am very aware of this high blood pressure. I am uneasy with this at the moment. I know it is very high but I need to observe the indicators and not get involved with the actual outcome of this rise in blood pressure. I need to think of what hat I am wearing at the moment, that of researcher or participant. I wonder is it because I was asked to watch the patient while MO was away for a minute that I have not moved out of the role. I need to come back to this ...</td>
</tr>
<tr>
<td>(observers comments).</td>
</tr>
</tbody>
</table>
Time: 5.00 pm.
Her heart rate is 100.
She looks very pale.
Lips bit blue.
She is still moving both her hands quite a bit under the covers.
I hear the nurse saying to M that she is giving her something for pain relief.

The anaesthetist arrives and he discusses the patient at length with MO. He notices me and wonders what I am up to. I explain the project to him and he seems genuinely interested. He tells me their thoughts at present about pain relief as there has been some problems he indicated of late. He also asks my opinion. I tell him that I will leave it in their capable hands as my interest is the judgement for the present and not the decision. I need to think this through ...

(observers comments)
The cardiothoracic doctor arrives at the bedside and asks for an update from M.
M is oozing from her nose at present.

Time: 5.30 pm.
She appears to be sound asleep.
Eyes are closed.
She is not moving.
Her hands are under the covers.
Mean pressure is 70, 113/67.
Respirations are 10.

Time: 6.00 pm.
Heart rate 88.
The manager is talking to MO now.
M is quiet there, no movement evident.
Her eyes are closed.
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Notes</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.15 pm</td>
<td>MO is undertaking oral hygiene with M.</td>
<td>Cue</td>
<td>Mouth Care</td>
</tr>
<tr>
<td></td>
<td>M seems to be moving her hands there under the covers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Her eyes are closed.</td>
<td>Cue</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Her blood pressure is the same at 114/68, mean 70.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>She does not appear to be resisting the mouth care, it appears as if she is enjoying the procedure.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.25 pm</td>
<td>M is asleep.</td>
<td>Rest</td>
<td>Cue</td>
</tr>
<tr>
<td></td>
<td>She is not moving.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Blood pressure is 113/69, mean 70.</td>
<td>Cue</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Heart rate 88.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Eyes are closed.</td>
<td>Cue</td>
<td></td>
</tr>
<tr>
<td>6.30 pm</td>
<td>MO is manipulating the chest drains at the moment.</td>
<td>Chest drains manipulated</td>
<td>Cue</td>
</tr>
<tr>
<td></td>
<td>I think M feels it.</td>
<td></td>
<td>General Cue</td>
</tr>
<tr>
<td></td>
<td>M is moving her hands.</td>
<td>Cue</td>
<td>Behavioural</td>
</tr>
<tr>
<td></td>
<td>M is moving her hands quite a bit now under the covers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>She looks as if she is waking up there.</td>
<td>Cue</td>
<td>Overt Motor</td>
</tr>
<tr>
<td></td>
<td>She is grimacing there.</td>
<td></td>
<td>Pain Behaviour</td>
</tr>
<tr>
<td></td>
<td>She is squeezing her eyes tight shut there.</td>
<td>Cue</td>
<td></td>
</tr>
<tr>
<td></td>
<td>She has a distinctive frown over her eyebrows.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>She is very restless at the moment.</td>
<td>Cue</td>
<td>Physiological</td>
</tr>
<tr>
<td></td>
<td>She is moving her right leg up and down.</td>
<td></td>
<td>Cue</td>
</tr>
<tr>
<td></td>
<td>Her heart rate is now 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>She is very restless, moving a bit in the bed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Her blood pressure is now 120/89, mean 89</td>
<td>Cue</td>
<td></td>
</tr>
<tr>
<td>6.35 pm</td>
<td>She is very bothered at the moment.</td>
<td>Cue</td>
<td>Behavioural</td>
</tr>
<tr>
<td></td>
<td>Her eyes are open</td>
<td></td>
<td>General Cue</td>
</tr>
<tr>
<td></td>
<td>She is very restless at present</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>She is moving around in the bed.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Case One

Researcher Observation Field Notes

Patient Pain Behaviours
Time: 6.38 pm.
She is shaking her head from side to side quite vigorously.

I notice that MO talks away to M asking her to go through a number of specific movements.

M is moving her tongue quite a bit on either side of the ET Tube. I hope it does not come out.

M looks as if she is chewing on the tube in her mouth. The alarm is going off there on the ventilator.

M continues to move her head from side to side.

Her blood pressure is still at a mean of 89.
Heart rate is still 100.
Respiratory rate is now 16.
M is trying to sit up in the bed there.

I am wondering here now will M ever settle as she looks very distressed now and anxious. It is not a nice feeling for me at the moment. But I do feel secure in that the nurse has not taken her eyes off M or her monitor at present.

I hear MO asking M is she in pain.
<table>
<thead>
<tr>
<th>Time: 6.40pm</th>
</tr>
</thead>
<tbody>
<tr>
<td>I notice that M is nodding her head in response to MO question asking her if she is in pain.</td>
</tr>
<tr>
<td>I hear MO telling M that she is giving her something for her pain right now.</td>
</tr>
<tr>
<td>M nods her head and I notice she squeezes MO hand.</td>
</tr>
<tr>
<td>M is still restless there.</td>
</tr>
<tr>
<td>M is chewing on the ET Tube.</td>
</tr>
<tr>
<td>I can see her moving her tongue around in her mouth quite a bit.</td>
</tr>
<tr>
<td>There is some alarm going off at the back of the bed.</td>
</tr>
<tr>
<td>She is very distressed there moving her head from side to side still.</td>
</tr>
<tr>
<td>Her blood pressure mean is now 80.</td>
</tr>
<tr>
<td>Heart rate is still 100.</td>
</tr>
<tr>
<td>I hear MO saying to M that she is giving her something to relax and more painkiller.</td>
</tr>
<tr>
<td>I notice that M is watching MO with a startled look in her eyes as if she is very frightened and does not know where she is. Perhaps that is an assumption on my part but she does look scared.</td>
</tr>
<tr>
<td>(Observer's comments).</td>
</tr>
<tr>
<td>I see that MO is constantly talking to M and keeping her abreast of everything she is doing with her.</td>
</tr>
</tbody>
</table>

| Time: 7.00pm. |
| The intensivist has arrived at the bedside. He wonders am I back to work in the intensive care unit. I smile and tell him that this is my first case. He notes he must be careful around all these tapes. |
| He talks at length to MO about the patient and the plan for extubation and I hear that it is to happen in six hours if at all possible. |
### Appendix 1B

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Notes</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.00 pm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Her blood pressure is 85/50, mean 55.</td>
<td>Cue</td>
<td>Physiological</td>
<td></td>
</tr>
<tr>
<td>Her heart rate is 81.</td>
<td>Cue</td>
<td>Physiological</td>
<td></td>
</tr>
<tr>
<td>I notice that M is talking urgently to the doctor about the blood pressure and about volume.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel a knot in my tummy with this pressure now but MO is working very actively at the bedside to sort it out, it seems.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.15 pm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M appears to be sound asleep. Her eyes are closed.</td>
<td>Rest</td>
<td>Behavioural</td>
<td></td>
</tr>
<tr>
<td>She is not moving at present.</td>
<td>Rest</td>
<td>General Cue</td>
<td></td>
</tr>
<tr>
<td>Her blood pressure seems to be coming up there.</td>
<td>Rest</td>
<td>Physiological</td>
<td></td>
</tr>
<tr>
<td>Her mean pressure is 68.</td>
<td>Rest</td>
<td>Physiological</td>
<td></td>
</tr>
<tr>
<td>Heart rate is 81.</td>
<td>Rest</td>
<td>Physiological</td>
<td></td>
</tr>
<tr>
<td>I feel a bit relaxed myself here now as all that activity of M in the bed has stopped for the present. I do not think there is a chance to become complacent here as there is so much going on with M that I am afraid I will miss some of her behaviours.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MO asks me to mind M for a minute while she puts in her gas in the machine. Here we go again. I decide to mind the patient so I move nearer the bed.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am a bit anxious myself about this. I did say that I was a researcher at the start of this observation period but how could I say that now. I realise that I have been at the bedside over five hours. So how could I say that I cannot participate here. Therefore I am a participant again. I need to think through all this later. The textbook gives a nice definition of researcher-observer but in practice it is not a nice linear structured process.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(observer's comments).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I notice M is taking a few breaths here now apart from the ventilator breaths. I am hassled again, rate is 16.</td>
<td>Cue</td>
<td>Physiological</td>
<td></td>
</tr>
</tbody>
</table>

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**Case One**

**Researcher Observation Field Notes**

**Patient Pain Behaviours**

12
### Appendix 1B

<table>
<thead>
<tr>
<th>Time: 7.20 pm.</th>
<th>Activity</th>
<th>Notes</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>M is coming towards the bed and documents her blood results. She is talking away. I just retreat into the background again out of MO’s vision.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M looks at the monitor, the mean blood pressure is on its way up again, mean 68.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Time: 7.30 pm. Her mean is 79, 135/72. Heart rate 85. Time is flying by. She is opening her eyes there. She is breathing there a bit faster than earlier, rate is 20. She is a very restless again there, moving a bit in particular her hands. She is moving her head again from side to side. She is breathing fast there above the ventilator rate it would appear, rate is 20. The alarm is sounding there at the back of the bed - from the ventilator. MO is working at the back of the bed with the equipment. M watches MO, her eyes are wide open now. The perfusionist arrives at the bedside and talks to MO. She questions M about the microphone. I hear MO make a comment. The perfusionist then talks to me about her own research. I listen but at the same time keep my observation of the patient in focus. I find these interruptions which are part of the social complex difficult to handle in case I miss some of the patient’s pain behaviours. I also realise that access to this environment and sample is based on not only the gatekeepers but also other individuals who cross my path in the process. | Rest |       |            |

| MO is working at the back of the bed with the equipment. M watches MO, her eyes are wide open now. The perfusionist arrives at the bedside and talks to MO. She questions M about the microphone. I hear MO make a comment. The perfusionist then talks to me about her own research. I listen but at the same time keep my observation of the patient in focus. I find these interruptions which are part of the social complex difficult to handle in case I miss some of the patient’s pain behaviours. I also realise that access to this environment and sample is based on not only the gatekeepers but also other individuals who cross my path in the process. |       |       |            |
No textbook gives information on how to be gracious while at the same time trying not to miss some of the data in particular in my case as I am observing patient pain behaviours and also trying to ensure that the nurse participant keeps talking. This process is really about negotiating, gaining access and renegotiating all the time. It is like threading on egg shells or perhaps this is my perception. This unit is a very dynamic unit, extremely busy unit and I am constantly aware of trying to be as unobtrusive as possible but also with the goal of obtaining data. I need to work through this ...

(observer's comments).

I see M is nearly trying to talk via the ET Tube.
M is very bothered and uneasy there.

She is moving her hands there above the covers.
She is trying to move in the bed.
She is trying to sit up in the bed.
I hope she does not extubate herself she is so restless.

Her mean pressure is still 79
Heart rate is 90 there
She is trying to pull at the bedclothes with her hands there.
She is shaking her head from side to side.

Her respiratory rate has increased there, about 20 per minute.
She is very uneasy in the bed.
She is grimacing there, crunching up her forehead.
The alarm is going off again on the ventilator.

It appears as if she is fighting the ventilator there.
She is chewing on the tube.
The airway pressure is alarming on the ventilator.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Notes</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cue</td>
<td>Behavioural General Cue</td>
<td></td>
</tr>
<tr>
<td>Cue</td>
<td>Behavioural General Cue</td>
<td></td>
</tr>
<tr>
<td>Cue</td>
<td>Behavioural General Cue</td>
<td></td>
</tr>
<tr>
<td>Cue</td>
<td>Behavioural General Cue</td>
<td></td>
</tr>
<tr>
<td>Cue</td>
<td>Physiological Cues</td>
<td></td>
</tr>
<tr>
<td>Cue</td>
<td>Behavioural General Cue</td>
<td></td>
</tr>
<tr>
<td>Cue</td>
<td>Physiological</td>
<td></td>
</tr>
<tr>
<td>Cue</td>
<td>Overt Motor Pain Behaviour</td>
<td></td>
</tr>
<tr>
<td>Cue</td>
<td>Patient Ventilator</td>
<td></td>
</tr>
<tr>
<td>Cue</td>
<td>Dysynchrony</td>
<td></td>
</tr>
</tbody>
</table>
### Case One

**Researcher Observation Field Notes**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Notes</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.33 pm</td>
<td>MO asking M has she a pain in her chest or what is bothering her.</td>
<td>Cue</td>
<td>Verbal</td>
</tr>
<tr>
<td></td>
<td>M nods her head in response to this question</td>
<td>Subjective</td>
<td></td>
</tr>
<tr>
<td></td>
<td>She tries to talk via the ETTube while MO is asking her has she pain.</td>
<td>Pain</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I can see that MO is doing oral hygiene.</td>
<td>Behaviour</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M watches MO and nods her head to indicate that her mouth is sore and the ET Tube is uncomfortable.</td>
<td>Cue</td>
<td>Subjective</td>
</tr>
<tr>
<td></td>
<td>She nods to MO asking her is her throat sore.</td>
<td>Pain</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I see she is nodding her head to MO that she is in pain in response to M questioning about her pain.</td>
<td>Behaviour</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Intensivist is visiting there at the end of bed. He is talking about weaning her as soon as possible. He also states that he would prefer if she did not have sedation.</td>
<td>Cue</td>
<td>Pain</td>
</tr>
<tr>
<td></td>
<td>M is trying to sit up in the bed there, lifting her head off the bed. Heart rate is still 90.</td>
<td>Behaviour</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MAP 79.</td>
<td>Physiological</td>
<td></td>
</tr>
<tr>
<td></td>
<td>She is pointing to her chest in response to MO asking her is the pain in her chest.</td>
<td>Cue</td>
<td></td>
</tr>
<tr>
<td></td>
<td>She nods her head in response to the questioning about her chest.</td>
<td>Overt Motor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I hear MO talking to her that she is giving her some pain treatment and she will be ready to come off the ventilator shortly.</td>
<td>Pain</td>
<td></td>
</tr>
</tbody>
</table>

**Observers comments**

**Time : 7.45**

I look at my watch and see the time is 7.45pm and realise that I have been observing the patient for over five and half hours. I am feeling drained at present as it was a busy period during which I had a few hats on for my roles. I feel that my ideal role which was researcher-observer worked for a good part of today but I did participate when I was approached by the nurse participant. I think that being conscious of my boundaries has helped me somewhat but I am perplexed about the participant role. It does not appear to detract from observing
the patient pain behaviours but it seems to take me some time after participating to exit from that role.

Time: 8.00 pm.
M looks very restful there.
Her eyes are closed.
Her blood pressure is 110/68, mean 70.
Her heart rate is 80.
She is breathing there herself as well as the ventilator but she seems easier.
The door bell rings.
MO tells me that there are visitors for her at the door.
I remove the microphone.
MO tells M that her visitors are here.
I stayed in the background.
M is much easier now.
MO talks with the visitors.
Once the visitors leave MO gets M organised for the T-Piece.
My observation period is over.

(Observer)
I thank M and tell her I will see her in the ward tomorrow.
I thank MO sincerely for her participation.
I talk with her briefly as another colleague stays with M.
I debriefed with MO. She told me that it was not too bad. Once she got started she went into full flow and never gave it another thought. I knew that I only gave her one probe to keep talking which was very early on in the process. I must check back on the tape.
I again emphasise that once I type up the tapes I will destroy them immediately.
I reassured MO that any identifying details of her or the location would be erased at the first listening of the tapes.

I sought out the manager and thanked her for the afternoon. I also checked with her that I would be back on Monday. She told me that there was a heart in the morning. I choose not to observe any patient on a Saturday as they were emergencies which did not fit my inclusion criteria. I explained my reasons to her for not taking up on this opportunity. I left with all my equipment.

Observer's reflections

In my fieldwork today, I was almost always the researcher participant, involved in the research but not participation. I played the required participant role, but mentally I was external to the situation knowingly uninvolved in order to be able to study the patient’s pain behaviours in the immediate phase after cardiac surgery.

Uninvolve was difficult as the temptation to become involved was ever present. It was a constant struggle initially with the urge to discard the emotions that appear to compel the researcher-observer not to participate, and to react spontaneously to the situation, to relate to people as a participant and to develop rapport rather than data from the situation.

Frequently I was pulled between how much spontaneous participation was possible without missing something as a researcher, or without jeopardising the neutrality which the researcher tries to maintain when (s)he is studying more than one group so that (s)he does not risk being rejected by opposing groups. Aside from not wanting to estrange the people one is studying the researcher-observer also wants to be liked, to feel part of the group. I wanted to belong a little, which creates its own problems for identification with the people being studied which is an issue with participant observation. I assume it will improve as this is my first period of observation.
Appendix II

Coding Guide

Think Aloud Data
## Appendix II
### Coding Guide Think Aloud Data

<table>
<thead>
<tr>
<th>Process</th>
<th>Unit of Analysis - Sentence</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
</table>
| **Cue**         |                             | **Cue** Any sign or symptom available to and verbalised by the critical care nurse. | Heart rate 100.  
Restlessness.  
Grimace.  
Biting the ET Tube.  
MAP 90.  
HB 8.0 grms/dl.  
Eyes closed.  
Unable to obey verbal commands.  
Chest drainage 100 mls last quarter.  
Poor cough reflex.  
Moving both arms.  
Apprehensive. |
| **Cue Interpretation** | **Cue Interpretation** Critical care nurse verbalises a meaning for a given cue. | Pain evidence on face — (cue — grimace).  
MAP too high from baseline of 70 – 80 – experiencing pain (Cue – MAP 93).  
He is uneasy there (cue – restless)  
Respiratory parameters normal (Cue – oxygen saturation 100%).  
Sore as analgesia wearing off, were pinpoint (Cue – pupils normal size).  
MAP response shows he has pain (Cue – MAP down 60).  
Agitated and frightened (cue – apprehensive). |
| **Clinical Judgement** | **Clinical Judgement** Critical care nurse verbalises a conclusion or inference based on a group of cues on the state of the patient in a face-to-face relationship with the patient in their natural habitat i.e. critical care unit. | He is anxious (cues – restlessness, uneasy, moving a bit in the bed, MAP acute rise, biting the endotracheal tube (ET Tube) at the bedside.  
He is sore (cues – throat is sore, the ET Tube is uncomfortable, grimace, he said he was sore).  
He is nervous (Cues – MAP 60, fidgety, attempting to self-extubate. |
**Appendix II**  
**Coding Guide Think Aloud Data**

<table>
<thead>
<tr>
<th>Clinical Inference</th>
<th>Clinical Inference</th>
<th>State of the Patient</th>
<th>State of the Patient</th>
<th>Decision[ - Context unit = paragraph]</th>
<th>Decision[ - Context unit = paragraph]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical care nurse verbalises a conclusion or judgement drawn from a group of cues in the critical care unit while the nurse was in face-to-face relationship with the patient.</td>
<td>He is uncomfortable (cues - grimace when suctioned, MAP 89 shooting up, chewing on the ET Tube, airway pressure high 34 cms).</td>
<td>He is in pain.</td>
<td>He is in pain.</td>
<td>I have decided to give him some morphine now.</td>
<td>I have decided to give him some morphine now.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>I am going to give her analgesia now for the pain.</td>
<td>I am going to give her analgesia now for the pain.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>I have made a decision not to give him any analgesia at the moment.</td>
<td>I have made a decision not to give him any analgesia at the moment.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>I have just given him morphine.</td>
<td>I have just given him morphine.</td>
</tr>
</tbody>
</table>
## Code Guide Think Aloud Data

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Cue Categories</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>•</td>
<td>Pain Descriptor Cue</td>
<td>Critical care nurse verbalises a cue that relates to the description of pain and its quality (sharp), intensity (mild, moderate, severe – may be graded 0 – 10) pattern (persistent, associated with activity / procedure, exacerbated with coughing), location (chest, leg) and degree (severe).</td>
<td>She has pain chest incision&lt;br&gt;She has pain chest drain sites&lt;br&gt;His mouth is sore&lt;br&gt;Her pain is severe&lt;br&gt;His pain is still there&lt;br&gt;That procedure caused a lot of pain</td>
</tr>
<tr>
<td>#</td>
<td>Physiological Cue</td>
<td>Critical care nurse verbalises an alteration in the patient’s baseline physiological parameters e.g. heart rate, blood pressure – mean arterial pressure (MAP), respiratory rate, pupil diameter.&lt;br&gt;Critical care nurse verbalises an alteration in heart rate, blood pressure, respiratory rate, pupil diameter post analgesia.</td>
<td>Her MAP is 89 acute rise-baseline 70-80&lt;br&gt;His heart rate 110 sinus tachycardia-baseline 74&lt;br&gt;Respiratory rate up 18&lt;br&gt;Her pupils are dilated&lt;br&gt;He is sweating across his forehead.&lt;br&gt;MAP down to 60 post analgesia.&lt;br&gt;Breathing pattern unequal.&lt;br&gt;MAP response to inotropes.&lt;br&gt;Chest expansion equal and bilateral.</td>
</tr>
<tr>
<td>❖</td>
<td>Technical Cue</td>
<td>Critical care nurse verbalises a specific cue based on a skill carried out by the nurse herself / himself at the bedside with the patient.</td>
<td>I milked the chest drains&lt;br&gt;His central venous pressure (CVP) is 16mmhg&lt;br&gt;I suctioned the patient&lt;br&gt;His urinary output is 200 last hour&lt;br&gt;Her airway pressure is 36 cms&lt;br&gt;I turned the patient after the X-ray&lt;br&gt;Chest drainage was 150&lt;br&gt;Last quarter&lt;br&gt;Oxygen saturation 95%</td>
</tr>
<tr>
<td>■</td>
<td>Mechanical Cue</td>
<td>Critical care nurse verbalises a cue that indicates a therapeutic intervention not prescribed by the nurse.</td>
<td>Nipride at 5&lt;br&gt;Adrenaline 4&lt;br&gt;Nipride 5&lt;br&gt;Fentanyl in theatre&lt;br&gt;No spinal morphine in theatre&lt;br&gt;Noradrenaline 8&lt;br&gt;Dobutamine 10</td>
</tr>
</tbody>
</table>
### Appendix II
**Coding Guide Think Aloud Data**

<table>
<thead>
<tr>
<th>Paraclinical Cue</th>
<th>Critical care nurse verbalises a cue based on clinical data undertaken / not undertaken by the nurse herself/himself in corroboration with other medical personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>She had a chest X-ray Lines in position on chest-X-ray ETTube in position on X-ray His ejection fraction is 50% CABG X 4 plus LIMA Fast Track Strategy She had an electrograph (ECG) Her potassium is 3.9 mmol/l His activated clotting time (ACT) is 160. His blood gas is ph, pco2, po2, base excess. HB 8.9 grms/dl. Her weight is 81 Kg MAP labile in theatre Support requirements Tachycardia coming off bypass MAP sagging in theatre Oozy in theatre Her blood sugar is 11.0 ml/L He was nervous pre-operative He had a MI last year He has angina Slow coming off bypass</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Behavioural (general) Cue</th>
<th>Critical care nurse verbalises a cue directly or indirectly relating to the patient's posture</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No movement She is lying there very quiet No grimacing He is restful His eyes are closed No response to verbal stimuli Not obeying verbal commands Unable to obey verbal commands He is not biting on ET Tube She is biting on ET Tube Restlessness She is moving both hands under the covers Relaxed facial expression She is coughing on the ET Tube He is fidgety Startled look in his eyes Coughing on the ET Tube No response to verbal stimuli Not biting on the ET Tube Not pointing to chest He is moving his head from side to side His eyes are open She is exploring the ET Tube She is trying to lift her head off the bed He is frisky Eyelids are flickering</td>
</tr>
</tbody>
</table>
### Appendix II
#### Coding Guide Think Aloud Data

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
</table>
| Covert Cue        | Critical care nurse verbalises a cue which is perceived by him/her based on the patient’s appearance. | He is uneasy  
                    |                                                               | He is anxious  
                    |                                                               | He is apprehensive  
                    |                                                               | She looks comfortable  
                    |                                                               | She looks uncomfortable  
                    |                                                               | Frowning, distressed looking |
| Overt Motor Pain  | Critical care nurse verbalises a cue which relates to an observed indicator. | He was rigid there during that turn  
                    |                                                               | She showed some resistance during that turn  
                    |                                                               | He is resisting the turn  
                    |                                                               | She is grimacing  
                    |                                                               | He grimaced when suctioned  
                    |                                                               | He is pointing to his chest  
                    |                                                               | He is pointing to the ET Tube |
| Knowledge Cue     | Critical care nurse verbalises a cue which relates to particular understanding of the patient as a person and or understanding of the patient’s behaviour over the shift while caring for the patient. | I know her now over the last few hours  
                    |                                                               | I know by him now. |
| Physical Cue      | Critical care nurse verbalises a sign during her physical examination of the patient | His pressure areas are red when I examined his pressure areas during the turn  
                    |                                                               | He is pale  
                    |                                                               | She has an old scar there on her hip |
## Appendix II
### Coding Guide Think Aloud Data

<table>
<thead>
<tr>
<th>Colour</th>
<th>Category</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>Impaired Comfort</td>
<td>Critical care nurse verbalises directly or indirectly that the patient’s state based on a group of cues is: uncomfortable</td>
<td>He is uncomfortable: (cues with interpretation – MAP 89 acute rise from baseline, heart rate sinus tachycardia 105 baseline 74 – experiencing discomfort, he grimaced when turned – so uncomfortable, Fentanyl in theatre so short acting, will be uncomfortable, self-report of pain – he said he was sore).</td>
</tr>
<tr>
<td>Orange</td>
<td>Risk for Impaired Comfort</td>
<td>Critical care nurse verbalises directly or indirectly that the patient’s state based on a group of cues is at risk of becoming uncomfortable or sore</td>
<td>She is comfortable but is at risk of not staying that way. He will be uncomfortable later She is not sore at the moment but will be. (cues with interpretation-MAP 70 – normal baseline, he is not moving at the moment-not experiencing soreness at present, not grimacing at present but cannot be sure about soreness, Not biting on ET Tube at present but who knows).</td>
</tr>
<tr>
<td>Pink</td>
<td>Altered Haemodynamics</td>
<td>Critical care nurse verbalises directly or indirectly that the patient’s state based on a group of cues is: haemodynamically stable or haemodynamically unstable</td>
<td>She is haemodynamically unstable: (cues with interpretation – MAP 57 – bit low for perfusion, CVP 4mmhg-low filling pressures, urinary output 200 hour-large diuresis, chest drainage 100 last quarter-oozy from chest drain). She is hypertensive: (MAP 91 – very high from baseline, Heart rate 110 with ectopics, Magnesium is 0.6 mmol/l too low causing arrhythmias, Potassium 3.9 mmol/l – too low causing ectopics). Her haemodynamics are askew: (cues with interpretation – MAP 90 – too high from baseline, grimaced when suctioned – experiencing soreness, asleep – but may be aware underneath, uneasy – very agitated).</td>
</tr>
<tr>
<td>Red</td>
<td>Anxiety</td>
<td>Critical care nurse verbalises directly or indirectly that the patient's state based on a group of cues is anxious</td>
<td>He is anxious: (cues with interpretation - moving arms quite a bit - more aware underneath, agitated - hassled and frightened, fidgety - very nervous. She is trying to sit up - very uneasy, MAP 60 - very low from baseline - agitated). She is apprehensive: (cues with interpretation - shaking head from side to side - very bothered, uneasy in the bed - agitated, biting on the ET Tube - fighting the ventilator, Heart rate 103 sinus tachycardia - anxious, pointing to mouth - experiencing soreness).</td>
</tr>
<tr>
<td>--------</td>
<td>---------</td>
<td>---------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Blue</td>
<td>Level of Wakefulness</td>
<td>Critical care nurse verbalises directly or indirectly that the patient’s state based on a group of cues is awake or asleep</td>
<td>She is awake: (cues - She awakens easily when touched-aware, eyes open - making good eye contact, obeys all verbal commands - awake and orientated, MAP 85 climbing so awake underneath). He is asleep: (cues with interpretation - not obeying verbal commands - he is still under anaesthetic, eyes closed - she is still out of it, no response to physical stimulus - she is heavily sedated, MAP 70, normal in line with baseline - so asleep.</td>
</tr>
<tr>
<td>Green</td>
<td>Risk for Anxiety</td>
<td>Critical care nurse verbalises directly or indirectly that the patient’s based on a group of cues is at risk of becoming anxious</td>
<td>He is at risk of becoming anxious: (cues - respiratory rate 14 - not anxious at present, not fidgety - not anxious at present, He was very nervous preoperative - so more than likely will become anxious, I am not convinced she will not be - because she had been very agitated already, heart rate 93 just above baseline so who knows).</td>
</tr>
</tbody>
</table>
## Appendix II
### Coding Guide Think Aloud Data

<table>
<thead>
<tr>
<th>Colour</th>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Pain</td>
<td>Critical care nurse verbalises directly that the patient’s state based on a group of cues is: acute pain or pain</td>
<td>He is in acute pain (cues – he is uncomfortable, anxious, non-compliant with ventilator, he is wide awake). She has pain (cues – haemodynamics are askew, she is anxious, she is fighting the ventilator, she is awake).</td>
</tr>
<tr>
<td>Orange</td>
<td>Risk for Acute Pain</td>
<td>Critical care nurse verbalises directly or indirectly that the patient is at risk of developing acute pain</td>
</tr>
<tr>
<td>Purple</td>
<td>Patient-ventilator Compliance</td>
<td>Critical care nurse verbalises directly or indirectly that the patient’s state based on a group of cues is: not compliant with the ventilator</td>
</tr>
<tr>
<td>Purple</td>
<td>Patient-ventilator Compliance</td>
<td>Critical care nurse verbalises directly or indirectly that the patient’s state is: compliant with the ventilator based on a group of cues.</td>
</tr>
</tbody>
</table>
APPENDIX III

CODING TEMPLATE

RESEARCHER OBSERVATION DATA
### Appendix III
#### Coding Template Researcher-Observation Data

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Category</th>
<th>Cue</th>
<th>Conceptual Definition</th>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>⚫️</td>
<td>Overt Motor Pain Behaviour Cue (⭐ Adapted with permission Keeffe &amp; Block 1982)</td>
<td>⚫️ Grimacing</td>
<td>Patient demonstrates ⚫️ Obvious facial expression of pain which includes furrowed brow / orbit tightening / lowering the eyebrows / wrinkle bridge nose / eyelids closing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>⚫️</td>
<td>Overt Motor Pain Behaviour Cue (⭐ Adapted with permission Keeffe &amp; Block 1982)</td>
<td>⚫️ Rubbing</td>
<td>Patient demonstrates ⚫️ Touching the affected area affected by pain.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>⚫️</td>
<td>Overt Motor Pain Behaviour Cue (⭐ Adapted with permission Keeffe &amp; Block 1982)</td>
<td>⚫️ Bracing</td>
<td>Patient demonstrates ⚫️ A stationary position in which a fully extended limb supports and maintains an abnormal distribution of weight.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>⚫️</td>
<td>Overt Motor Pain Behaviour Cue (⭐ Adapted with permission Keeffe &amp; Block 1982)</td>
<td>⚫️ Guarded Movement</td>
<td>Patient demonstrates ⚫️ Abnormally stiff, interrupted or rigid movement while moving from one position to another.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>⚫️</td>
<td>Overt Motor Pain Behaviour Cue (⭐ Adapted with permission Keeffe &amp; Block 1982)</td>
<td>⚫️ Pointing to painful area</td>
<td>Patient points to identify the area of pain in order to inform the staff that he / she is in pain.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>⭐️</td>
<td>Behavioural (General) Cue</td>
<td>⭐️ Restlessness</td>
<td>Patient shows excessive motor activity of his / her upper and or lower limbs or torso</td>
<td></td>
<td></td>
</tr>
<tr>
<td>⭐️</td>
<td>Behavioural (General) Cue</td>
<td>⭐️ Tearing</td>
<td>Patients shows evidence of tearing from both eyes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Behavioural (General) Cue</td>
<td>Attention-seeking behaviour</td>
<td>Patient demonstrates tapping of the bed with one or both hands. Patient moves head from side to side.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----</td>
<td>---------------------------</td>
<td>-----------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☠</td>
<td>Verbal – Subjective Pain Behaviour Cue</td>
<td>Patient self-report pain</td>
<td>Patient attempts to provide a verbal report of his / her pain. Patient is unable to provide a verbal report in response to pain questioning.</td>
<td></td>
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<tr>
<td></td>
<td>Behavioural General Cue</td>
<td>Immobile posture</td>
<td>Patient lies quietly without showing any signs of moving any of their upper or lower limbs or torso</td>
<td></td>
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<tr>
<td>☠</td>
<td>Patient-ventilator-dyssynchrony</td>
<td>Chewing ET Tube</td>
<td>Patient demonstrates a chewing motion on the ET Tube</td>
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<td></td>
<td>Distress on the ventilator</td>
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<td>Patient fighting the ventilator</td>
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<td></td>
<td>Diaphoresis</td>
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<tr>
<td>#</td>
<td>Physiological Pain Indicators</td>
<td>Increased heart rate</td>
<td>Patient demonstrates evidence of sudden increase in heart rate above his / her baseline.</td>
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<tr>
<td>#</td>
<td>Physiological Pain Indicators</td>
<td>Increased blood pressure. Increased Mean arterial pressure (MAP)</td>
<td>Patient demonstrates evidence of sudden increase in blood pressure and or MAP above his / her baseline</td>
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<td></td>
</tr>
<tr>
<td>#</td>
<td>Physiological Pain Indicators</td>
<td>Decreased blood pressure</td>
<td>Patient demonstrates evidence of sudden drop in blood pressure and or MAP below his / her baseline</td>
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## Appendix III
### Coding Template Researcher-Observation Data

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<th>Symbol</th>
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<th>Conceptual Definition</th>
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<th>Activity</th>
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<td>Increased respiratory rate</td>
<td>Patient demonstrates evidence of sudden increase in respiratory rate above his/her baseline</td>
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<td>Decreased respiratory rate</td>
<td>Patient demonstrates evidence of decrease in respiratory rate below his/her baseline</td>
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APPENDIX IV

NURSE-PARTICIPANT CONSENT FORM
Appendix IV

Hospital

The Nurse Participant Consent Form

Project Title: “Clinical Judgement by Critical Care Nurses in the Context of the Ventilated Patient in Pain in the Immediate Phase Post Cardiac Surgery”

Researcher: Laserina O Connor

Purpose:
This project will:
Ascertain how critical care nurses reach a judgement that the ventilated patient is in pain in the immediate phase post cardiac surgery.

This is to certify that I ____________________________

Print Name

Hereby agree to participate in the above named project

I understand that I am free to withdraw my consent and terminate my permission at any stage, without penalty.
I hereby give my permission to participate and think aloud at the bedside while caring for a ventilated patient in the immediate six hours approximately post cardiac surgery. I also agree to wear a pocket microphone and tape-recorder so that the think aloud data can be tape-recorded. I understand that at the completion of the think aloud period the tapes will be transcribed by the researcher within ninety-six hours and destroyed immediately. I also understand that the information may be published but my name will not be identified with the project.

__________________________________________  ____________________________

Participant  Researcher

Date  ____________________________
APPENDIX V

NURSE DEMOGRAPHIC

DATA SHEET
Appendix V

Nurse Demographic Data Sheet

Please tick the appropriate box below

Gender:
Male □
Female □

Age: 23 – 27 □ 43 – 47 □
28 – 32 □ 48 – 52 □
33 – 37 □
38 – 42 □

Registered Nurse Qualification:
Certificate
Diploma Nursing □
Degree Nursing

Total Time Experience Critical Care Nursing
Less 1 year □
1 – 2 years □
2 – 3 years □
3 – 4 years □
4 – 5 years □
5 – 6 years □
6 years plus □ Please specify

Critical Care Qualification:
Certificate
Orientation Programme □
None □

Total Years Professional Nursing
1 – 2 years □
2 – 3 years □
3 – 4 years □
4 – 5 years □
5 – 6 years □
7 – 8 years □
8 – 9 years □
9 – 10 years □

10 years plus □ Please specify
APPENDIX VI

PATIENT INFORMATION LEAFLET
Appendix VI
Hospital
Patient Information Leaflet
“Clinical Judgement by Critical Care Nurses in the Context of the Ventilated Patient in Pain in the Immediate Phase Post Cardiac Surgery”

How are you feeling?

This project will attempt to explore the pain experiences of patients asleep on a ventilator (breathing machine) in the critical care unit following cardiac surgery. Patients (like you) who will be attached to a ventilator in the first few hours post surgery may be unable to verbalise your pain experience to the nurse. However, you will be able to use non-verbal expressions to communicate your pain. Therefore, it is important to establish how you communicate your pain to the nurse as pain indicators are invaluable to build a comprehensive picture of your pain experience. Therefore, the researcher would like to observe you in the critical care unit tomorrow when you return there post cardiac surgery. The observation period will take approximately six hours. The researcher will record her observations using a tiny pocket tape-recorder, transcribe the tapes herself within ninety-six hours and then destroy the tapes immediately.

Confidentiality and anonymity will be maintained at all times. Furthermore, you are free to participate in this study. In addition, you are free to withdraw your consent at any stage during the study.

The researcher believes that this project which allows the patient and critical care nurse tell their pain story can only improve pain management for patients post cardiac surgery and support pain nurses’ efforts to develop a scientific base of practice.

Do you have any questions?

Thank you for your time and co-operation

Laserina O Connor
APPENDIX VII

PATIENT DEMOGRAPHIC DATA SHEET
Appendix VII
Patient Demographic Data Sheet

Gender:
Male  □
Female □

Please tick the relevant box below

Age:   18 – 27 Years □
        28 – 37 Years □
        38 – 47 Years □
        48 – 57 Years □
        58 – 67 Years □
        68 – 77 Years □
        78 – 85 Years □
APPENDIX VIII

PATIENT-PARTICIPANT

CONSENT FORM
Appendix VIII
Hospital

The Patient Participant Consent Form

Project Title: “Clinical Judgement by Critical Care Nurses in the Context of the Ventilated Patient in Pain in the Immediate Phase Post Cardiac Surgery”

Researcher: Laserina O Connor

Purpose:
This project will:
Establish how critical care nurses reach a judgement that the ventilated patient is in pain in the immediate phase post cardiac surgery.

This is to certify that I _________________________________________

Print Name

Hereby agree to participate in the above named project

I understand that I am free to withdraw my consent and terminate my permission at any stage, without penalty or without compromising current and or future medical treatment.
I hereby give my permission to be observed six hours immediately post my cardiac surgery in the intensive care unit and for the observation to be tape-recorded. I understand that at the completion of the observation period the tapes will be transcribed by the researcher and destroyed immediately. I also understand that the information may be published but my name will not be associated with the project.

____________________________________  _______________________________________
Participant                                      Researcher

Date  ____________________
APPENDIX IX

NURSE DEMOGRAPHIC

TABLES
### Table 3.1: Age Profile of Nurse Participants

<table>
<thead>
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<th>Age</th>
<th>Frequency</th>
<th>Percent</th>
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Mean 29.8  Median 30.0  Standard Deviation 5.97
### Table 3.2: General Nursing Qualification

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### Table 3.3: Total Years Professional Nursing

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Mean 8.9  Median 8.0  Standard Deviation 5.15
### Table 3.4: Qualification Critical Care Nursing

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Appendix IX
Demographic Data Of Nurse Participants

Table 3.5: Total Time Experience in Critical Care Nursing

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Mean 3.7  Median 2.0  Standard Deviation 4.0
APPENDIX IX_a

PATIENT DEMOGRAPHIC

TABLES
APPENDIX IX A
DEMOGRAPHIC DATA OF PATIENT PARTICIPANTS

Table 3.6: Patient Gender

<table>
<thead>
<tr>
<th>Gender</th>
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**APPENDIX IX A**

**DEMOGRAPHIC DATA OF PATIENT PARTICIPANTS**

Table 3.7: Age Profile of Patient Participants

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Mean 62.1  Median 62.0  Standard Deviation 9.66
APPENDIX IXb

PATIENT PARTICIPANTS

PERIOPERATIVE CHARACTERISTICS
Appendix IX B
Perioperative Characteristics of Patient Participants

Table: 3.8 Perioperative Characteristics

All conventional coronary artery bypass operations consisted of a standard median sternotomy, thoracic access for heart-lung machine and cold crystalloid cardioplegia. Induction to anaesthesia, tracheal intubation, and institution of mechanical ventilation were accomplished with midazolam, fentanyl, gas, and pancuronium. Maintenance anaesthesia was accomplished with isoflurane in oxygen/air, fentanyl, and midazolam supplemented with pancuronium or vecuronium for neuromuscular blockade. The total dose of fentanyl was 20 micrograms/kg and that of midazolam, 0.15 to 0.2 mg/kg. Intravenous nitroglycerin 0.1-5 micrograms/kg/min was titrated according to haemodynamic response and ST-segment analysis. After weaning from coronary pulmonary bypass (CPB) a mean arterial blood pressure of 65-75 mmHg was considered optimal, while low values were treated by volume replacement, pacing, or inotropic support. Normoventilation with PaCO2 of 4.5-5.5 kPa and PaO2 values above 12 kPa and end-tidal carbon dioxide concentration at 4.5-5.3 kPa were maintained throughout the perioperative period. The sternum was closed with a minimum of seven peristernal wires to a maximum of nine wires. All patients had two mediastinal and one or two pleural drains in situ. Coronary artery surgery was performed with a left internal mammary graft (LIMA) to the left anterior descending coronary artery in twenty-nine patients with one patient receiving a right internal mammary graft (RIMA) while all patients had saphenous vein conduits to other territories.

The patients were transferred to the critical care unit intubated and mechanically ventilated following the completion of coronary artery bypass surgery and monitored with standard equipment including continuous electrocardiography, SpO2 via pulse oximetry, and systemic catheters and pulmonary artery catheter and urinary catheter. Standard postoperative care consisted of mechanical ventilation, cardioactive drugs where indicated, the use of warm air heaters to maintain normothermia, and analgesia with intravenous morphine boluses as required. Criteria for weaning from the ventilator included haemodynamic stability (no or decreasing use of cardioactive drugs), absence of significant bleeding (<100 ml/h), absence of significant arrhythmias, adequate urinary output and oxygen saturation more than 95% with fractional concentration of inspired oxygen less than 0.50; the patient also needs to be sufficiently awake to follow commands. The thirty patient participants were targeted for fast-track management, defined as early extubation enabling discharge from the critical care unit on the first postoperative day, upon their arrival in the critical care unit. In the field of cardiac surgery, studies have shown that modifying anaesthetic techniques and postoperative sedation protocols may allow for early extubation and thereby early ICU discharge so-called fast-track management (Silbert et al. 1998) with no significant additional morbidity or mortality (Cheng et al. 1997).