A PORTFOLIO OF STUDY PRACTICE AND RESEARCH

Submitted for the Doctor of Psychology (Psych D) in Clinical Psychology

CONVERSION PROGRAMME

Linda Cox
Department of Psychology
University of Surrey
1995
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Department of Psychology
University of Surrey

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ACKNOWLEDGEMENTS

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Women’s perceptions of stereotactic fine needle aspiration cytology as an aid to the diagnosis of impalpable screen detected breast lesions  

(Originally submitted in partial fulfilment of the requirements for the degree of Master of Science in Clinical Psychology)

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Abstract

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SECTION I

PROFESSIONAL AUDIT
PERSONAL STUDY PROGRAMME

Psych D in Clinical Psychology
Conversion Programme

Name: Linda Cox
Date of registration: 5.10.1994
Reg. number: 3412091

SECTION ONE: Professional Audit

1. Overall Aims and Objectives

Prime aim: To attain greater professional competence in order to enhance personal effectiveness in the contribution of clinical psychology to health care.

Prime objective: To produce a portfolio of study, practice and research that will demonstrate increased competence in each of these three areas.

2. Academic

2.1 Aims

To increase the theoretical knowledge base from which to draw in providing a clinical service.

To enhance academic competence in specific areas of clinical psychology relevant to the service provided.

2.2 Objectives

To complete three academic reviews in the areas specified below.

To attend training workshops, seminars and conference presentations relevant to these topics.

A. The role of psychotherapy in the rehabilitation of severe brain injury.

B. Quality of life following brain injury: Do we really know what we mean?

C. Approaches to the rehabilitation of acquired visual perceptual disorders: A review.
2.3 Rationale

Within my current clinical work I am called upon to provide a comprehensive clinical psychology and neuropsychology service to people on a community re-entry programme following acquired neurological impairment, usually involving brain injury. This is a rapidly developing area, and in order to provide a high grade service it is important to remain up to date in the application of cognitive neuropsychology to clinical issues and also to develop a sound theoretical framework regarding issues relevant to the rehabilitation of this client group. In order to provide a comprehensive clinical psychology service it is also important to take a holistic stance and take into consideration the impact of neurological impairment on the emotional well-being and psychological and social adjustment of the individual.

2.4 Plan

To conduct a search of the relevant literature; to obtain relevant books and offprints; and to produce a critical review on each of the chosen topics.

3. Clinical

3.1 Aims

To increase personal professional competence and to develop the services offered by the Department of Clinical Psychology.

3.2 Objectives

To prepare a dossier demonstrating increased personal competence and the development of services by the introduction of a training programme for transdisciplinary rehabilitation assistants.

3.3 Rationale

The unit in which I work is staffed by qualified professionals from a variety of disciplines, assisted by a team of rehabilitation assistants who function on a transdisciplinary basis. Many of these are psychology graduates. The underlying approach to the treatment of residents draws heavily on psychological principles and theories which are not always made fully explicit to the rehabilitation assistants. It is felt that both effectiveness and job satisfaction will be enhanced with the introduction of a more formal training programme. In addition, it is felt that the response of rehabilitation assistants to individual residents may be enhanced by a greater understanding of the neuropsychological sequelae of brain injury. The development, implementation and evaluation of such a training programme has been identified as an objective from my Individual Performance Review and is in accordance with a personal objective of developing teaching skills.
3.4 Plan

Preparation of a course outline will be prepared in conjunction with other professionals attached to the Unit. A programme will then be drawn up, involving contributions from disciplines other than clinical psychology. Preparation of course materials will be completed as necessary. The course will be delivered over a number of weeks and evaluated on a sessional and whole course basis.

4. Research

4.1 Aims

To increase personal research competence by gaining experience of a wider range of research methods and analysis and to increase the knowledge base available to the Department and the profession.

4.2 Objectives

To develop a research dossier, including the original M.Sc. dissertation, which will demonstrate increased research competence and present a contribution to knowledge.

To undertake an exploratory investigation into the clinical utility of the Leiter International Performance Scale in neuropsychological assessment and rehabilitation planning.

4.3 Rationale

In clinical populations, the use of the instruments of choice for neuropsychological assessment is often limited by the particular disabilities of the client group. In particular, assessment of cognitive functioning in people with significant language impairments can be problematic. The Leiter International Performance Scale (LIPS) provides a potential assessment tool which requires no expressive or receptive language skills. Although originally developed for use with children, the scale covers the age range from 2 to 18 years, rendering it potentially appropriate for use with an adult population. While other non-verbal tests of intellectual functioning are available, (e.g. Ravens Progressive Matrices), these usually rely on verbal instructions and do not assess such a wide range of cognitive functions as the LIPS. In planning for rehabilitation an understanding of the underlying processes which are affected is more important than the calculation of an IQ.

From previous clinical experience, the LIPS appears to offer some potential as an additional tool for the neuropsychologist. There is no published study of the neuropsychological properties of the LIPS and its relationship to other more established neuropsychological assessment tools. Such an investigation would be beyond the scope of the present project. The purpose at this stage is to investigate the clinical utility of the LIPS by incorporating it into the
assessment of a range of clients referred for rehabilitation following acquired brain injury, including those with a significant language impairment or other factors which inhibit administration of verbal tests. Clinical utility will be assessed in terms of the amount of additional information obtained, the contribution of this information to the development of rehabilitation programmes, and the relative cost-effectiveness.

5. Portfolio outline

Academic

A. The role of psychotherapy in the rehabilitation of severe brain injury.

B. Quality of life following severe brain injury: Do we really know what we mean?

C. Approaches to the rehabilitation of acquired visual perceptual disorders: A review.

Clinical

The design, implementation and evaluation of a training programme for rehabilitation assistants in a neuropsychologically oriented rehabilitation programme.

Research

A. Women’s perceptions of stereotactic fine needle aspiration cytology as an aid to the diagnosis of impalpable screen detected breast lesions. (Original MSc dissertation)

B. Is the Leiter International Performance Scale a useful tool for the clinical neuropsychologist? An exploratory investigation into the clinical utility of the LIPS in a neuropsychological rehabilitation setting.

6. Suggestions for training events

To be determined in the light of events advertised.

Signed .................................. Participant

Signed ................................. Head of Clinical Department

Signed ................................. Course Director
PERSONAL PROFESSIONAL DEVELOPMENT

A summary of work and study undertaken for the MSc in Clinical Psychology and subsequent post-qualification training, including that undertaken during the period of registration for the Psych D.

1. MSc Course, University of Surrey, October 1988 to September 1990

A. Academic Content

Main subject areas were:

<table>
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<tr>
<th>Adult Mental Health</th>
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<td>Child and Adolescent</td>
<td>Research Methods and Statistics</td>
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<td>Learning Disabilities</td>
<td>Professional Issues</td>
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<td>Neuropsychology</td>
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B. Professional Placements

i. Adult mental health - hospital-based outpatient and inpatient experience covering a wide range of mental health problems.

ii. Learning disabilities - a combination of long-stay hospital and community based experience, covering a range from mild to profound learning disability.

iii. Child and Adolescent - a range of community and hospital based experience, including work in a regional adolescent unit and a child guidance clinic, covering an age range from 2 to 17 years.

iv. Neuropsychology - a range of in- and out-patient work including referrals from acute neurology, general practice and psychiatry.

v. Psychotherapy - brief dynamic psychotherapy in an out-patient setting, covering a variety of disorders.

C. Research

An investigation of women’s perceptions of a potentially aversive medical procedure - stereotactic fine needle aspiration cytology, as an aid to the diagnosis of screen-detected breast lesions. Involved interviewing 73 women who had undergone this procedure and administering several assessment tools designed to investigate the women’s perceptions of stereotactic fine needle aspiration in comparison with other health-related investigations. Full research project reported elsewhere in this portfolio.
2. **Post-qualification training prior to registration for Psych D**

i. **Short courses October 1990 to September 1994**

A variety of short courses, seminars and study days, full details of which are no longer available. These included:

- **1991** Neuropsychological rehabilitation. 3-day workshop by Dr. Barbara Wilson
- **1993** "Neuropsychological rehabilitation." A one-day workshop outlining the work of the Centre for Rehabilitation of Brain Injury, Denmark. Prof. Anne-Lise Christensen and Dr. Tom Teasdale. Ticehurst House.
- **1993** Patients who are difficult to assess. Seminar at Royal Hospital for Neuro-disability.
- **1994** "The therapeutic milieu approach to neuropsychological rehabilitation: concepts, programmatic, contents and outcome." Seminar by Dr. Yehuda Ben-Yishay at Ticehurst House Hospital.
- **1994** "Effectiveness of neurorehabilitation programmes" and "Neuropharmacology". Both seminars included in the Post Qualification Course in Clinical Neuropsychology, BPS Special Group.

ii. **Diploma in Clinical Neuropsychology**


3. **Courses and events attended while registered for Psych D.**

i. Analysing Psychological Data. Dr. Sean Hammond, University of Surrey. One-day revision workshop, July 1995


SECTION TWO

ACADEMIC AUDIT
THE ROLE OF PSYCHOTHERAPY IN THE
REHABILITATION OF SEVERE BRAIN INJURY
THE ROLE OF PSYCHOTHERAPY IN THE REHABILITATION OF

SEVERE BRAIN INJURY

The last ten to fifteen years have seen a significant change in attitudes towards the use of psychotherapy with adult survivors of severe brain injury. This change in attitude appears to be largely related to the growth in rehabilitation facilities for this population, coupled with growing understanding of the long-term consequences of brain injury and the relative contribution of cognitive and psychosocial factors (Oddy, 1984; Prigatano and others, 1986). Nevertheless, there are many references in the literature to a continuing belief amongst colleagues that psychotherapy with this client group is not appropriate (e.g. Langer, 1992; Lewis, 1991). This view appears to be most prevalent among those seeing psychotherapy from a more traditional, psychoanalytically oriented standpoint (Langer, 1992).

This leads to the question “what is psychotherapy?” Bellak and Small (1978) suggest that it is “a verbal or otherwise symbolic interaction of a therapist with a patient, guided by an orderly and integrated series of concepts, and directed towards beneficial change in the patient” (p.29). A more pragmatic definition, from within the brain injury field, comes from Prigatano and his colleagues (1986), who describe psychotherapy as the process of “teaching the patient to learn to behave in his or her own best self-interest” (p.67). Sbordone (1990) expands on this by defining psychotherapy as “a process that attempts to alleviate the client’s emotional distress as well as modify the client’s behaviour, and his or her perception of self, others and the demands of the environment” (p.146). He adds that it can also be viewed as “a
process that modifies the environment and teaches the client as much as possible about the nature of his or her neurobehavioural symptoms”, since this can improve coping ability and facilitate behaviour consistent with the client’s best self-interest.

Prigatano (1991), echoing Sbordone’s reference to the importance of education as part of the psychotherapeutic process, sees psychotherapy as “a teaching experience in which a socially sanctioned healer uses whatever learning techniques are culturally acceptable to the individual and society. These techniques must “make sense” to the patient as well as to the therapist. They must reflect a method of interaction that takes into consideration the cognitive and personality characteristics of the individual being served” (pp.2-3). It is clear from these definitions that psychotherapy with those suffering from brain injury may be seen as encompassing a broader range of activities than might generally be considered and that the process might be approached in many different ways. The literature includes examples which range from the behavioural (Becker & Vakil, 1993) to the psychodynamic (Langer, 1992).

Langer (1992) suggests that many of the concerns about the value of psychoanalytic psychotherapy with brain-injured clients stem from erroneous beliefs about the nature of brain injury and assumptions about its uniformity. Thus all brain-injured clients may be seen as lacking the cognitive skills deemed necessary to participate in therapy. However, Langer argues that even psychodynamic approaches may often be suitable for use with brain-injured clients, although the therapist must be willing and able to take into account the effects of the individual’s neuropsychological status. Nevertheless, the nature and extent of injury in some individuals does pose significant
constraints on what can realistically be undertaken. Lewis (1991) argues that "many
patients suffer from such profound impairment of communications skills and ideation
abilities that a psychotherapy process cannot be meaningfully effective" (p. 22).
However, both Lewis and Langer suggest that reluctance to treat brain-injured patients
stems as much from the therapist's own anxieties and concerns as from limitations
imposed by the cognitive status of the patient.

In arguing the case for psychotherapy, Lewis (1991) points out that brain-injured
individuals struggle with the same psychological issues that everyone else does and the
relevance and helpfulness of psychotherapy should not be underestimated. Prigatano
(1991) describes the existential issues faced by brain injury sufferers - "Will I be
normal?"; "Why did this happen to me?"; and "Is life worth living after this brain
injury?" In addition, there is substantial evidence that serious brain injury often leads
to very significant personality disturbance and psychosocial consequences (e.g..
Brooks, 1984; Prigatano and others, 1986). It is now recognised that personality and
psychosocial factors are at least as important as physical and cognitive impairments in
determining the individual's ability to return successfully to a productive and rewarding
life-style (Lezok, 1987; Oddy, 1984; Prigatano and others, 1986). The cost of these
psychosocial problems is great, both in economic terms (e.g. low return-to-work rates)
and in personal terms. Divorce and family breakdown are common. Prigatano argues
that failure to address the underlying psychosocial problems may lead to growing
difficulties, citing evidence that levels of gainful employment may be lower 10 to 15
years after injury than 2 to 4 years after injury, and also that some personality
difficulties seem to worsen over time (Brooks, 1984; Prigatano, Klonoff & Bailey, 1987; Thomsen, 1984).

Psychosocial adjustment after brain injury is affected by both cognitive deficits and personality and emotional disturbance (Prigatano and others, 1986). The former are generally addressed by cognitive rehabilitation programmes aimed at either remediating the underlying processes or teaching compensatory strategies. Prigatano (op. cit.) suggests that personality and emotional disturbances observed following brain injury may be classified in three ways: reactionary problems; neuropsychologically-mediated problems; and characterological styles (i.e. premorbid characteristics). These distinctions, he suggests, are useful in determining the most appropriate treatment strategy, with reactionary problems being the most amenable to psychotherapeutic approaches. It is important to note, however, that the distinction is not, in practice, always an easy one to make. Depression, for instance, may most often be thought of as a reactionary problem, associated with some degree of insight into the individual’s current state. However, there is some evidence that the incidence of depression following brain injury may be affected by the site of the lesion, suggesting that there may be an organic component in some cases. An alternative explanation is that injury to different areas within the brain gives rise to different functional sequelae. It is possible that these various sequelae may lead to differential rates of secondary depression. Cicerone (1989) suggests that emotional reactions after injury “appear particularly related to the recognition of reduced competencies and, more generally, a sense of loss of self” (p. 106).
The theme of self-concept following brain injury has been taken up by many writers in this field (e.g. Lewis and Rosenberg, 1990; Prigatano, 1991; Langer, 1992). However, the importance of taking into account both psychogenic and neurogenic factors in considering the effects of brain injury on the “self” is highlighted in a thoughtful paper by Stuss (1991), who seeks to integrate current understanding of disturbances of self-awareness which can be a direct result of frontal lobe pathology, with the theory of the self propounded by William James (1890). Prigatano (1992) argues that altered self-awareness may substantially contribute to the long-term psycho-social difficulties often seen after brain injury and must be addressed in order to maximise the chance of the individual achieving and maintaining a productive life-style.

Cicerone (1989) points out that emotional reactions following brain injury bear no direct relationship to the severity of the injury and may worsen over time as the individual becomes increasingly aware of the difficulties in resuming a former lifestyle, leading to increased anxiety, depression, irritability, social withdrawal and mistrust of others. In contrast, personality and psychosocial changes resulting directly from damage to the brain are generally related to severity of damage and are usually at their greatest in the early stages of recovery, often showing some improvement as neurological status improves. Common neuropsychologically based problems include poor social judgement, egocentricity, lack of empathy, increased irritability and aggressiveness, emotional lability, disinhibition and suspiciousness (Cicerone, 1989). These problems are largely associated with impaired functioning of the frontal and temporal lobes, the areas most frequently implicated in traumatic head injury. The role of premorbid characterological factors is less well understood, particularly in the light
of the changes which may occur following severe head injury. For example, there are reports of both exaggeration of premorbid characteristics and also of dramatic alteration of previous traits (Cicerone, 1989; Langer, 1992). Nevertheless, the importance of taking into account premorbid personality as part of the assessment process is frequently emphasised (e.g. Prigatano and others, 1986; Cicerone, 1989; Langer, 1992). It is all too easy for the therapist to assume that “dysfunctional” behaviours are a result of the head injury, when information from family members can indicate otherwise.

An issue of importance which merits particular consideration is that of unawareness or denial of deficit. This is a common phenomenon following severe traumatic brain injury and has been attributed to psychological defence mechanisms, to neuropathology or to a combination of both (Prigatano and Schacter, 1991). The range of terminology used in the literature can be confusing and is not always consistent. “Lack of awareness”, “unawareness of deficit”, “lack of insight”, “diminished awareness” and “denial” are all to be found, sometimes interchangeably, sometimes in order to indicate a specific emphasis. For present purposes the term “unawareness” will be used in a broad sense to include all aspects of the phenomenon, and “denial” used only to indicate an ego-protective mechanism. Unawareness (including denial) of illness or injury is not a phenomenon related solely to brain injury, but is of particular importance here in that the process has implications for the response of the individual to rehabilitation. Cicerone (1989) reports that patients who do not acknowledge their real limitations often assume excessive vocational or social responsibilities, fail to recognise or compensate for their errors and have difficulty accepting assistance. In
clinical settings, resistance to treatment may be a major issue. A patient who is unaware of his deficits will not see the need for treatment and may be reluctant or refuse to participate actively in the programme.

Langer and Padrone (1992) add lack of knowledge to the possible causes of unawareness and stress the importance of considering the underlying basis of the unawareness in determining the treatment programme adopted in any individual case. Cicerone (1987) found that patients who completed a post-acute rehabilitation programme reported retrospectively that concrete feedback was the most effective means of dealing with resistance to treatment, suggesting that this can, in some circumstances, reduce the level of unawareness. Such feedback may be provided by a variety of means, including the systematic use of cognitive retraining exercises (e.g. Klonoff et al, 1989) or community based activities, and is not dependent upon specific psychotherapeutic interventions. Indeed, Prigatano (1995) argues that psychotherapy is unlikely to be helpful when the unawareness of deficit stems from organic damage resulting in an altered awareness of self.

The growth of integrated neuropsychological rehabilitation programmes offers the opportunity for the creation of an environment which is geared towards a more holistic appreciation of the needs of brain-injured patients. Cicerone (1989) highlights the importance of integrating any psychotherapeutic interventions into the rehabilitation process, using situations as they arise in the course of rehabilitation activities. Addressing in situ the patient's expectations, actual task performance and reactions to any discrepancy between the two can be a powerful way of assisting the individual to
acknowledge the reality of his or her current situation. Langer and Padrone also highlight the importance of timing in treating emotionally based denial. Cicerone (1989) goes further and sounds a cautionary note that it may not always be appropriate to address denial, especially if it is not interfering with rehabilitation or daily functioning. He suggests that “awareness may not in and of itself be a valuable commodity” (p. 109) and cites Alexy’s (1983) contention that the perceived need for patients to “mourn their deficits” may have more to do with therapists’ values than with the needs of the individual patient. Most clinicians would no doubt accept the premise that denial can be functional and decisions on the necessity or timing of treatment should take into account the effect of the denial on the individual’s ability to respond to rehabilitation and to adjust to the current situation. It is worth pointing out here that denial is not an “all or nothing” phenomenon. For example, any individual may exhibit complete denial of deficit, or a limited acknowledgement of the deficit while denying its full implications, or may even show a good awareness of the deficit, while at the same time denying its permanence.

The emotional and psychosocial difficulties facing survivors of brain injury are now well established and clearly these must be taken into account in designing rehabilitation services which address the holistic needs of the individual as well as acknowledging the long-term costs to society. If psychotherapy, in the broad sense described above, is to address these issues, some clear goals of therapy must be defined. Prigatano and his colleagues (1986), working within the context of an integrated, neuropsychologically-oriented brain injury rehabilitation programme, describe the goals of psychotherapy as including the following:
1. Providing a model(s) that helps patients understand what has happened to them.
2. Helping patients deal with the meaning of the brain injury in their life.
3. Helping patients achieve a sense of self-acceptance and forgiveness for themselves and others who have caused the accident.
4. Helping patients make realistic commitments to work and interpersonal relations.
5. Teaching patients how to behave in different social situations (to improve competence).
7. Fostering a sense of realistic hope.

Prigatano (1991) later summarised this agenda as comprising two broad goals - helping the individual to engage in the rehabilitation process (in the broadest sense) more actively and positively, and helping patients cope which what he describes as their “wounded soul” by addressing the existential issues. Whilst not, perhaps, being fully inclusive, the more detailed aims described in the earlier paper are worth considering for two main reasons. First, they provide a framework which can be helpful to therapists in knowing how to structure their interventions with this client group. Without some such conceptual framework it is very easy for the therapist to feel overwhelmed by the extent of the patient’s needs. Second, a clear list of the goals of therapy should facilitate the process of evaluation. Whilst not all of Prigatano et al’s seven goals can be readily defined in operational terms, there are at least some useful pointers which can be pursued. The question of evaluation is discussed further below.
The range of topics covered by these seven goals is considerable and reflects the wide definitions of psychotherapy considered above. The breadth of the agenda raises the question of the most effective method of approaching these goals. Prigatano, following the pioneering work of Ben Yishay and his colleagues (e.g. Ben Yishay et al, 1985), sees psychotherapeutic interventions as coming from the rehabilitation environment as well as from specific individual or group psychotherapy sessions. This "milieu" approach, he argues, "focuses on teaching patients to be part of a small community and to be cooperative and responsible within the context of that community" (Prigatano et al., 1994, p. 92). However, to achieve this, Prigatano’s programme depends heavily on a highly structured approach incorporating a number of group activities and discussions (Prigatano and others, 1986; Prigatano, 1989). Wood (1989) challenges the assumption that this is necessarily the most suitable approach for all brain-injured patients, drawing attention to the demands the therapeutic milieu, as described by Prigatano, makes on the communication and reasoning skills of the individuals concerned. He also points to the high level of staff training required for such an approach and suggests that alternative strategies, including behavioural methods, may be more suitable in many cases. The concept of a "social milieu" rather than a "therapeutic milieu" is suggested. This debate reflects to some extent the different approaches which are often adopted in British and American rehabilitation programmes. The latter are often highly specific, with strictly defined admission criteria, while the former often accept clients with a much wider range in levels of cognitive functioning. The main point of agreement between Wood and Prigatano is that both clearly favour an integrated approach to treatment, in which all rehabilitation
staff follow defined guidelines in their interactions with patients and in which the social consequences of an individual's behaviour are acknowledged and addressed.

Many of the seven goals of psychotherapy described by Prigatano and his colleagues can be met using methods others than those traditionally associated with psychotherapy. Indeed, this is clearly the case in the programme they describe. Whilst a strong advocate for the role of psychotherapy with those suffering from brain injury, Prigatano (1991) accepts that there is no case for automatic referral for individual psychotherapy, each case being considered on its own merits. Group psychotherapy, however, is a standard part of his programme and while this may well be appropriate for the particular client group admitted, Wood's caution is an important one and the needs of those who cannot benefit from such an approach must also be considered. Where individual psychotherapy is considered appropriate, the importance of flexibility of approach is highlighted in a growing body of literature which suggests ways of compensating for the cognitive deficits which had previously led to those with brain injury as being considered unsuitable for psychotherapeutic treatment (e.g. Carberry and Bird, 1986; Cicerone, 1989; Langer, 1992; Lewis, 1991). These writers suggest a number of ways in which problems arising from memory impairments, attentional deficits and other cognitive limitations can be addressed, and their effects on the therapeutic process minimised. It would be beyond the scope of this paper to review this literature here, beyond relating this work to the broad definitions of psychotherapy discussed earlier and the clear need to consider both the psychological and neuropsychological status of the individuals concerned. Indeed, the need for a
thorough assessment covering both of these aspects is stressed in a number of papers (e.g. Langer, 1992; Lewis, 1991; Prigatano and Klonoff, 1988).

A neuropsychological assessment allows the therapist to modify his or her approach in two important ways. Firstly, it is essential to take into account the patient’s cognitive strengths and weaknesses in order that he or she may benefit from the process. Deficits of attention or memory, for instance, may not be insuperable barriers to psychotherapy but they do place constraints which the therapist would be ill-advised to ignore. With adequate information, suitable compensatory strategies can sometimes be implemented. Second, an understanding of the organically-based aspects of an individual’s behaviour is essential if inappropriate and potentially harmful interpretations are to be avoided (Langer, 1992). In considering the emotional and psychosocial adjustment of those suffering from brain injury, it is important to remember that the brain injured patient is not simply an individual, but a member of a social unit. The stresses imposed by brain injury on other family members has already been mentioned. A supportive and stable environment is of great importance in facilitating the maximum potential functioning of a brain-injured individual and the role of interventions with the family, whether educational, supportive therapy or family therapy, is increasing recognised (Rosenthal, 1989). Although these issues are beyond the scope of this paper, their importance must not be forgotten.

Given the growth of interest in the use of psychotherapeutic approaches with those suffering from brain injury, the effectiveness of such interventions is an important issue. There are two main sources of information available to date: individual case studies
(e.g. O'Brien and Prigatano, 1991) and evaluation studies of neuropsychological rehabilitation programmes. Examples of the latter include Prigatano and others (1986), Teasdale and Christensen (1994) and Prigatano et al. (1994). Whilst these studies provide growing evidence of the effectiveness of such programmes in terms of measures which reflect adjustment to disability and return to a more productive lifestyle, there are a number of problems in interpreting the findings. First, it appears that candidates are selected in terms of their perceived suitability for the particular programme. Patients with brain injury are not a homogeneous group and few conclusions can be drawn about the benefits for a wider client group of the particular approach adopted. Second, the programmes evaluated are multi-faceted and it is inevitably difficult to determine to what extent the various treatment components contribute to overall improvement. Indeed, the increasing trend towards an integrated approach makes the evaluation of discrete aspects of the service especially problematic. These difficulties in interpretation may apply also to individual case studies, the subjects of which are frequently participants in structured neuropsychological rehabilitation programmes. Rosenthal (1989) stresses the importance of careful documentation of the goals and accomplishments of psychotherapy with this client group and of attempting to identify those aspects of successful outcome that may be attributable to the effectiveness of psychotherapy. Whilst this is a necessary and important aim, the difficulties are formidable and little progress has been made in this direction.

A review of the literature indicates a clear need amongst survivors of severe brain injury for a therapeutic approach which addresses their cognitive, psychosocial and
emotional needs in an integrated fashion. The precise way in which those needs can be best met is less clear. People with acquired brain injury should in principle have the same rights of access to a psychotherapy service as the rest of the population, with suitability being assessed on an individual basis. It is essential that such therapy is only offered by those in a position to assess and understand the effects of the cognitive deficits of the particular individual concerned on the therapeutic process. The process itself must be adapted to take into account individual needs and there is now a growing body of literature giving examples of strategies which may assist in compensating for cognitive deficits. However, not all individuals will want or need individual psychotherapy, and in some cases cognitive and communication difficulties may be so great that, even within the broad definition given earlier, psychotherapy may not be a feasible proposition. The literature suggests that psychosocial and emotional issues can be addressed in a number of ways. In some programmes, group psychotherapy and a formal milieu approach are an integral part of the programme. Whilst this might be effective with some clients, this is not necessarily the most suitable approach for the wider client group. As Wood (1989) argues, other methods may well be more suitable in many cases. A good, integrated rehabilitation programme will provide an environment in which the individual is treated with dignity and respect, is encouraged to make decisions and choices, and is given the opportunity to develop a new social role based on the changed circumstances. All of these can be provided without specific group or individual psychotherapy and all are likely to contribute to emotional and psychosocial adjustment, although they may not, in themselves, be sufficient in all cases. What is clear from the literature is that a variety of approaches can be adopted successfully in particular circumstances. What is not yet fully clear is which
approaches are likely to be most effective with which clients in what circumstances.

Such a task is not an easy one.

It might be argued that the role of psychotherapy in addressing the psychosocial and emotional needs of those with acquired brain injury is three-fold. First, although direct individual or group psychotherapy may not be suitable, or indeed necessary, for the whole client group, it should be available to those who need it and who might benefit from it. Second, although it has been beyond the scope of this paper to consider, psychotherapists experienced in this field should be able to contribute substantially to working with the families of those suffering from brain injury. The extent to which the family is able to understand and adjust to the changed needs of their injured member must inevitably impact upon the social and emotional well-being of that individual. Finally, the insights and understanding gained from working psychotherapeutically with this client group must serve to foster increased awareness and understanding of the emotional and psychosocial needs of those with acquired brain injury. It is to be hoped that this will further stimulate the development of approaches which address these needs in a variety of ways, and which take into account the needs of those whose cognitive and communication difficulties pose a particular challenge.
References


QUALITY OF LIFE FOLLOWING BRAIN INJURY:
DO WE REALLY KNOW WHAT WE MEAN?
Quality of life has become a topic of significant interest in recent years, and there is now a proliferation of literature on the quality of life of people suffering from a variety of chronic medical conditions. With improved survival rates of people suffering from acquired brain injury, and a greater understanding of the often very significant sequelae, it is not surprising that quality of life following brain injury is one of the areas addressed. However, the concept of quality of life is, necessarily, somewhat subjective, and difficult to operationalise. If we are to gain a greater understanding of the issues relating to quality of life for individuals with acquired brain injury, it is important that we are clear what we mean and that we are able to create operational definitions which allow for identification of relevant variables and the conditions under which they may operate. The purpose of this paper is to review the current literature on quality of life following moderate or severe acquired brain injury, in order to consider to what extent there is consensus on what is meant by the term, and the various factors affecting its achievement. It is not the intention to look in any detail at currently available tools of measurement.

Bowling (1991), in her review of quality of life measurement scales used in health research generally, discusses the difficulty in arriving at a satisfactory definition, and the even greater difficulty in phrasing this in operational terms. After reviewing a number of attempts at definition, Bowling concludes that “Basically, quality of life is
recognized as a concept representing individual responses to the physical, mental and social effects of illness on daily living which influence the extent to which personal satisfaction with life circumstances can be achieved. It encompasses more than adequate physical well-being, it includes perceptions of well-being, a basic level of satisfaction and a general sense of self-worth. It is an abstract and complex concept comprising diverse areas, all of which contribute to the whole, personal satisfaction and self-esteem” (p. 9).

Turning to the area of brain injury, the literature relating specifically to quality of life after acquired brain injury is still relatively small. This is quite surprising given the well documented physical, cognitive, emotional and social sequelae. Whilst a number of different operational definitions have been used, as will be discussed below, very few papers have explicitly addressed quality of life as a concept and attempted a more general definition. One exception to this is a thoughtful paper by DeJong and Batavia (1989), which looks at the question of quality of life within the context of societal duty and resource allocation. DeJong and Batavia argue that resource allocation cannot be determined in a vacuum, and that it must necessarily be measured against some notion of the quality of life sought for the individual concerned. However, they point out that “quality of life is a clouded concept that is inextricably linked to one’s conception of what constitutes a meaningful life” (p. 2). Although they do not see the two concepts as synonymous, DeJong and Batavia argue that our views on the meaning of life cannot but influence our concept of what constitutes quality of life. In support of their argument, they draw on the work of Emmanuel (1987), who identified five competing, but not necessarily mutually exclusive, views on what constitutes a
meaningful life, each of which has very different implications for resource allocation. The five views described by Emmanuel are (i) vitalism, or the view that life itself is meaningful, regardless of its limitations or the pain which may be endured; (ii) the hedonistic view, that the purpose of human life is the maximisation of pleasure and the avoidance of pain; (iii) the affective view, which argues that human interaction and emotional relationships are what gives life its meaning; (iv) the autonomy/self-direction view, which holds that the ultimate meaning of life is the capacity for self-determination; and (v) the utilitarian view, which takes into account the gains and costs in terms of society as a whole, such that the burden to society should not outweigh the gains to any individual.

DeJong and Batavia point out that meaning of life issues affect decisions on initial treatment, especially in cases of very severe injury, but quality of life becomes the major issue once survival is assured. In their view, quality of life encompasses views on the meaning of life, but "goes beyond the meaning of life to consider other aspects of the individual's ability to function and survive in society" (p.3). Consideration of Emmanuel's five viewpoints clearly indicates how each of these views may influence the individual's perception of what constitutes quality, as well as the meaning, of life. For some, being alive is important in itself; for others, pleasure, human interaction or autonomy are likely to be significant determinants of what is perceived as quality of life. DeJong and Batavia also suggest that few individuals would hold to only one view on the meaning of life, and go on to conjecture that people are likely to weight the various issues differently depending on the person to whom they are being applied, i.e. themselves, their loved ones or others. This suggestion has a logical appeal,
although there does not, at present, appear to be any direct empirical evidence to confirm it. It also raises an interesting issue regarding the subjectivity of the concept of quality of life. DeJong and Batavia are suggesting that not only will each individual have a personal view on what constitutes quality of life, determined at least in part by their views on the meaning of life, but that view may also reflect particular circumstances, i.e. it is not fixed. The implications for obtaining any consensus on what constitutes quality of life after brain injury and how it should be measured are considerable.

As indicated above, few other writers have addressed the question of quality of life following brain injury from such a philosophical standpoint. Most make implicit or explicit assumptions about what constitutes quality of life, seemingly going straight for an operational definition. Among those that attempt a broader view, Jacobs, Blatnick and Sandhorst (1990), in a descriptive paper, emphasise the importance of normalisation, and of seeing the individual not just in terms of a series of weaknesses. They stress the difficulties that can arise when the "survivor" is made to feel a burden to society and identify the need for maximisation, within the constraints of individual circumstances, of self-determination and autonomy, including choices about when and how one uses assistance. Whilst they make a persuasive and articulate case, Jacobs et al. do not present any empirical evidence to confirm that these are the issues of importance to the individual with acquired brain injury. The importance of equality and autonomy is also emphasised by Condeluci et al. (1992), who attempted to evaluate survivor perspectives on outcome and value following head injury rehabilitation. Condeluci et al. reviewed three studies, one of which (Condeluci &
Swales, 1990) indicated that half their subjects were dissatisfied with their residential situations, and more than three quarters were dissatisfied with their vocational status. Most would have liked more social activity and involvement. This study did not involve a control group, and these levels of dissatisfaction must therefore be interpreted with caution. A second study described by Condeluci et al, which will be discussed further below, indicated that living situation, independence in activities of daily living and ability to manage one's own affairs were rated as the three most important clinical outcomes following rehabilitation.

Moore, Stambrook and Wilson (1991), investigating the relationship between quality of life following brain injury and locus of control beliefs, do not attempt to define quality of life as such, but take as an operational definition ratings on measures focusing primarily on the physical, psychosocial and emotional aspects (summary measures of the Sickness Impact Profile (Bergner et al., 1976); the summary scale of the Profile of Mood States (McNair, Lorr & Droppleman, 1971); and a measure of depression). Moore et al. refer to these measures as having “demonstrated validity and reliability in the assessment of quality of life outcomes for a variety of chronic disorders” (p. 189). However, the SIP was devised as a measure of health status, rather than quality of life, concentrating on assessing the impact of the condition on daily activities and behaviour, rather than feelings. When used as a measure of quality of life, there is an implicit assumption that inability, difficulty or restrictions in doing certain things inevitably constitute a poor quality of life. Moore et al. (1992), in a study comparing quality of life of married and single people following traumatic brain injury, use the same measures. Walker et al. (1987), investigated prediction of
recovery, using a number of measures taken at the time of entry to a rehabilitation programme, including The Quality of Life Rating Scale, a measure devised and used specifically within that particular programme. Again, Walker and his colleagues do not give any definition of quality of life, but the measure used comprises a rating scale completed by subjects and relatives/significant others, with items tapping “cognitive functioning, emotional control, physical functioning, daily living skills, social functioning, educational/intellectual abilities, vocational skills, behavioural adjustment, and overall adaptation to home, work, and society” (p. 702). Klonoff, Costa and Snow (1986), investigating predictors and indicators of quality of life after brain injury, adopted the definition given by McSweeney et al. (1982) in their study of patients with chronic obstructive pulmonary disease. McSweeney and his colleagues saw quality of life as encompassing the four dimensions of emotional functioning (including mood change and other psychiatric symptoms); social role functioning (including employment, home management, and social and family relationships); daily living activities (including mobility); and recreational activities. They give no indication of how they arrived at this working definition. An interesting addition to the list of potential components of quality of life following brain injury is identified by Garden (1991), who reviews the incidence of sexual dysfunction in neurologic disability, including brain injury, and concludes that quality of life may be improved through rehabilitation programmes that address the issues of sexuality. Other studies incorporate investigations of some of the dimensions identified above, without explicitly relating them to the concept of quality of life (e.g. Jellinek, Torkelson and Harvey, 1982).
Table 1 summarises the component factors from these various studies. Interestingly, those authors writing in a more descriptive vein, (Jacobs et al., 1990; Condeluci, 1992) emphasise the importance of less tangible factors such as self-determination and equality of status, while empirical studies tend to concentrate on aspects which can be more readily measured, such as daily living skills and emotional functioning. This suggests that the need for an operational definition may, in itself, limit the perception of what constitutes the whole concept of quality of life. It also begs the question of whether the sum is more or less than the component parts. In effect, many studies appear to be defining quality of life as that which is measured by their chosen scale or scales, even when the scales were not originally developed for this purpose. This

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inevitably raises the question of the validity of their definitions and measures for the population concerned.

An essential aspect to consider in defining quality of life, must surely be that of subjectivity versus objectivity. Bowling's (1991) definition, quoted earlier, recognised quality of life as a subjective concept, involving the individuals' perception of their well-being, rather than just that well-being itself. While Bowling acknowledges the multi-factorial nature of the concept, she appears to see the different components in terms of their contribution to individual levels of satisfaction, rather than as measures of quality of life in their own right. On this basis, one might question whether quality of life is something that can be observed, or whether it is instead something that can only be experienced. If the latter, how would an individual with many of the components of a good quality of life as identified in the studies above, but who professes to be dissatisfied with his life, compare with another individual who, to the outside observer, has a very poor quality of life but who professes himself to be content? Is it possible to be unhappy and yet to describe yourself as having a good quality of life? There are, of course, no easy answers to such questions, and yet they surely need to be addressed if quality of life is to have any real meaning as a concept. However, most of the studies discussed above do not begin to adds such issues explicitly. Instead, they seem to see the contributing factors as defining quality of life, rather than as contributing to the individual's perception of his quality of life, as Bowling argues.
Although many of these studies use self-rating measures, thereby giving the impression of an element of subjective perception, it must be borne in mind that the individual is being asked to rate specific, pre-determined factors, and usually to do so in terms of actual behaviours or situational factors, rather than feelings about these factors. Where emotional status is addressed, as in several of the studies described above, it is usually by a separate measure, and not directly linked to levels of functioning in other areas. Thus, the subject is not being asked to rate quality of life directly, and an implicit assumption is made that low or high scores on the rating scales indicate a good or poor quality of life for that individual. Nor does there appear to have been any study which directly asks those who have sustained an acquired brain injury what they consider to be the most important determinants of their quality of life. There is little reason to assume that the perspectives of those suffering the injury are necessarily the same as those of family or professionals. Condeluci et al. (1992) compared brain injury survivors’ rankings of importance of a set of clinical outcomes previously identified by Jones and Evans (1991), with rankings by family and by service purchasers, using data drawn from a study by Hosack et al., 1991. While some factors were rated similarly by all groups, survivors attached greater importance than families or purchasers to ability to manage their own affairs and to obtaining an income, and far less to level of supervision required. Condeluci et al. point out that even when outcomes are similarly ranked by the three groups, it cannot be assumed that this is for the same reasons. For example, families may rate certain outcomes highly because they would result in an easing of the burden of caring for their injured member. It should be noted that this study concerned itself with clinical outcomes and not quality of life as such, but it is likely that similar differences of perspective exist in the latter
case. These findings support DeJong et al.'s suggestion that these concepts are not only subjective, but may differ according to whether they are applied to oneself, a loved one or another.

If it is accepted that quality of life has, at the least, a subjective component, then the issue of obtaining meaningful information from the individuals who have sustained a brain injury is of primary importance. For those with more severe brain injury this may be very difficult. Leaving aside as a special case those who remain in a vegetative state, many people with severe brain injuries have a combination of cognitive and communication deficits which would make collection of subjective data, especially of an open-ended nature, extremely problematic. In such cases it may be necessary to obtain third party information, in which case it is important to acknowledge the difference between such observations and the individual's own perception. In the studies considered here, rating scales were often completed by both the individual with the brain injury and by family or significant others. No clear rationale is given for this in terms of definitions of the concept of quality of life. In such studies it is often noted that there is a discrepancy between the reports of the individual and of the family. Walker et al. (1987) interpret such discrepancies in terms of "denial" among the head-injured subjects, and predict that subjects who make the best recovery will have evidenced less denial. In making such assumptions, Walker et al. appear to be confusing quality of life with outcomes. It is often noted that individuals with brain injury will seem less aware than family or professionals of some of the consequences of that injury, and some of the reasons for this are touched upon in the paper "The role of psychotherapy in the rehabilitation of people with acquired brain injury", elsewhere in
this portfolio. Such individuals often do less well in rehabilitation than those with
good insight into their levels of functioning. However, in the absence of a definition of
quality of life which uses objective minimum standards rather than subjective
perceptions, it seems an unjustified assumption to equate poorer outcomes with poorer
quality of life without any other supporting evidence.

This is a major issue, and one which will not be resolved in this paper. There are,
however, a number of other issues that might be taken into account in considering
quality of life following brain injury. One dimension of potential significance is the
temporal one. There are a number of reasons why this might be expected to influence
perceptions of quality of life. First, factors which are accepted without undue distress
at a relatively early stage post-injury, may take on a more important aspect when they
are still present well after the individual has completed rehabilitation and settled into a
more permanent situation. Perception by families of the burden imposed by a member
with brain-injury are also likely to change over time, affecting relationships and family
dynamics, with a consequent effect on the injured individual. Although there is now
some longitudinal data on psychosocial and other outcomes as a function of time since
brain injury, some of which suggests that ratings on certain outcome measures may
deteriorate over time(e.g. Brooks, 1984; Prigatano, Klonoff and Bailey, 1987;
Thomsen, 1984), there is no published study looking at which factors most affect
quality of life at different stages post-injury.

A second issue which arises in relation to the kinds of working definition described
above, is the role of beliefs, expectations and personality factors. This issue is closely
related to the earlier discussion on subjectivity, and to the confusion which arises in some studies regarding the distinction between outcomes and quality of life. Jellinek et al. (1982) found a negative relationship between level of independence in self-care skills and level of distress at long-term follow-up. However, such studies do not generally describe the range of individual differences which might be found. Those working routinely with people with acquired brain injury soon become aware that some individuals who have made a relatively good physical recovery may show higher levels of distress and dissatisfaction with their situation than certain others who remain significantly physically disabled. This cannot always be explained in terms of levels of awareness of deficit. It would be interesting to explore this issue of individual difference to see what mediates such factors, and whether different beliefs, for example along the lines of the views on the meaning of life outlined by Emmanuel (1987), affect perceived quality of life regardless of objective outcome.

This leads to consideration of the role of another important dimension, severity of injury. Most people would accept that outcomes following acquired brain injury affect quality of life, even though the two concepts should not be regarded as synonymous. Since outcome is related to severity of injury, it would therefore be expected that quality of life would bear a similar relationship. Certainly this is the conclusion drawn by Klonoff, Costa and Snow (1986) in their study of predictors and indicators of quality of life in patients with closed head injury. However, as Moore et al. (1991) point out, "the extent and severity of the direct damage to the brain is a problem that rehabilitation teams are unable to change directly. Hence, an important goal of research should be the identification of factors that promote good psychosocial
recovery, independently of actual brain injury severity” (p.186). Moore et al.’s approach was to investigate the role of factors which could potentially be manipulated, in this case locus of control beliefs. An alternative approach would be to investigate the relative importance to the individual of different components of quality of life, in relation to actual level of functioning. For example, Klonoff, Costa and Snow (1986) found that residual motor dysfunction affected a number of factors deemed to be associated with quality of life, in particular activities of daily living and social role functioning. Whilst it may well be the case that significant motor dysfunction will result in a poorer quality of life, however that may be defined, there is only a limited amount that can be done to change the degree of motor dysfunction and its direct effects. It might, therefore, be useful to know which aspects of quality of life become more important for those with significant motor dysfunction. As indicated earlier, whilst many of the studies described in this paper acknowledge the multi-factorial nature of quality of life, they do not really address the issue of weighting of the different factors or the dynamic processes that may affect such weighting. One possible model is that quality of life following acquired brain injury may be viewed in a loosely hierarchical manner, with the weighting of some components of quality of life being increased when other components are no longer available. Investigation of such issues might help provide much needed information on what practical steps can be taken to help improve the quality of life of those most disadvantaged following brain injury.

A review of the literature on quality of life following acquired brain injury reveals that knowledge and understanding of the issues involved is still at a very early stage. Most
studies do not attempt to address the relationship between quality of life and outcomes, choosing instead to use a priori working definitions of quality of life, based on what may well be contributory factors, but which do not take into account the individual’s subjective perception. In addition, they tend rather to treat quality of life as a static concept, thus ignoring issues of individual differences, temporal issues, or other dynamic factors which might contribute to the relative weighting of the component parts in contributing to the overall perception of quality of life. Without consideration of these issues, the concept of quality of life as currently defined in empirical research is of limited value, contributing little more than that obtained from measures of outcome.
References


APPROACHES TO THE REHABILITATION OF ACQUIRED VISUAL PERCEPTUAL DISORDERS: A REVIEW
APPROACHES TO THE REHABILITATION OF ACQUIRED VISUAL PERCEPTUAL DISORDERS: A REVIEW

Visual perceptual disorders of various sorts are common sequelae of acquired brain injury, especially cerebro-vascular accidents and traumatic head injury, and can have a significant effect on the ability of the individual to resume many of the activities they previously enjoyed, or which are generally regarded as central to normal life, such as reading and driving. During the earlier stages of recovery they can add to the confusion and disorientation experienced by many patients and can place constraints on the undertaking of many activities during rehabilitation. No figures are readily available in the literature to indicate the proportion of patients in brain-injury rehabilitation facilities presenting with visual perceptual disorders, and some writers suggest that many cases may go undiagnosed or misdiagnosed. In addition to perceptual disorders, there is evidence for very significant incidence of visual dysfunction following traumatic brain injury (e.g. Schlageter et al., 1993), which again may frequently go undetected (Perlin et al., 1985). There is now a very large body of literature on the topic of unilateral visual neglect, or hemi-inattention, but the literature on rehabilitation of other visual perceptual disorders is more limited, with much of it focusing on single cases or on very specific aspects. For the rehabilitation clinician wishing to gain a broad overview of the area, the generic volumes on neuropsychological rehabilitation can seem a useful starting point. The aim of this paper is to review three different approaches to the rehabilitation of visual perceptual disorders, which can be found in current, comprehensive texts on neuropsychological rehabilitation. The three papers, Gianutsos and Matheson, 1987; Sohlberg and
Mateer, 1989; and Riddoch and Humphreys, 1994, were selected as representing a range of different approaches.

The earliest paper, by Gianutsos and Matheson (1987), and entitled “The rehabilitation of visual perceptual disorders attributable to brain injury”, set as its aim to review the current state of the art and to offer “a conceptual framework of visual perception for the development of effective rehabilitation protocols” (p. 202). Despite the title of the paper, Gianutsos and Matheson go on to use the term “visual imperception”, which they suggest emphasises their point that all visual system pathologies, including visual sensory dysfunction, must be taken into account in planning rehabilitation. They argue that what might appear as a perceptual disorder, or even confusion, might simply be “a normal response to abnormally processed information” (p. 202). Thus Gianutsos and Matheson define visual imperception as a disorder in the reception or the processing of information using the visual modality.

Consistent with this definition, Gianutsos and Matheson see evaluation as an essential first step, starting with evaluation of the visual sensory system which they argue, should always include examination of visual acuity; visual field deficits; binocular incapacities; and oculomotor function, since each of these can have a significant impact on visual processing. Whilst this may seem obvious, Gianutsos and Matheson point out that near point visual acuity, required for many therapeutic activities, was reported in only one of the studies they reviewed. Also of importance, they suggest, is the fact that visual field deficits are traditionally assessed through simple visual confrontation, yet this technique apparently misses as many of half the cases which can be detected by
more sophisticated systems (Trobe et al., 1981). This is an issue which has been raised more recently by Beaumont and Davidoff (1994), who point out that clinical neuropsychologists generally lack the training and resources to carry out a thorough assessment of basic visual processes, and also argue that even carefully conducted perimetry may not always identify all the visual problems from which a patient suffers. In a study attempting to follow through the recommendations made by Gianutsos and Matheson on evaluation, Perlin et al. (1985) found that of 39 patients routinely screened, 19 needed the services of a rehabilitation optometrist. This clearly suggests that a large number of potentially remediable visual sensory system deficits are going undetected in rehabilitation centres.

The next stage for Gianutsos and Matheson is a comprehensive evaluation of visual perceptual functioning which, they argue, should be undertaken within a conceptual framework which can guide both assessment and rehabilitation strategies. As a basic conceptual model for considering visual imperception, Gianutsos and Matheson draw on what they describe as a multi-factor view of visual imperceptive behaviour. Their model was guided by empirical observation that imperception could take a variety of forms and that difficulties on different measures were not necessarily correlated with each other. A factor analytic study of the performance of 98 rehabilitation patients of mixed aetiology (Gianutsos et al., 1983a), resulted in the identification of three independent behavioural patterns: spatial (peripheral field) hemi-imperception; lateral scanning disorder, a bilateral deficit which Gianutsos and Matheson relate to oculomotor dysfunction; and focal (central field) hemi-imperception. The latter, implicated in misreading beginnings or ends of words, matching complex shapes and in
arithmetic, they feel to be frequently undiagnosed, as focal imperception may not be immediately evident in most daily living activities. Gianutsos and Matheson claim that this behavioural model parallels what is known about the neurological organisation of the visual system. In particular, they link spatial and focal hemi-imperception with the rod (peripheral) and cone (foveal) receptors in the retina and their respective pathways within the brain, focal or foveal vision being served by a pathway to the striate cortex via the lateral geniculate body, while some peripheral vision is understood to reach visual association areas via the superior colliculus in the upper brainstem. Interaction between these two systems involves a combination of “bottom up” stimulus driven processes and “top down” conceptually driven processes. Gianutsos and Matheson suggest that where the former mode is disabled as a result of brain injury, it may be possible to train “top down” processes to help compensate. For example, where a stimulus detected in the left periphery would normally elicit an orienting response, bringing the stimulus into focal vision, this may not occur as a result of spatial hemi-imperception, but can be initiated by a “top-down” awareness of the need to look to the left. Whilst the parallels that Gianutsos and Matheson draw between their multi-factor view of imperception and the physiological organisation of visual processing may be reasonable as regards initial visual sensory functioning, they do not pursue the comparison in terms of the visual system beyond the striate cortex, or of understanding of the modular and hierarchical functioning of the visual system, aspects which are not addressed in their model.

In considering approaches to assessment, Gianutsos and Matheson reviewed a large number of published studies and summarised the main assessment tools chosen. They
then identified a number of limitations to these instruments, including lack of any
temporal element in the majority of tasks; use of static displays with no response times;
the substantial motor element to many tasks; and most important, the lack of
understanding of the underlying processes involved in many of the more popular tasks
and of their applicability to the demands of daily living. They argue that the three-
factor behavioural model can be used to help clarify the component behaviours in
different tasks and to recognise when the two areas of spatial and focal imperception
may be confounded, as in finding a word on a page and then reading it. Oculomotor
function, they believe, must be assessed separately, using dynamic computerised
displays. They do not, however, indicate how they see their model assisting in
interpreting performance involving functions such as figure-ground discrimination, and
difficulties in object recognition are only addressed in terms of focal imperception.
Gianutsos and her colleagues have developed a number of computerised assessment
tools (Gianutsos & Klitzner, 1981; Gianutsos et al, 1983b; Gianutsos et al, 1984),
which they describe in the chapter, and which they suggest assist in identifying deficits
within the framework of the three-factor model.

In considering rehabilitation of visual perceptual problems, Gianutsos and Matheson
begin by looking at the evidence regarding spontaneous recovery. Their review of the
literature indicates that in the majority of cases there is substantial spontaneous
recovery within the first six months post injury, particularly for hemi-imperception,
which must be taken into account in evaluating treatment studies. No longitudinal
information was available on recovery from visual field deficits. Gianutsos and
Matheson then go on to review some of the literature on perceptual retraining studies,
referring in particular to the seminal work by Weinberg, Diller and their colleagues at the Rusk Institute (e.g. Weinberg et al, 1977 and 1979; Gordon et al, 1985). These studies indicated that compared with conventionally treated controls, subjects with right brain injury who underwent perceptual retraining showed more effective functional scanning behaviour, especially in the case of the more severely impaired subjects. The addition of spatial organisation training (size estimation) and training in non-visual sensory awareness were found to increase effectiveness of the intervention. Young et al (1983) added block design training to the approach used in Weinberg et al studies, and found that this further enhanced the improvement on measures of visual scanning, reading and writing. While these studies indicate that specific perceptual training can be effective over and above conventional occupational therapy treatment, the subjects are relatively heterogeneous, in that they are generally described simply as stroke patients who have suffered right brain damage. There is no attempt at more precise delineation of the specific deficits sustained, and no information is given regarding screening for visual sensory deficits. Gianutsos and Matheson suggest that consideration of these issues, and, in particular, use of a theoretical model of visual imperception, would enhance future research.

Despite the expectations that might be raised by the title of their paper ("The rehabilitation of visual perceptual disorders attributable to brain injury"), the studies described by Gianutsos and Matheson all focus primarily on problems thought to result from deficient scanning of the environment, and do not address other forms of visual perceptual deficits. A further area addressed by Gianutsos and Matheson, which may also be regarded as associated with deficits in effective scanning of the environment, is
the work by Zihl and his colleagues on perimetric stimulation in the treatment of visual field deficits (e.g. Zihl and Von Cramon, 1979). Zihl (Zihl, 1980; Zihl & Werth, 1984) has also investigated the possibility of improving function through interventions aimed at developing the supposed alternate visual pathway mediated through the superior colliculus (Levine & Shefner, 1981), which has been postulated as explaining the phenomenon of "blindsight" (Weiskrantz, 1986). However, Gianutsos and Matheson point out that these studies depend on sophisticated technology, which is not readily available outside of research facilities. Whilst extremely interesting, they are not at present of immediate use to the average rehabilitation clinician.

Gianutsos and Matheson end their chapter with suggestions for a clinical strategy based on four stages: diagnostic evaluation; education; exercise and retraining; and promoting compensation and self-management. The first of these stages has already been discussed. The second stage, education, is considered essential since the individual is often unaware of the deficit. Gianutsos and Matheson point out that since there is a discrepancy between the objective findings from assessment and the individual's own subjective experience, information and counselling is not enough. They advocate setting up situations through which the individual can experience, with the aid of systematic feedback, the effects of relying on the impaired sensory system. Exercise and retraining is the next stage and involves repeated practice in the hope of improving function, supplemented as necessary by specific instructions and training in compensatory methods. Gianutsos and Matheson limit their suggestions for intervention to training using the computerised programmes developed by Gianutsos and her colleagues (Gianutsos & Klitzner, 1981; Gianutsos et al., 1983b; Gianutsos et
al., 1984) and present only descriptive case studies rather than any empirical evidence on the effectiveness of the interventions.

Gianutsos and Matheson argue the case for an approach to rehabilitation which initially concentrates on attempts at restitution of function, despite the limited empirical evidence, contending that this should be the initial goal on the grounds that, if effective, it obviates the need for later stages of rehabilitation, and also that it is the primary wish of the individuals concerned. They comment on the tendency for any improvements resulting from cognitive retraining to be specific to the exercises used in training, and stress the importance of introducing new procedures, including in vivo practice, to facilitate generalisation of improvements. However, they give no empirical evidence to indicate whether such attempts at generalisation are effective and whether there is any transfer to functional settings.

In their chapter, “Theory and Remediation of Visual Processing Disorders”, Sohlberg and Mateer (1989) also argue the need for a sound theoretical foundation and criticise the clinical approach to the evaluation and rehabilitation of visual perceptual disorders as “often disjointed and incomplete” (p. 176). Like Gianutsos and Matheson, they aim to put forward a model of visual and spatial perception that can provide a comprehensive and systematic basis for the assessment and remediation of visual perceptual disorders. In doing so, they seek to integrate the different approaches developed from physiological studies, with cognitive neuropsychological models. Although the stated aim of the chapter is very similar to that of Gianutsos and Matheson, the proposed model is quite different. While Gianutsos and Matheson
started with observed differences in behaviour on visual perceptual tasks, from which they worked backwards to make links with neurologically based models of the visual sensory system, Sohlberg and Mateer take as their starting point five major areas of the brain known to be implicated in visual perceptual processing, and the functions they are thought to support. These five areas and their functions, as taken from Sohlberg and Mateer (1989) are:

- Peripheral and brainstem mechanisms. These functions support visual acuity and ocular motor function.
- Upper brainstem and midbrain mechanisms (including superior colliculi). These nuclei support a "second visual system" that supplies information about the location and movement of visual stimuli.
- Occipital lobe mechanisms. These mechanisms support visual discrimination, colour vision, and the appreciation of visual detail.
- Temporal lobe functions. These mechanisms support a system of object recognition.
- Parietal lobe mechanisms. These mechanism support both appreciation of spatial information and the integration of visuomotor responses and assist in supporting visual attention to the full range of visual space.


Sohlberg and Mateer go on to describe each of these mechanisms in more detail, and in particular provide a clear and readable, if simplified, account of the physiological
systems involved in the first two stages, linking these with possible approaches to intervention. Moving on to the cortical areas, Sohlberg and Mateer additionally list tests which are thought to be sensitive to the particular functions associated with each area, followed by brief suggestions of the type of treatment approach which might be adopted. These are supplemented by illustrative case examples of the kinds of problems described. Unfortunately, while these case examples give some information on differences in test performance on admission compared with discharge, they do not give any indication whether improvements were a result of spontaneous recovery or related to specific intervention strategies. In discussing treatment approaches for each of the five areas, Sohlberg and Mateer restrict themselves mostly to very brief and general descriptions, rarely giving any detailed references or information on evaluation of the techniques they suggest. Indeed, they sometimes go beyond suggestion, to make claims for usefulness which they do not attempt to substantiate with reference to any empirical studies. It is interesting to note that in discussing the need for a multi-dimensional model, Sohlberg and Mateer criticise most assessment tools on the grounds that they are usually task-oriented, with little theoretical underpinning, often with minimal face or construct validity and little correlation with other tasks purporting to measure the same function. In addition, the tasks are often multi-dimensional, rendering it difficult to identify which components are contributing to deficient performance. However, in suggesting appropriate assessment tools for each of the five functional areas in their model, they do not address these issues or give any guidance on what other factors may bear on interpretation of test performance.
Sohlberg and Mateer describe their model as a physiologically based model of visual processing. Certainly they have attempted to draw together the physiological and neuropsychological models of visual processing in a clear and well structured manner. However, there is a risk that in attempting to link function with specific anatomical locations, they have allowed a degree of oversimplification which might not always be helpful to the less experienced clinician when trying to interpret clinical phenomena within the framework of the model. Sohlberg and Mateer’s approach tends to stress the centrality of particular cortical regions, at the expense of developing the concept of neural pathways.

Sohlberg and Mateer go on to describe the visual process training system which they have developed based on the models, techniques and processes described in their chapter, and which they have evaluated using four single-subject, multiple baseline studies. Unfortunately, although they were able to demonstrate improvement on various measures following visual process training, they give no details of the components of that training, nor indications of whether it was a standardised procedure for all four subjects or individualised according to individual needs, as determined by assessment and interpretation according to their model. They also acknowledge that improved performance on tasks thought to tap certain aspects of visual perceptual functioning, may actually represent improvements in the organisation and planning components associated with frontal lobe function. It is disappointing that, having strongly argued the case for the use of a theoretical framework in assessment and planning of rehabilitation, they do not give any indication that they have done so in any of the four cases described. Indeed their comment that the
variations in improvements across different measures suggests that “different tasks are sampling different aspects of visual processing, and that some processes may be more amenable to intervention in a particular patient than others” (pp. 205-206), seems strangely naive in the light of the thrust of their earlier argument.

As a chapter in an introductory text, this paper has the strength of being eminently readable. The links between anatomical areas and neuropsychological function are clearly drawn, if at times somewhat simplistic, and provide useful guidance for the development of initial hypotheses on which to base observation and assessment. The approach offered also has the advantage of addressing all aspects of visual perceptual functioning, including disorders of recognition, hemi-impereception and spatial organisation. It is unfortunate that the treatment methods advocated are not clearly formulated in terms of the theoretical model and not well evaluated. Indeed, the main empirical evidence they quote seems to be based on an intervention methodology which is unspecified, at least in this text, and which does not appear to be related to the needs of the individual as identified by thorough assessment within the framework of the model proposed.

The final paper to be considered here is more specific in its approach and does not set out to provide an all-encompassing approach to the whole range of visual perceptual disorders. In the title of their paper “Visual object processing in normality and pathology: implications for rehabilitation”, Riddoch and Humphreys (1994) clearly delineate the field that they intend to cover. As with the previous two papers, Riddoch and Humphreys stress the importance of a sound theoretical model, and argue the need
to draw on the combined understandings gained from physiological, cognitive
cognitive and neuropsychological studies. They take as their starting point normal
visual object processing, as it is understood from both cognitive and physiological
studies. They argue that, unlike other areas such as language or problem solving,
physiological accounts of visual processing are well developed and are even able to
offer some preliminary account of how learning takes place, which they feel to be an
essential part of a complete theory of rehabilitation. Beginning with these
physiological models, Riddoch and Humphreys outline in some detail the evidence for
functional specialisation of visual processing, and the increasing complexity of
function, from the very specialised cells in the striate cortex, responding to particular
features of an image, topographically mapped to a corresponding area of the retina, to
those with more complex integrative functions, drawing on information from the
outputs of a number of cells earlier in the chain. They also describe the two main
visual pathways, the occipital parietal and the occipital temporal pathways, which they
describe as distinguishing between the "what" and the where" of visual processing
(Ungerleider & Mishkin, 1982). The main implications from physiological studies of
visual processing, which they see as relevant to rehabilitation, are the evidence for
some degree of both functional and anatomical modularity; the tendency for more
complex functions to be handled by the summation of information from more
specifically tuned areas; and the evidence from animal studies that visual processing is
subject to learning, even in adult animals.

From the more general physiological models of visual processing, Riddoch and
Humphreys then narrow their topic to consider cognitive models of visual object
recognition, the main focus of their paper. Like physiological models, cognitive models also incorporate a series of modular processes (e.g. Marr, 1982; Biederman, 1987). Although there is some debate over the specific nature of some of the earlier processes, they conclude that a common theme is the transition from initial coding of specific properties of the object, through some form of grouping process allowing detection of higher-order features which are then matched to representations stored in memory. Whilst the initial models did not address the nature of these memory representations, Riddoch and Humphreys describe evidence supporting the view that there is a differentiated representation of structural and semantic information, an issue of potential importance for rehabilitation. They suggest that broad support for these modular models of visual object recognition is available from cognitive neuropsychological studies (e.g. Warrington, 1982, 1985; Kartsounis and Warrington, 1991; Humphreys and Riddoch, 1987a), which attempt to classify visual object processing disorders observed in patients into classes which reflect damage to a series of hierarchically organised processes. Humphreys and Riddoch acknowledge that these proposed disorders do not map exactly onto the stages of object recognition proposed in current cognitive models, arguing that the models may need to be modified to take into account patients whose patterns of deficit cannot adequately be accounted for, thereby creating a two-way interaction in which cognitive psychology and neuropsychology together can help develop and refine an increasingly accurate model of visual processing. Such a model, they suggest, can be used as a framework for diagnosis and a guide to targeted rehabilitation strategies.
Riddoch and Humphreys believe that accurate diagnosis of deficits in terms of models of normal visual processing should theoretically lead to the development of rehabilitation programmes targeted at the particular stage of processing at which the deficit occurs. However, they point out that in the three cases they review, in which such an approach has been attempted, there has been very limited success (Wilson & Ratcliff, 1982; Humphreys & Riddoch, 1987b; Riddoch & Humphreys, 1987; Riddoch & Humphreys, 1992). Such improvements as do occur are generally restricted to training items, with no significant generalisation and no functional benefits. This is in spite of very substantial targeted input, for example 3,000 trials of practice with feedback in one of the cases discussed. This lack of generalisation led Riddoch and Humphreys to look at normal visual learning processes, and in particular at studies which attempt to relate visual learning to physiological mechanisms. They review a number of studies of normal visual learning which suggest that even for adult subjects, some improvement in discrimination of basic attributes of visual stimuli is possible, with practice (e.g. Fiorentini & Berardi, 1981; Ball & Sekuler, 1987). It is not, at present, clear whether this is mediated through increased sensitivity or through inhibition of activation, or partial activation, by visually similar stimuli. However, where such modification takes place in the primary visual cortex, where cells are not only highly specialised but topographically specific, training does not necessarily generalise across retinal locations (Nazir & O'Regan, 1990; Karni & Sagi, 1992). The work of Karni and Sagi (1992) also suggests that training led to improvement in sensitivity in detecting location of differences in their training material, without a corresponding improvement in identification of the difference, i.e. indicating improvement in discrimination in the dorsal, orbito-parietal visual system, without a
corresponding improvement in the ventral, orbito-temporal system. One limitation of these studies in terms of their implications for rehabilitation, is that subjects were prevented from making eye movements, a situation which would not normally occur in a natural environment. Riddoch and Humphreys suggest the possibility that eye movement may be central to generalisation across retinal locations, an area which has yet to be explored.

Riddoch and Humphreys point out that these studies are primarily concerned with improving discrimination in cells already tuned to particular properties. They do not address the issue of establishing sensitivity to new properties, an aspect which they argue is of particular importance in clinical rehabilitation, where selective perceptual abilities may have been lost. To pursue this aspect, Riddoch and Humphreys draw on studies in the literature on three specific areas requiring learning or development of expertise in visual object classification and identification: the development of expertise in chicken sexers; learning to detect targets defined in terms of conjunctions of features; and perceptual expertise in face recognition. From these studies they draw a number of conclusions of potential relevance to rehabilitation. First, in real-life situations it is possible for subjects to improve performance by making better use of first-order perceptual features which are normally computed from the image, e.g. the detection of a concave versus convex sexual eminence in day-old chicks, (Biederman & Shiffrar, 1987). Second, it appears difficult to develop new higher-order feature detectors which involve the arbitrary conjunction of simple visual features, e.g. detecting blue 'Ts', (Treisman & Gelade, 1980). However, it does appear possible to
learn new second order metric relations between separate perceptual features, e.g. in face recognition, (Young et al., 1985; Young, Hellawell & Hay, 1987).

In further support of the effect of learning on physiology, Riddoch and Humphreys refer to the work of Zihl and his colleagues, discussed above, which suggests that visual field deficits after stroke can be reduced with training on perceptual detection tasks. They note that benefits were greatest within areas of the visual field where the defect was less severe, an aspect which has yet to be explored in terms of the implications for rehabilitation. A further area identified by Riddoch and Humphreys, and which may have potential in terms of learning, is the phenomenon of covert recognition. This is demonstrated when a subject who cannot overtly recognise a stimulus gives some indication of covert recognition by virtue of differential performance, e.g. matching familiar, but unrecognised, faces more quickly than unfamiliar faces (de Haan, Young & Newcombe, 1987). Riddoch and Humphreys suggest that this phenomenon may reflect either a milder degree of perceptual deficit, or the preservation of a direct processing channel, which continues to operate even when overt recognition is impaired, a view put forward by Bauer (1984) as a result of detection of changes in galvanic skin responses on presentation of familiar, but unrecognised faces. Riddoch and Humphreys suggest that it may be possible to capitalise on these autonomic responses to facilitate learning, although this does not appear to have been attempted to date.

Riddoch and Humphreys’ approach to rehabilitation is to look to the restitution of function through careful identification of deficits in terms of physiological and
cognitive psychological models of normal visual processing. Whilst acknowledging that direct retraining of visual object recognition has so far met with only limited success, they suggest that this may because few studies have diagnosed the deficit relative to an accurate model of normal visual object recognition, leading to inaccurate targeting of intervention. Interestingly, they do not specifically criticise the three studies which they quoted on these grounds, even though these studies did not report any functional improvement. Riddoch and Humphreys emphasise the need to link cognitive and clinical neuropsychological studies with neurophysiological research in order to improve knowledge about the effects of training at a neuronal level, thus providing further feedback which can be utilised in rehabilitation.

The fundamental approach taken in each of the three papers reviewed here is essentially the same. Each emphasises the need for rehabilitation to be led by thorough assessment based on a sound theoretical framework. However, the details of each approach are quite different. Gianutsos and Matheson offer a conceptual framework which is drawn from observation of different behavioural patterns of visual imperception, and linked to an understanding of the visual processing system at a physiological level. Their framework concentrates largely on the differences between central and peripheral systems and does not explicitly make use of physiologically-based hierarchical models. While the two main pathways from the occipital cortex - the dorsal occipito-parietal system and the ventral occipito-temporal system, as well as the alternative visual pathway mediated via the superior colliculus, are discussed, it is not really clear how these systems relate directly to the three-factor model which Gianutsos and Matheson put forward. In addition, there are no explicit links made
with cognitive models of visual processing, the emphasis being primarily on identification of differential behavioural patterns. Sohlberg and Mateer, do attempt to take account of both physiological and cognitive models in presenting their anatomical-functional model of visual processing, but do so in a relatively simplistic way which, at one level, may be appropriate for an introductory text, but which may lead the less experienced practitioner to some confusion over the complexities which arise when clinical presentations do not fall into the seemingly discrete functional categories described. Riddoch and Humphreys, while primarily addressing one specific area of visual processing, do so in a comprehensive manner, seeking to integrate information from the fields of physiology, cognitive psychology and cognitive neuropsychology to develop a process model.

Both Gianutsos and Matheson, and Sohlberg and Mateer, take an overtly clinical stance. Their aim is to advocate the defining of clinical practice by reference to a sound theoretical framework, and a large part of both texts is given over to suggestions for and descriptions of assessment tools and intervention strategies. Riddoch and Humphreys, on the other hand, do not attempt to give detailed guidelines on clinical interventions. Their work holds out a direction for the future, rather than simple answers for the present. Both the chapters by Gianutsos and Matheson, and by Sohlberg and Mateer, have the superficial attraction of appearing to provide some detailed indications for the clinician on assessing and treating visual-perceptual disorders. Their limitations in this respect must, however, be recognised. The approach advocated by Gianutsos and Matheson may provide a clinically useful way of thinking about certain types of visual perceptual deficit, which may guide the clinician
away from some misunderstandings and inappropriate interventions, but does not provide a comprehensive approach to the whole field, and is not based on a model which incorporates cognitive, as well as physiological models of processing. In addition, the assessment and intervention approach they advocate, while closely related to the proposed model, is highly dependent on the availability of computerised tools such as those developed by Gianutsos and her colleagues. Empirical evidence for the effectiveness of this approach is, on the basis of the information in this chapter, limited.

The chapter by Sohlberg and Mateer appears to be very much directed towards the idea of providing practical advice to the clinician on how to approach visual perceptual disorders. In this respect, its main weakness lies in the limited extent to which the model they propose is actually drawn upon in the development of suggested rehabilitation protocols. Whilst advocating an overall approach based on comprehensive assessment within a conceptual framework, the interventions they describe seem to be based on an unspecified, ‘blanket’ approach which does not appear to have been developed according to the needs of the individual patients and their particular deficits. Thus there remains the impression that Sohlberg and Mateer are not actually practising what they preach. Riddoch and Humphreys make no suggestions for assessment or intervention protocols, instead implicitly challenging the reader to develop a clinical practice which is based on an explicit rationale, developed from a sound understanding of the physiological, cognitive psychological and cognitive neuropsychological literature. Whilst it would be hard to criticise this approach on theoretical grounds, it presents a strong challenge to the average clinical
neuropsychologist, often working in less than ideal circumstances and with limited resources.
References


SECTION III

CLINICAL AUDIT

THE DESIGN, IMPLEMENTATION AND EVALUATION OF A TRAINING PROGRAMME FOR REHABILITATION ASSISTANTS IN A NEUROPSYCHOLOGICALLY ORIENTED REHABILITATION PROGRAMME
The Design, Implementation and Evaluation of a Training Programme for Rehabilitation Assistants in a Neuropsychologically Oriented Rehabilitation Programme.

Background

This programme was developed to meet the needs of rehabilitation assistants in Haberdashers House, a community-based rehabilitation unit for adults suffering primarily from acquired brain injury. The facility concerned is a twelve-bedded residential unit, part of the Royal Hospital for Neuro-disability. The unit is staffed by a team of professionals from the various rehabilitation disciplines (clinical psychology; occupational therapy; speech and language therapy; physiotherapy; social work) plus one care adviser (nursing). Twenty-four hour cover is provided by a team of rehabilitation assistants (RAs) who provide the care component of the programme and act as assistants to the therapy team.

The unit provides post-acute rehabilitation aimed specifically at community re-entry. A socially-oriented model of rehabilitation has been adopted, with the emphasis on maximising functional independence through every-day activities. Residents are encouraged, as far as any physical disabilities permit, to take responsibility for their own personal care, to manage their own laundry and to keep their rooms tidy. Residents also participate in general household tasks such as laying and clearing the meal table and stacking the dishwasher. Trips into the wider community are routine and cover a variety of purposes including assessment and training in road safety; use of public transport; route finding; shopping; and leisure activities. Activities and outings will often incorporate several aspects of the individual’s rehabilitation programme. For example, prior to and during a shopping trip, a resident may be working on several of
the areas identified above, together with general planning and organisation, money management and budgeting skills, meal planning and memory management strategies. Where necessary and appropriate, residents may receive specific individual or group therapies aimed at improving functioning either through direct remediation of underlying processes or through the teaching of compensatory strategies. Where possible, therapy is also incorporated directly into daily activities, providing an integrated approach to rehabilitation and maximising generalisation. The professional therapy team works on an interdisciplinary basis, with members of the various rehabilitation disciplines co-operating and collaborating to provide an integrated service to residents. Whilst some parts of the programme are common to all residents, the greater part of each resident's programme is individually tailored to meet his or her particular needs.

**Client group**

Residents admitted to the unit have all suffered illness or injury affecting the central nervous system. Almost all have some form of acquired brain injury, although suitable persons with spinal injuries may also be admitted in preparation for a return to the community. Residents may have physical, cognitive and communication difficulties. Whilst those with challenging behaviour are not admitted, some degree of inappropriate or difficult behaviour is common amongst this client group.

Residents may be admitted from acute hospital wards, from the rehabilitation ward in the Royal Hospital, or from other, usually ward-based, rehabilitation units. The minimum period of admission is usually a 6-8 week assessment period. There is no
fixed maximum length of stay, this being determined by the degree of progress being made, expectation of further functional improvements, and availability of funding. This may range from 3 months upwards, but is typically in the region of 9 to 18 months.

The role of the rehabilitation assistant

The rehabilitation assistants (RAs) fulfil a transdisciplinary role, providing the care component of the programme under the supervision of the care adviser, and acting as assistants to all of the therapy staff. In addition, they act as key workers for residents, which is primarily a befriending role, but which also involves the RA in taking a leading role in carrying through the programme for the individual concerned. RAs regularly conduct individual sessions with residents, following programmes set up by the therapy team. They may also be involved in running groups, either on their own or in conjunction with members of the therapy team. RAs are also responsible for ensuring that prescribed procedures and strategies are incorporated into every relevant aspect of each resident’s daily routine, on and off the unit. They are responsible for carrying through almost all community-based rehabilitation activities. RAs are also required to maintain various types of observational record.

RAs are the only staff on duty outside normal working hours. At such times they have the back-up of the senior nursing officer on duty in the main hospital, and a member of the therapy team is always available for consultation by telephone on a rota basis.
Current qualifications and training provision

Applications for the post of rehabilitation assistants are normally sought from recent psychology graduates. This is common practice for this type of unit and there is a ready pool of applicants seeking to gain clinical experience before applying for postgraduate training. However, personal qualities are also of primary importance and suitable applicants from other backgrounds are considered.

RAs take part in a standard, one-week induction programme within the Royal Hospital, which is mandatory for all new staff. This programme is not specific to the needs of RAs. Certain emergency procedures are taught during this programme and training in lifting and handling procedures continues over the next four weeks. On completion of the standard induction programme, RAs then participate in a structured two-week orientation programme in the unit. During this period, they have the opportunity to "shadow" residents and senior RAs and to have a series of formal and informal sessions with various members of the therapy team. Sessions with the care advisor are generally structured and include training in various nursing procedures and in the care aspects of the job. Training in nursing procedures continues beyond the formal induction period, and competence is assessed by the care advisor according to set criteria. Induction sessions with other members of the team are less clearly prescribed and may range from a general introduction, to the imparting of more specific information, including the use of handouts. Two one-hour sessions are allocated with each team member. Further training may be provided on an ad hoc basis in accordance with the needs of individual residents and RAs. Some of the issues involved in working with this client group are addressed by the clinical psychologist.
during the orientation period and weekly support meetings have also been introduced to help address some of these issues as they arise. With the exception of evaluation of competence in nursing procedures, there is no formal evaluation at the end of this two-week period since it is regarded as general induction, rather than specific training. However, in common with all other employees, RAs are subject to a formal probationary period and performance is monitored carefully during this time.

The need for further training

RAs fulfil a very important role in the rehabilitation of the unit's residents. They provide a substantial majority of the staff contact time with residents and they are the only staff routinely on duty at evenings and weekends. Whilst guidelines for general or specific purposes are provided, RAs will frequently be called upon to use their own judgement in interpreting and applying those guidelines in particular instances, and also in dealing unassisted with novel situations that may arise, for example on a community visit. In working with patients with acquired brain injury, it is very easy for inexperienced staff to misinterpret behaviours, sometimes leading to inappropriate responses.

The policy of recruiting RAs primarily from psychology graduates ensures that most have a background of relevant knowledge on which they can build and that, in the main, they are quick to learn. Since the posts are seen as providing experience for future career development, rather than providing any career structure in themselves, there is a regular, significant turnover amongst RAs, with up to 65% moving on to other jobs or further training per year, many of them within the summer months. This
means that for a significant part of the year there may be a high proportion of relatively inexperienced RAs.

Informal observation and discussions indicated that there was a wide variation in the amount of relevant knowledge held by each RA. Even among those who were psychology graduates, it appeared that the coverage of relevant topics, and in particular of neuropsychology, they had received on undergraduate courses varied considerably and many indicated that they found it difficult to make links between what they had studied and the needs of the residents with whom they worked.

The need for training of professional and paraprofessional staff working in brain injury rehabilitation facilities was studied by Becker and her colleagues in Texas (Becker, Harrell and Keller, 1993). In a survey of brain injury programmes, they found that three quarters of those who responded employed paraprofessional staff, mostly to assist therapy staff and supervise daily activities. Eighty four percent indicated that specialised training in traumatic brain injury was "definitely needed" for paraprofessional staff. This rose to 88% for post-acute programmes.

Aims of a training programme

The main aims of the programme were:

i. to increase understanding of typical sequelae of acquired brain injury;

ii. to increase understanding of psychological models relevant to brain injury rehabilitation;

iii. to help RAs apply theoretical knowledge or models to their work.
Evaluation

Evaluation was deemed to be an essential part of the exercise. As well as being good practice, evaluation was particularly important as it was hoped that, if effective, the course would be repeated on an annual basis. The commitment in terms of man-hours in attending sessions would be substantial, with up to seven RAs, and at least one member of the therapy staff at each session, with remaining therapy staff meeting residents' needs during this period. For simplicity, evaluation was primarily by a number of self-ratings pre- and post-training, although evaluation forms were also distributed at the end of each session. Evaluation tools are described more fully below.

Although subjective self-ratings have a number of draw-backs, more formal assessment was deemed to be impracticable at this stage. The course does not lead to any recognised qualification and formal examination of knowledge was not considered appropriate. Whilst it would have been possible to devise a series of short answer tests to evaluate knowledge, this would, in effect, have only assessed ability to select appropriate information from the handout provided. Any more substantial assessment would have required considerable time commitment. The effects of training on daily working practice would be extremely difficult to quantify, and formal evaluation of this aspect was not considered practicable.

Pre-training questionnaire

In consultation with other members of the rehabilitation team, a list of possible training topics was drawn up. This was incorporated into a pre-training questionnaire (Appendix A) asking RAs to rate on a 1-5 scale (a) their knowledge of each topic; (b)
their ability to apply that knowledge to their work; and (c) the usefulness of further training in the topic. The questionnaire also sought data on educational background; an overall self-rating of ability to draw on theoretical knowledge and models in working with residents; and an indication of what each RA would hope to gain from a training programme. Whilst the terms used to identify previous coverage of neuropsychology (i.e. "substantial", "reasonable", "very basic") were not operationally defined, information on educational background was only required to help determine the level at which training should be pitched, and inter-rater reliability was not felt to be an issue.

The questionnaire was administered to the 15 RAs in post in December 1994. One RA moved to a new job during the course of the training programme and his data has been omitted. Of the remaining 14 RAs, all continued in post throughout the whole of the training programme and subsequently completed a post-training questionnaire. The results of the pre-training questionnaire are shown in full in Appendix A and summarised below.

Participants in the training programme

Of the 14 staff who completed the programme, 12 were graduates. Of these, 10 had single or joint psychology degrees and the remaining two had other degrees incorporating some psychology. Of the two non-graduate staff, neither had any formal education in psychology or any other relevant subject. Indications of previous relevant experience was not requested on the questionnaire, since the majority of RAs are new graduates in their first full-time post. However, one of the non-graduate RAs
had experience of issues relating to disability gained within her own family. Three of the 14 RAs (21%) rated previous coverage of neuropsychology as "substantial"; four (29%) as "reasonable"; and a further four felt coverage had been "basic". Three RAs (21%) had received no previous teaching in neuropsychology.

One RA felt able to draw on theoretical knowledge or models to guide him in his work "quite a lot"; seven (50%) felt able to do so "sometimes"; four (29%) "very little"; and two "not at all". In terms of anticipated gains from a training programme, 50% stated that they hoped to improve their ability to link theory with practice and 43% to increase or update theoretical knowledge. Other aims included increased competence and confidence, benefits for future career and increased job satisfaction.

The training programme

The original aim was to provide a series of fifteen one-hour sessions to be attended by all RAs on duty. Because of the constraints of the shift system, it was anticipated that between 5 and 7 RAs would normally be available for each session. It was not considered cost-effective to repeat sessions for those unable to attend as this would involve at least 3 presentations of each topic. In the circumstances it was decided that detailed handouts would be drawn up for each session, which would be distributed to all RAs whether or not they had attended the session.

The final programme was drawn up in discussion with the Clinical Manager of the unit, taking into account the ratings from the pre-training questionnaire and the views of other therapy staff. Initially it was intended to run a fifteen-week programme but for
practical reasons this was reduced to twelve weeks, resulting in the exclusion of some planned topics. In addition, the Occupational Therapist, who was due to teach a number of the topics, resigned during the course of the programme and some of the proposed topics could not be covered in her absence. The final programme is shown in Figure 1. The order of topics was chosen to reflect a progression from more general information about the brain and the nature and consequences of the most common types of acquired brain injury, to more specific information regarding particular sequelae and approaches to rehabilitation. However, in some cases the ordering of topics reflected the availability of particular speakers. The order of the final programme did not in any way reflect the relative degree of importance attached to each topic.

A total of 15 topics were included in the final 12-week programme. Of these, 7 were presented by the author (clinical psychologist); 2 by the author jointly with other members of the therapy team; 4 independently by other members of the therapy team; and two by other members of the Department of Clinical Psychology at the Royal Hospital with particular expertise in the topic concerned. Since one of the aims of the course was to help RAs apply knowledge to their work, it was considered that this could best be achieved by primarily using speakers who were familiar with the residents and with the duties undertaken by the RAs, i.e. therapy staff working regularly on the Unit. The amount of previous teaching experience varied considerably between speakers.
## RT TRAINING PROGRAMME

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<tr>
<th>Session No.</th>
<th>Topic</th>
<th>Speaker</th>
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<tr>
<td>1.</td>
<td>(a) Models of rehabilitation: where does Haberdashers House fit in?</td>
<td>(CM)</td>
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<td></td>
<td>(b) Mechanisms of recovery</td>
<td>(CP)</td>
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<td>2.</td>
<td>Basic Neuroanatomy</td>
<td>(HCP)</td>
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<td>3.</td>
<td>(a) Common neuropsychological consequences of traumatic head injury</td>
<td>(CP)</td>
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<td></td>
<td>(b) The role of neuropsychological assessment in rehabilitation</td>
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<td>4.</td>
<td>Frontal lobe injuries and the dysexecutive syndrome</td>
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<tr>
<td>5.</td>
<td>Stroke: nature, consequences and rehabilitation</td>
<td>(OT/CP/ST)</td>
</tr>
<tr>
<td>6.</td>
<td>Facilitating functional ability: an introduction</td>
<td>(OT)</td>
</tr>
<tr>
<td>7.</td>
<td>Disorders of speech and language</td>
<td>(ST)</td>
</tr>
<tr>
<td>8.</td>
<td>(a) Attentional disorders</td>
<td>(CP)</td>
</tr>
<tr>
<td></td>
<td>(b) Unawareness of deficit</td>
<td>(CP)</td>
</tr>
<tr>
<td>9.</td>
<td>Physical rehabilitation following neurological injury</td>
<td>(PT)</td>
</tr>
<tr>
<td>10.</td>
<td>Memory impairments</td>
<td>(CP)</td>
</tr>
<tr>
<td>11.</td>
<td>Social, emotional and family issues</td>
<td>(SW/CP)</td>
</tr>
<tr>
<td>12.</td>
<td>Management of behavioural problems</td>
<td>(OCP)</td>
</tr>
</tbody>
</table>

**Key to speakers:**  
CM = clinical manager; CP = clinical psychologist (author); HCP = head of clinical psychology dept. at Royal Hospital; OCP = other clinical psychologist from Royal Hospital; OT = occupational therapist; PT = physiotherapist; ST = speech and language therapist; SW = social worker.
In preparing each session, speakers were asked to bear in mind the overall aims of the training programme. Thus, the general format was to provide appropriate theoretical information; to relate this to the client group, using specific examples where appropriate; and to consider how RAs could use what they had learned in their work with residents. The balance between these three aspects varied according to the topic. A primarily didactic approach was generally adopted, as this not only facilitated transmission of theoretical information more quickly within each session, but also enabled the speaker more readily to prepare handouts for those who were unable to attend. However, a more open discussion and participative style was often used in helping RAs to consider how they might apply what they had learned in their work. In general, the style to be adopted was left to each individual speaker, within the constraints of the overall aims, and depended to a great extent on personal preference and the nature of the material to be covered.

In determining the precise content of each session, the governing concept was to consider what RAs needed to know in order to help them carry out their role more effectively. The needs of those who wished from personal interest to acquire a deeper knowledge of certain topics, were catered for by provision of suggestions for further reading.

Handouts for each session were prepared by the relevant speaker or speakers and varied markedly in format. Handouts prepared by the author are shown at Appendix E. In preparing these handouts and determining associated session content, use was
made of a variety of source materials, including psychological textbooks and journal articles, and notes from lectures and seminars previously attended by the author. Where appropriate, clear guidelines on application of the subject matter to the work of the RAs were explicitly given. Informal feedback on the content, depth of coverage and readability of handouts was sought from RAs during the course of the training programme.

**Evaluation of individual sessions**

Attendance at each session ranged from 4 to 7, depending on the number of RAs on duty. At the end of each session an evaluation form was given to each attendee (Appendix B). Where more than one topic was presented at a session, each topic was evaluated separately. Ratings were made on a 5 point scale (range “not at all” to “very”) according to (a) how useful, and (b) how interesting each session was found to be. Further comments were invited. Ratings for the usefulness of each session are shown in Table 1. Median ratings are not shown as the limited range of scores renders calculation of means or medians unsatisfactory. Ratings of how interesting RAs found each session were obtained for the personal benefit of individual speakers, and are not shown here.

Overall, ninety-one percent of evaluation forms were returned. Of these, there were no ratings at points 1 or 2 on the 1-5 scale, and 83% of ratings were at points 4 or 5, indicating a high level of satisfaction with the usefulness of the sessions. Although additional comments were invited, these were usually of a general and positive nature (e.g. “A useful session”). No constructive criticisms or suggestions
were received, with the exception of a number of requests that further time be devoted to the topics covered in the session on social, emotional and family issues.

**TABLE 1. Ratings for evaluation of sessions on a 1-5 scale**

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>NO OF ATTENDEES MARKING EACH OF THE RATING CATEGORIES BELOW</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Models of rehabilitation</td>
<td>0</td>
</tr>
<tr>
<td>Mechanisms of recovery</td>
<td>0</td>
</tr>
<tr>
<td>Basic neuroanatomy</td>
<td>0</td>
</tr>
<tr>
<td>Neuropsychological sequelae of traumatic brain injury</td>
<td>0</td>
</tr>
<tr>
<td>The role of neuropsychological assessment in rehabilitation</td>
<td>0</td>
</tr>
<tr>
<td>Frontal lobe injury and the dysexecutive syndrome</td>
<td>0</td>
</tr>
<tr>
<td>Stroke</td>
<td>0</td>
</tr>
<tr>
<td>Facilitating functional ability</td>
<td>0</td>
</tr>
<tr>
<td>Disorders of speech and language</td>
<td>0</td>
</tr>
<tr>
<td>Attentional disorders</td>
<td>0</td>
</tr>
<tr>
<td>Unawareness of deficit</td>
<td>0</td>
</tr>
<tr>
<td>Physical rehab. following neurological injury</td>
<td>0</td>
</tr>
<tr>
<td>Memory impairments</td>
<td>0</td>
</tr>
<tr>
<td>Social, emotional and family issues</td>
<td>0</td>
</tr>
<tr>
<td>Management of behavioural problems</td>
<td>0</td>
</tr>
<tr>
<td>TOTALS</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Post-training evaluation**

On completion of the training programme, a post-training questionnaire (Appendix C) was completed by all 14 RAs. This questionnaire was in two parts. In part 1, RAs
were asked to complete again the main items from the pre-training questionnaire in respect of the topics covered by the programme. In part 2, which was anonymous, RAs were asked for comments and ratings on the overall programme content, handouts and presentation.

Ratings of overall usefulness of the course and of the handouts are shown in Table 2. Sixty-five percent of RAs gave a rating of 4 or 5 for the usefulness of the course overall. In terms of usefulness of handouts, 72% gave ratings of 4 or 5 for sessions they had attended, and 29% for those they had not attended. Whilst handouts for sessions attended were generally reported to be more useful, this may have been

TABLE 2  Self-ratings of usefulness of course and handouts

(Ratings on 1-5 scale. 1 = not at all; 5 = very)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Usefulness of course overall</th>
<th>Usefulness of handouts for sessions attended</th>
<th>Usefulness of handouts for sessions not attended</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>2 (14%)</td>
<td>1 (7%)</td>
<td>2 (14%)</td>
</tr>
<tr>
<td>3</td>
<td>3 (21%)</td>
<td>1 (7%)</td>
<td>7 (50%)</td>
</tr>
<tr>
<td>4</td>
<td>5 (36%)</td>
<td>6 (43%)</td>
<td>4 (29%)</td>
</tr>
<tr>
<td>5</td>
<td>4 (29%)</td>
<td>4 (29%)</td>
<td>0</td>
</tr>
<tr>
<td>no rating</td>
<td>0</td>
<td>2 (14%)</td>
<td>1 (7%)</td>
</tr>
</tbody>
</table>

influenced by differences in the frequency with which handouts were read (Table 3). 72% of RAs read all or most of the handouts for sessions they had attended, but only 57% read all or most for the sessions they had not attended. 4 RAs read only a few or none of the handouts in either case.
TABLE 3 Proportion of handouts read by RAs

<table>
<thead>
<tr>
<th>Proportion of handouts read</th>
<th>For sessions attended</th>
<th>For sessions not attended</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>6 (43%)</td>
<td>3 (21%)</td>
</tr>
<tr>
<td>Most</td>
<td>4 (29%)</td>
<td>5 (36%)</td>
</tr>
<tr>
<td>About half</td>
<td>0</td>
<td>2 (14%)</td>
</tr>
<tr>
<td>A few</td>
<td>3 (21%)</td>
<td>4 (29%)</td>
</tr>
<tr>
<td>None</td>
<td>1 (7%)</td>
<td>0</td>
</tr>
</tbody>
</table>

In general, there appeared to be a high level of satisfaction with the choice of course content. Only one RA felt that a topic should have been omitted (Models of Rehabilitation), although two others felt this topic could have been covered more briefly. Several RAs felt that certain topics should have been covered in more depth. This particularly applied to management of behaviour problems (4 comments). Greater coverage of disorders of speech and language was also suggested by 2 RAs, with similar suggestions by one RA each for social and emotional issues; neuropsychological assessment; stroke; neuroanatomy; neuropsychological consequences of acquired brain injury; and memory. A number of RAs acknowledged the difficulty of pitching sessions at a level to suit the needs of those from quite different academic backgrounds. The only suggestions for additional topics were motivation after brain injury, and a session looking at staff communication with residents.

Comments on the handouts varied considerably. Some RAs would have welcomed greater depth, while others felt that coverage was sometimes too complex, and in particular that there was not always sufficient explanation for those who had been
unable to attend the sessions or who did not have a background in psychology. Several felt the handouts were generally clear and easy to understand.

The self-ratings taken from the pre- and post-training questionnaires were deemed to meet the criteria for ordinal rather than interval data, and were compared using the non-parametric Wilcoxon Matched-Pairs Signed-Ranks Test. There was a significant difference in pre- and post-training ratings of overall ability to draw on theoretical knowledge and models to guide staff in their work as rehabilitation technicians \( p = 0.005 \) (Table 4).

### Table 4  Ability to draw on theoretical knowledge and models (self-ratings on 1-5 scale)

<table>
<thead>
<tr>
<th>Median rating before training</th>
<th>Median rating after training</th>
<th>z scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>3.5</td>
<td>2.8031</td>
</tr>
<tr>
<td></td>
<td></td>
<td>((p = 0.005))</td>
</tr>
</tbody>
</table>

When ratings for individual topics were analysed, the results were more varied (Table 5). Separate ratings were given for “knowledge” of the topic and for “ability to apply knowledge” in the work situation. Analysis of the self-ratings for “knowledge” showed significant post-training improvements on eleven of the fifteen topics. Ratings for “ability to apply knowledge” showed significant improvements on eight topics. It was interesting to note that for several of the topics, one or more RAs gave lower ratings post-training than pre-training (7 topics for “knowledge” and 11 for “ability to apply”). There are three possible explanations for this finding. First, it is possible that the speakers totally confused these RAs. This seems unlikely, especially since
TABLE 5  Comparison of pre- and post-training self-ratings on 1-5 scale (n=14)

(figures in the table denote the number of RAs giving that rating)

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>KNOWLEDGE</th>
<th>ABILITY TO APPLY KNOWLEDGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rating</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Philosophy of HH and approach to rehab.</td>
<td>Before</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>-</td>
</tr>
<tr>
<td>Basic neuroanatomy</td>
<td>Before</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>-</td>
</tr>
<tr>
<td>Mechanisms of recovery</td>
<td>Before</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>-</td>
</tr>
<tr>
<td>Common consequ. of traumatic head injury</td>
<td>Before</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>-</td>
</tr>
<tr>
<td>Stroke</td>
<td>Before</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>-</td>
</tr>
<tr>
<td>F.L. injuries and dysexec. syndrome</td>
<td>Before</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>-</td>
</tr>
<tr>
<td>Attentional deficits</td>
<td>Before</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>-</td>
</tr>
<tr>
<td>Memory impairments</td>
<td>Before</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>-</td>
</tr>
<tr>
<td>Physical rehabilitation</td>
<td>Before</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>-</td>
</tr>
<tr>
<td>Unawareness of deficit</td>
<td>Before</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>-</td>
</tr>
<tr>
<td>The role of assessment</td>
<td>Before</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>-</td>
</tr>
<tr>
<td>Managing behavioural problems</td>
<td>Before</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>-</td>
</tr>
<tr>
<td>Facilitating functional ability</td>
<td>Before</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>-</td>
</tr>
<tr>
<td>Disorders of speech and language</td>
<td>Before</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>-</td>
</tr>
<tr>
<td>Social, emotional and family issues</td>
<td>Before</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>-</td>
</tr>
</tbody>
</table>

*p = <0.05  ** p = 0.01  *** p = <0.005

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significant improvements overall were found for several of these topics. A second possibility is that, after training, some RAs recognised that the topic was more complex than they had realised and that they knew less than they had thought. Although this was not investigated further, it is a plausible explanation, since many of the RAs undergoing training had graduated with psychology degrees during the last few months. They may well have felt, initially, that some topics were very familiar to them from their undergraduate courses, but prior to training may not have fully appreciated the complexity of relating their knowledge to clinical situations. The final possibility is that the rating scale itself is not sufficiently reliable. Any self-rating scale of this type is inevitably subjective, and some degree of variability in rating, irrespective of intervening events, might well be expected.

Although it was not a specific aim of the programme, it was felt useful to consider the differential effect of attendance at a training session, compared with provision of the handout only for those who were unable to attend. It was not possible to carry out a detailed analysis of the differential benefits for each topic, as the number of attendees and non-attendees on each occasion was very small. Appendix D shows the changes in pre- and post-training ratings for attendees and non-attendees separately, categorised in terms of negative change, no change or positive change in self-ratings for each topic. Table 6 summarises this information in terms of percentages in each category. These figures suggest that there is little difference between those who attended the sessions and those who only had handouts, in terms of improving knowledge. However, there is some indication that attending the session was more helpful in terms of feeling able to apply that knowledge at work.
Table 6  Comparison of changes in pre- and post-training self-ratings for attendees v non-attendees

<table>
<thead>
<tr>
<th></th>
<th>Attendees</th>
<th></th>
<th></th>
<th></th>
<th>Non-attendees</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>negative</td>
<td>no change</td>
<td>positive</td>
<td>change</td>
<td>negative</td>
<td>no change</td>
<td>positive</td>
</tr>
<tr>
<td>Know</td>
<td>2.4%</td>
<td>40.0%</td>
<td>57.6%</td>
<td></td>
<td>4.8%</td>
<td>43.2%</td>
<td>52%</td>
</tr>
<tr>
<td>Apply</td>
<td>7.1%</td>
<td>28.2%</td>
<td>64.7%</td>
<td></td>
<td>9.6%</td>
<td>41.6%</td>
<td>48.8%</td>
</tr>
<tr>
<td>Total</td>
<td>4.7%</td>
<td>34.1%</td>
<td>61.2%</td>
<td></td>
<td>7.2%</td>
<td>42.4%</td>
<td>50.4%</td>
</tr>
</tbody>
</table>

A further factor which might have had an effect on pre- and post-training changes in ratings is length of service. It might be expected that those with the shortest length of service might gain most from the programme, since they would have had less opportunity to acquire knowledge in the course of their work. No formal statistical analysis of this factor was attempted in view of the very small numbers involved.

However, Table 7 shows the median before and after ratings for ability to draw on theoretical knowledge and models, according to length of service at the start of the course.

Table 7  Self-rating of ability to draw on theoretical knowledge and models, in relation to length of service at the start of the course. (self-ratings on 1-5 scale)

<table>
<thead>
<tr>
<th></th>
<th>Less than 6 months service (n=6)</th>
<th>More than 12 months service (n=8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median rating before training</td>
<td>2.5</td>
<td>3.0</td>
</tr>
<tr>
<td>Median rating after training</td>
<td>3.0</td>
<td>3.5</td>
</tr>
</tbody>
</table>

course. Six RAs had between 15 and 23 months service, and eight had between 2.5 and 5.5 months service. The information in Table 7 suggests that length of service is a relevant factor, although both groups showed improvement, indicating that the course
was providing information which was not readily obtained in the course of normal duties. However, the numbers involved are very small and any comparison between the two groups must be treated with caution.

Discussion

The course was generally well received, and overall self-ratings of ability to draw on theoretical knowledge and models were significantly improved following training. In addition, significant improvements in self-ratings of knowledge and ability to apply that knowledge were found for the majority of topics covered. Thus, the aims of the course appear to have been met. However, some of the results suggest factors which need to be taken into account if the course is to be offered on a regular basis. First, the improvements in ratings of knowledge of topics were generally a little better than those for ability to apply knowledge. Although the importance of facilitating the application of knowledge was clearly identified, these findings suggest that even greater attention might be focused within sessions on the practical applications of theoretical knowledge. However, this is unlikely to provide the whole solution, since evaluation also suggested that improvements in ability to apply knowledge were greater for those who attended sessions, than for those who had only the handout. Whilst this is not surprising, and is probably unavoidable, it may well be worth revising some of the handouts with this in mind.

The lack of significant improvement in knowledge, or ability to apply knowledge, for social, emotional and family disorders, is interesting. This topic was extremely well-
received by those who attended, and several comments were made on the evaluation forms that more time to pursue some of the issues raised would be appreciated. The format of this session was non-didactic and took the form more of a consciousness-raising exercise. The result may well have been to help RAs realise that this topic was much more complex than they had realised, without giving them specific answers. It is clear from this and from comments on the session evaluation sheets, that this is an area that might benefit from further input, either through additional training sessions or in some other way. One other surprising finding is that there was no significant difference in pre- and post-training ratings under either heading for facilitating functional ability, in spite of the fact that this session was highly rated for usefulness on the session evaluation sheet. It may have been relevant that only 4 RAs were able to attend this session, although significant changes in ratings have been found for other topics with the same level of attendance. Another possibility is that the handout for this session was less helpful than some, especially for those who had not attended the session. However, there was a clear trend towards higher post-training ratings for this and most of the other topics where changes in ratings did not reach statistical significance. The one exception was the role of assessment.

An important issue to consider is that a maximum of half the RAs (7) attended each session, and at times there were only 4 or 5 present. Those who did not attend were entirely dependent on the handouts. It has already been noted that handouts alone were less beneficial in terms of ability to apply knowledge, compared with acquisition of knowledge. A further issue is that the post-training survey indicated that RAs were less likely to read the handouts for those sessions they had not attended (Table 3), with
43% reading half or less. This situation is likely to have influenced the post-training ratings, since no improvement would be expected in those cases where the handouts were not read. The format of the evaluation questionnaires did not permit further elucidation of this issue. What is not clear from the information available at present, is whether the handouts were less helpful for non-attendees because they were read less frequently, or whether they were read less frequently by non-attendees because they found them less helpful without the context of the session itself. If the former is the case, some means of encouraging reading of handouts must be considered. If the latter, then some handouts may need to be revised to take this into account. This issue has important implications for future training courses and warrants further investigation.

The limitations of the chosen evaluation system must also be acknowledged. Mention was made earlier of the likely limitations on test-retest reliability of a subjective self-rating system. On this occasion, no attempt was made to assess test-retest reliability, although this may well be useful if this method of evaluation is to be adopted for future courses. An additional problem is the limited range of possible scores (1-5), with a consequent reduction in sensitivity to change, especially at the upper end of the range. It is generally accepted that a maximum of seven points should be used for such scales. A five-point scale was chosen on this occasion as evaluation was inevitably subjective and measurement could not be made with any great degree of accuracy. However, it would be useful to investigate whether a seven-point scale would allow for greater sensitivity. A further consideration in evaluating the outcome is the five month interval between completion of the pre-and post-training questionnaires. Whilst this was
inevitable because of the duration of the course, it is possible that some of the improvement in post-training ratings might have been due to factors unrelated to the training course, such as increased experience and exposure to information obtained in the course of normal duties. This would particularly apply to those most recently appointed. However, the information in Table 7 indicated that both experienced and inexperienced RAs felt better able to draw on theoretical knowledge and models in their work, indicating that the course is addressing issues which are additional to those with which RAs become familiar in the course of their ordinary duties.

Evaluation of this project was, for the reasons stated earlier, limited to subjective self-rating. In the longer term it would be helpful to develop a more objective evaluation system. One possible framework for considering such an evaluation might be drawn from current work on occupational standards in applied psychology (Consultative Working Group for Applied Psychology, 1995). This involves the development of a set of standards by using a functional analysis approach, starting with the definition of a key purpose, which leads to the identification of functions or key roles, which are further broken down into component units and elements. These then lead to detailed specification of performance criteria and the range of application, together with appropriate performance and knowledge evidence. Such an approach would, however, be a major undertaking which would necessitate much wider consultation within the main hospital.
Conclusions

Overall, the evaluation exercise suggests that this 12-week training course has been successful in meeting its stated aims and could usefully be repeated on an annual basis. However, some changes to the format are indicated if even greater benefit is to be obtained. In particular, it seems that greater emphasis should be placed on the practical applications of the subject matter covered. Whilst this was highlighted as an important focus of the training effort, the results suggest that this could be developed further for some topic areas. Consideration must also be given to the current choice of topics and the relative allocation of time. A significant improvement from pre- to post-training ratings does not, in itself, mean that the topic is particularly useful. Equally, there are some topics for which no significant change was found, which are extremely relevant to the work undertaken by rehabilitation assistants. In these cases further consideration must be given to ways of increasing the relevance and benefit of the training sessions.

A matter of particular concern is the relatively low rate of reading of handouts for sessions which were not attended. Attempts must be made before the next training cycle to address this problem. It will be necessary first to try to identify the reasons for this, through discussion with the RAs. Overall, the most appropriate way forward seems to be to convene a small working group involving 2 or 3 RA representatives, to consider the issues of course content and balance, and ways of encouraging the reading of handouts.
References


RA TRAINING QUESTIONNAIRE

Name:

1. Do you have a degree? If so, please state the subject. If not, please state subjects taken at A level or equivalent or other relevant qualifications.

Psychology (single or joint honours) 10
Other degree incorporating some psychology 2
HND 1
A levels 1

2. If you studied neuropsychology as part of your degree course would you say that the coverage was (please tick)

a. very basic 4 (29%)
b. reasonable 4 (29%)
c. substantial 3 (21%)
d. not applicable 3 (21%)

3. To what extent do you feel able at present to draw on theoretical knowledge or models to guide you in your work with residents? (please tick)

a. not at all 2 (14%)
b. very little 4 (29%)
c. sometimes 7 (50%)
d. quite a lot 1 (7%)
e. a great deal 0

4. What would you most hope to gain from a training programme?

(This was an open question. Responses are categorised below)

i. Linking theory to practice 7 (50%)
i. Increasing/updating theoretical knowledge 6 (43%)
iii. Increased confidence 2 (14%)
iv. Benefits for future career 2 (14%)
v. Increased job satisfaction 2 (14%)
vi. Increased effectiveness/competence 2 (14%)
vii. Gaining a holistic understanding 1 (7%)
viii. Increased understanding of problems of individual residents 1 (7%)
The chart below lists a number of possible topic areas for a training programme. Please rate each topic under the three headings using the rating scale below.

<table>
<thead>
<tr>
<th></th>
<th>(a) How much do you feel you know about this topic?</th>
<th>(b) How well do you feel able to apply your knowledge to your work as RA?</th>
<th>(c) How useful would extra training on this topic be for you as a RA?</th>
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<tr>
<td>Philosophy of HH and its approach to rehab.</td>
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<td>4.6 (4-5)</td>
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<td>Common neuropsychological consequences of traumatic head injury.</td>
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<td>1.8 (1-3)</td>
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<td>Improving coordination/fine motor control.</td>
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</table>
RA TRAINING PROGRAMME

Evaluation form

Topic:

1. Please answer the following questions using the scale below:

   1 2 3 4 5
Not at all Very

(a) How useful did you find this session in respect of your work as an RA? (please rate 1-5)

(b) How interesting did you find this session? (please rate 1-5)

2. Any other comments?
10th May 1995

Dear

RA TRAINING PROGRAMME - EVALUATION

Now that we have completed the twelve RA training sessions, I would like to seek your help in evaluating the programme.

The evaluation is in two parts. For the first part (below and on the next page), I need to know your identity. This is so that I can compare ratings with those on the original questionnaire in order to see to what extent being able to attend particular sessions affected the benefits obtained, compared with those for whom only the handouts were available. Please rest assured that I am the only person who will have access to the before/after ratings for any individual and the information will only be used for evaluating the programme (and not for evaluating the RA!). The second part, which is also enclosed, is anonymous. You can return that separately so that you will feel free to be totally honest.

Could you please return both parts of the evaluation to me as soon as possible.

Many thanks for your help and co-operation.

Linda Cox
Chartered Clinical Psychologist

-------------------------------------------------------------------------------------------------------------------------------------

RA TRAINING PROGRAMME EVALUATION - PART ONE

Q1 To what extent do you feel able at present to draw on theoretical knowledge or models to guide you in your work with residents? (please tick)

a. not at all
b. very little
c. sometimes
d. quite a lot
e. a great deal

/cont.
Q2. The chart below lists each of the topic areas covered during the training programme. Please rate each topic under the two headings using the rating scale below.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tr>
<td>none/not at all</td>
<td>a little</td>
<td>reasonably</td>
<td>quite a lot</td>
<td>extremely</td>
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</table>

<table>
<thead>
<tr>
<th>(a) How much do you feel you know about this topic?</th>
<th>(b) How well do you feel able to apply your knowledge to your work as an RA?</th>
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<tbody>
<tr>
<td>Philosophy of HH and its approach to rehabilitation</td>
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<td>Facilitating functional ability</td>
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<td>Disorders of speech and language</td>
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<td>Social, emotional and family issues</td>
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</table>
RA TRAINING PROGRAMME EVALUATION - PART TWO

This part of the questionnaire is anonymous. Please answer the questions as honestly and as fully as you can, using a continuation sheet if necessary.

Please answer the following questions, using the 1-5 scale below where appropriate.

1  2  3  4  5
not at all  very

1. How useful did you find the course overall in relation to your work as an RA? (rate 1-5)

2. Do you feel that any topics could have been omitted from the programme?

3. Do you feel that any of the topics should have been covered more briefly?

4. Do you feel that any of the topics should have been covered in more depth?

5. Were there any topics not covered by the programme, which you feel should have been included?

6. For the sessions that you were able to attend, how useful was it in general to have the handout? (rate 1-5)
7. For those sessions you were unable to attend, how useful did you find the handouts in general, in terms of extending your knowledge/understanding of the topic? (rate 1-5)

8. How many of the handouts did you read for the sessions that you attended (please tick)

(a) all  
(b) most  
(c) about half  
(d) a few  
(e) none

9. How many of the handouts did you read for the sessions that you did not attend? (please tick)

(a) all  
(b) most  
(c) about half  
(d) a few  
(e) none

10. Please add any further comments relating to the handouts (e.g. length, complexity, comprehensibility, further reading lists, etc.).

11. Please add any comments regarding changes to the presentation of sessions which you feel would have been helpful (e.g. greater use of overheads, flip-chart etc.; more time for questions; more participative style)
## APPENDIX D

Changes in pre- and post-training ratings for attendees and non-attendees, by session

<table>
<thead>
<tr>
<th>Topic</th>
<th>Attendees</th>
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<td><strong>TOTAL</strong></td>
<td>Know: 85</td>
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<td></td>
<td>Apply: 6</td>
<td>24</td>
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</tbody>
</table>
Session 1  Mechanisms of Recovery from Brain Injury

Brain damage following traumatic head injury can be thought of as resulting from three separate mechanisms:

1. **Primary damage** may be caused by the blow itself, by tearing or shearing of nerve fibres and by acceleration/deceleration effects.

2. **Secondary damage** may result from raised intracranial pressure, brain swelling (oedema), infection, haemorrhage, infarction, and/or oxygen deprivation (hypoxia, anoxia).

3. **Non-neurologic alterations** in physiology that affect brain function include metabolic changes such as hyperthermia (excessive fever), electrolyte disturbances (salt and water retention), damage to the hypothalamus or pituitary gland, and hyperventilation (increased respiration).

Acute medical management of head injury is aimed primarily at managing and minimising the effects of 2. and 3. above.

**Physiological and structural theories of recovery of function**

1. **Resolution of secondary factors** such as reduction in swelling, resolution of haematomas, normalisation of blood flow etc. These changes account for much of the early "spontaneous" recovery.

2. **Diaschisis** is the term used for the depression or cessation of activity that takes place in areas of the brain outside the immediate site of damage and is thought to occur as a form of shock due to disruptions in the neural network connecting injured and functionally related areas. As the "shock" effect subsides, recovery of function in this undamaged areas can take place.

3. **Axonal sprouting** includes growth from damaged nerve axons and collateral sprouting from intact axons to take over a vacant synaptic site. This can result in new neural pathways but the process may not always be a beneficial one.

4. **Denervation supersensitivity.** Partial denervation may result in hypersensitivity to the remaining input. Again, this may not always be beneficial.

5. **Anatomical reorganisation.** There is no hard evidence for major reorganisation such as the right hemisphere taking over language function in adults. Theories generally revolve around ideas of build in redundancy or
duplication in the system. One theory is that there is a very high level of connectivity in the brain, with a large number of latent connections which are normally inhibited. Once the normal balance is upset these pathways may be unmasked.

Neuropsychological theories of mechanisms of recovery

The main influence has come from the work of Luria (see refs. for further reading). Luria's work shifted the emphasis away from the search for discrete functional centres within the brain and emphasised the concept of a dynamic, integrated system. Luria suggested that recovery of function may occur through new learned neural connections and that these new connections may be established through specifically targeted cognitive retraining exercises. This would facilitate the rate of recovery and assist in functional reorganisation.

Other factors include the role of arousal and of attention in all cognitive functioning. There is increasing evidence that targeted practice can be effective in increasing attentional capacity.

More recent work has related to theories regarding latent connections within the brain. If the brain is seen as a competitive organ, healthy circuits may "take over", inhibiting the damaged circuit. This can lead to maladaptive compensation - short term benefits may be unhelpful in the long term by masking residual spared functioning in the damaged system. Recent research suggests that inhibiting the intact system may help increase the functioning of the damaged system.

Alternative approaches

Much rehabilitation work is carried out on the basis that recovery of the initial brain function may not be practicable and concentrates on compensation (to get round a deficit, for example by using a memory book) or substitution (solving a cognitive problem by alternative methods).

Further reading


Session 3: Common neuropsychological consequences of traumatic head injury - an introduction

Neuropathology

Primary effects result from:-

a) sudden acceleration and deceleration of brain within skull;
b) focal contact between brain and skull.

Main effects include:-

- diffuse white matter (axonal) injury due to stretching and shearing of nerve pathways as brain rotates on its axis;
- stretching and shearing of subcortical pathways and brain stem;
- focal damage to cortical and subcortical brain areas.

Particularly vulnerable areas are orbito-frontal region (underside) of frontal lobes and anterior part of temporal lobes. These areas are nearly always affected regardless of site of external impact.

Secondary effects, including haemorrhage, haematoma, oedema, raised intracranial pressure etc., can result in focal or diffuse damage.

Neuropsychological sequelae

Precise picture will depend on specific areas of damage. Most common areas of impairment are:

i. cognitive problems

- impairments of arousal and attention - easy fatiguability; trouble sustaining attention; impaired selective attention and scanning; poor shifting of attention; difficulty with divided attention.
- difficulties with initiation and planning of goal-directed activities - “apathy” resulting from lack of initiation; impulsivity and perseveration; slowness in initiating action; difficulty ordering or sequencing information; difficulty knowing where to start in problem solving.
- impaired ability to take the abstract attitude - “not seeing the wood for the trees”, concrete thinking; tendency to miss the point or take things literally.
- impaired judgements and self-monitoring - unrealistic expectations; difficulty in integrating information; misinterpretation of actions or intentions of others; difficulty interpreting social cues; not noticing errors
• memory and new learning - material specific or more general memory impairments; difficulty organising material to be remembered; slowed rate of learning new information.
• reduced speed of information processing - slowed reaction times; slowness in psychomotor activities.
• communication disorders - anomia; impaired word-finding; tangential speech; excessive talkativeness

Additional impairments may include motor and visuo-spatial functioning and other speech and language disorders dependent on areas damaged. A more generalised deterioration in intellectual functioning may also be found, though this may relate to the effects of factors above.

ii. psychosocial problems (sometimes resulting from cognitive problems)

• emotional change - apathy, silliness, lability, irritability, libidinal changes, sometimes anxiety and depression;
• impaired social perceptiveness - self-centred behaviour, reduced empathy, socially inappropriate behaviour;
• impaired self-control - impulsivity, restlessness, impatience, aggressive behaviour;
• increased dependency - including lack of initiative (talk but no action);
• behavioural rigidity - difficulty coping with change, inability to learn from experience.

Evidence suggests that the psychosocial impairments are often more important than cognitive impairments in determining likelihood of return to employment and in making/maintaining close personal relationships.

Further reading


L.C. 1995
Week 3: The role of neuropsychological assessment

Historical role: traditionally to aid in differential diagnosis. Still important in acute settings, less so with advent of improved imaging techniques (CT, MRI, PET etc.)

Role in rehabilitation: to assist in treatment planning. Aim is to help determine what cognitive strengths and weaknesses may affect the individual’s ability to function effectively and under what conditions.

Process: information obtained from/re

- medical records, including scans etc.
- interviews - patient, relatives/carers, other staff re current problems and pre-morbid functioning, previous medical history etc.
- observation in functional settings
- medication (can affect cognitive functioning)
- neuropsychological assessment

What is assessed?

5 key areas identified by Cohen and Mapou (1988):

- arousal and attentional functioning
- language functioning
- visuo-spatial functioning
- organisational, reasoning and problem-solving abilities
- memory functioning

Additional assessment of executive functioning is often necessary.

How?

Fixed battery v hypothesis-testing approach.

Quantitative data - characterises overall performance; inter-task comparisons; pre/post injury comparisons; baseline for measuring change etc.

Qualitative data - how does individual approach task? Why does he/she fail? How does he/she respond to changes in task parameters? What factors may be interfering with task performance? etc.

Both quantitative and qualitative are data essential for planning rehabilitation in order to:

- identify areas to work on
• determine appropriate approach to treatment/rehabilitation
• understand problems that arise during rehabilitation

e.g. Is failure to learn/remember new information due to attentional deficits, organisational problems or memory impairments? Are other factors such as anxiety having an effect? Should the problem be addressed by direct treatment/retraining, indirect methods (using “spared” capacity to do the work of an impaired system, e.g. visual v verbal memory) or by teaching compensatory strategies such as use of memory notebook? Are behavioural outbursts caused by frustration at problems or by neuropsychological impairment such as disinhibition?

Further reading


Session 4: **Frontal lobe injuries and the dysexecutive syndrome**

The frontal lobes

Main divisions:
- primary motor cortex
- premotor area
- Broca's area
- pre-frontal cortex

The prefrontal (anterior) cortex of the frontal lobes has complex interconnections and feedback loops with the major sensory and motor systems. This area integrates already processed information from the external environment (via the sensory systems) and the internal environment (via the limbic system and brain stem arousal systems). Damage in this area tends to affect how an individual responds. Luria describes the frontal lobes as providing "a system for the programming, regulation and verification of activity."

The frontal lobes are not unitary. Pattern of behaviour will depend on the specific areas damaged. Hart and Jacobs (1993) summarise the main functions of the frontal lobes as follows:

1. deciding what is worth attending to and what is worth doing;
2. providing continuity and coherence to behaviour over time;
3. modulating affective and interpersonal behaviour so that drives are satisfied within the constraints of the internal and external environment;
4. monitoring, evaluating and adjusting.

**Executive control dysfunction**

Executive functioning is an "umbrella" process, potentially affecting all other cognitive functioning. It is commonly associated with the prefrontal cortex but other brain areas are involved. The theoretical background can be found in the "Further reading" suggestions and is based on models such as Shallice and Norman's Supervisory Attentional System. Put very simply (and it is not simple!) the model incorporates three levels of functioning:

- schema - routinized actions or thought processes, each has its own activation strength with determines dominance;
- contention scheduling - handles routine situations in which conflict occurs between schema (fast, automatic, e.g. activating "gear changing" schema at road junctions;
- supervisory attentional system - resolves conflict between schema in novel situations and those requiring the suppression of dominant schema that are inappropriate (e.g. stops us driving to work on Sundays. Slow, effortful)
The most important function of the executive control system is in the formulation and successful execution of goal-directed behaviour. With an impaired executive system, residents may have the skills and knowledge to carry out various “components” of behaviour but have difficulty in integrating them into a coherent, goal-directed sequence. Impairments of executive functioning include:

- decreased ability to plan, initiate and execute behaviour
- decreased flexibility of thinking
- reduced awareness of behavioural alternatives
- decreased organisation and sequencing
- difficulties with focused, sustained and selective attention
- impulsivity
- decreased monitoring and self-correcting of errors, evaluation, use of feedback
- discrepancy between “knowing” and “doing”
- stimulus-bound behavior
- perseveration
- lack of awareness or concern about impact of behaviour
- poor emotional control
- difficulty in formulating strategies (both generating strategies and anticipatory processes)

Treatment

Treatment of choice will depend on nature and extent of the problem. (Treatment of behavioural disorders will be covered in a later session). The two main principles involved are

- provision of structure (through physical or social environment, or through taught strategies)
- building up of automated patterns of behaviour (some behaviours which were originally automatic, after injury become slow and effortful. Training may help return these processes to automatic control - speeds up the process and reduces load on supervisory attentional system)

1. Environmental modification - physical organisation of environment, labelling, checklist and cue cards etc. Social environment - prompts, educating families/carers etc.

2. Specific skills training - (a) task specific routines (e.g. showering) taught in systematic step-by-step format using progressively less cueing; (b) training use of external compensatory systems (e.g. use of memory book or electronic organiser); (c) training pragmatic skills (e.g. social skills training); metacognitive skills training (e.g. use of self-instructional or similar techniques across a range of settings.

3. Remediation of underlying processes - evidence is equivocal for many interventions in terms of effect on underlying processes. Good evidence now for specific value of attention process training.
What do you as RAs need to consider?

- These problems are complex. You will need to be guided by therapy staff on particular approaches and interventions with individual residents. Ask for guidance if it has not automatically been provided!
- Structure. Dependent on the needs of the particular individual, you may need to provide the structure, through environmental modification and through providing prompts and cues. If therapists advise it, keep to a routine with the resident in daily activities. Use hierarchical prompting, with the minimum prompt needed to enable the resident to proceed successfully.
- Encourage the use of taught strategies at all times (e.g. there are guidelines on problem-solving strategies available).
- Bear in mind that most people with impairments of executive functioning have some degree of attentional deficit, particularly with dividing or shifting attention. Try to avoid overloading their attentional capacity. It is often difficult for them to do more than one thing at a time (i.e. doing something while listening to a string of advice or instructions). If necessary, get the resident to stop and think. He/she may need prompting to get restarted (e.g. “where had you got to?”)

Further reading


I have many more articles and references on this topic. Please talk to me if you are interested in further reading.

L.C.
Feb. 1995
Stroke = cerebro-vascular accident (CVA) - a focal neurological deficit caused by a local disruption of blood supply to the brain. Onset is usually sudden and rapid. Disability produced is worst at onset or within a very short period.

Types of stroke

Two main classifications used nowadays are:-

(a) ischaemic stroke. Blood supply to part of brain suddenly becomes inadequate for brain cells to function (usually caused by thrombosis or embolism)

(b) haemorrhagic stroke. Blood vessel ruptures and blood either rushes through the brain (intracerebral haemorrhage) or outside brain into sub-arachnoid space.

Effects of ischaemia

- complete thrombosis or major embolism causes a shortage of blood supply to a cone shaped area of the brain. Some cells die, others are temporarily out of action but may recover as other vessels take over the role of the blocked vessel. The area involved is known as an infarct.

- transient ischaemic attacks occur when the cells are not deprived of blood supply for long enough to die. If blood flow is restored quickly enough an infarct does not occur. (A temporary reduction in flow to an already narrowed artery can be caused by sudden drop in blood pressure, e.g. on standing up or a neck movement "kinking" a narrowed artery etc.)

Results of infarction

Depends on the area of the brain involved and the number of cells permanently damaged. Most common problems include contralateral hemiplegia, facial palsy, hemianopia, loss or disturbance of speech, sensory loss, perceptual problems and unilateral neglect. Other problems may also arise depending on the area affected.

Deficits are much more focal than those following traumatic head injury.

Further reading


REHABILITATION ASSISTANT TRAINING PROGRAMME

Week 5: Unilateral neglect following stroke

What is it?
Inattention to the contralesional side of visual or personal space which cannot be explained in terms of a primary sensory deficit. As if affected side of space had no meaningful existence. Often found in association with a hemianopia (loss of half of visual field) but independent of it.

Not a unitary phenomenon. Neglect of visual space (e.g. bumping into things on affected side, missing part of visual display in reading etc.) can be found in dissociation from peri-personal neglect (brushing one side of hair only etc.) and vice versa. May be task specific (e.g. reading not writing). Visual neglect may be full neglect of affected side of space, or object centred (i.e. neglect of affected side of each object) or a combination.

Prevalence
Left neglect (i.e. following right hemisphere stroke) more common and more severe than right neglect. Very common in early stages. Often resolves within a few weeks. Continuing neglect is the most important predictor of poor functioning on activities of daily living.

Theories regarding mechanism
Main theories regard neglect as either an attentional deficit or a deficit in spatial representation. See further reading if interested.

Rehabilitation

Many neglect patients also have problems with dual-tasking. Asking them to apply a strategy (e.g. scan left) at same time as doing some other rehab. activity may lead to overload.

Treatment strategies reported in the literature include:

- training to locate visual “anchor” on affected side (red line, finger etc.) on scanning tasks. Useful in specific situations but studies show poor generalisation outside the trained task.
- marking furniture, doorways etc. to minimise collisions. Effect can persist after removal of markers but does not usually generalise to other settings.
- activation of limb on affected side during another task, e.g. by tapping a switch to turn off buzzer. (Passive movement does not work). Experimental results are interesting but complicated. Not yet clear how useful this will be in a clinical setting.
- current research indicates a number of possible interventions (see further reading), though mostly giving transient effects and not readily applicable in functional settings. No simple solutions are likely as neglect is not a unitary phenomenon.
In the clinical setting a number of strategies are routinely applied. It is important to remember that unilateral neglect following stroke will be combined with other difficulties such as reduced sensation on the affected side, altered tone, hemianopia and other perceptual difficulties such as proprioception and body schema. Treatment techniques used in therapy are therefore focused on providing integrated strategies with a functional basis. Standard therapy techniques include:

- structure of living space to encourage looking across the midline towards affected side. Aspects may need to be adjusted for comfort and function (e.g. looms may need to be located easily).
- interaction - sit on the affected side or as far round to the centre as is necessary for successful communication.
- positioning - body and equipment. Symmetrical posture. Position equipment activities either centrally or on the affected side. Use of centrally placed mirror.
- visual anchors (brightly coloured) for objects on the affected side, e.g. light switches. Scanning tasks - visually locating objects around the room.
- tactile cueing - tapping the arm gently, providing stimulation before activity to help facilitate function and awareness of the limb. Weight bearing through the affected limbs. Encouragement to locate things on affected side.
- verbal cueing - e.g. "check the left" if only half the food on a plate has been eaten, or "look to the left" if veering into the left door frame. The intention is to promote self-cueing.
- facilitating bilateral use of limbs.
- practise tasks and activities specific to individual’s functional needs.

Further reading


Various journal articles on work published since 1993 can be borrowed from L.C.

L.C./C.S.
February 1995
Week 8  **Attentional disorders**

Disorders of attention are very common following head injury (frontal cortex is heavily involved in attentional processes).

Attention disorders affect response to all rehabilitation activities and return to productive lifestyle.

Attention is not a unitary process. Several different areas of the brain are involved in the different processes.

**Theoretical models**

Posner and Peterson (1990)

3 dimensions

1. Selectivity  - selectivity  
   - focused attention  
   - divided attention  

2. Intensity  - sustained attention  
   - alertness  
   - vigilance  

3. Orientation  - engagement  
   - disengagement  

Sohlberg and Mateer (1989)

clinical model of attention

1. Focused attention  
2. Sustained attention  
3. Selective attention  
4. Alternating attention  
5. Divided attention  

Attentional control theories:


Assessment

Most assessment tools are not “pure”, are not theoretically based and may not be sufficiently demanding to detect impairments. Test of Everyday Attention (Robertson et al. 1994) attempts to use ecologically valid measures based on theoretical model (Posner and Peterson).

Behavioural manifestations

Effects of attentional problems include:

- distractibility
- difficulty directing attention to specific task/stimulus
- difficulty sustaining attention
- difficulty switching attention between different tasks/stimuli
- poor monitoring and vigilance
- "information overload"

Reactions to information overload

Emotional and/or behavioural reactions. Distress, anger, avoidance. Need for strategic coping strategies.

Possible mechanisms of secondary attentional problems

- Low self-efficacy, leading to task abandonment
- Self-talk ("I can’t do it")
- Self-referential thoughts ("They think I’m stupid" etc.)
- Poor motivation
- Lack of opportunity for practice
- Depression/anxiety

Rehabilitation

Must be related to assessment of which processes are impaired, or which secondary mechanisms may be involved.

Increasing evidence that attentional processes can be directly remediated by carefully planned cognitive retraining exercises.

What can RAs do to help?

Read the file, and ask if necessary to get an understanding of the needs of the individual resident. Some more general principles are:
remember that increased demands on attentional capacity will reduce performance;
- unless directed otherwise, keep the environment as distraction free as possible during demanding activities;
- do not expect residents to do more than one thing at a time. Do not bombard them with advice and directions while they are doing something. Keep instructions simple and, if need be, ask the resident to stop what they are doing while you speak to them (this will depend on the individual);
- bear in mind possible secondary mechanisms affecting attention, e.g. encourage a resident to put aside worries while engaging in an activity, to use anxiety management techniques, etc.;
- understand and be alert to reactions to information overload. Help the resident to adjust the environment to reduce overload (remember, the environment includes you!). Encourage the resident to develop strategies to manage demands on attention (e.g. asking you to slow down, to repeat information, etc.).

Further reading


L.C.
1995
Unawareness of deficit

Anosognosia - lack of knowledge, awareness or recognition of disease. Lots of different terms used in the literature (e.g. unawareness, denial, lack of insight, imperception). May be used interchangeably or with specific meaning.

Unawareness of deficit is not uncommon after severe brain injury. Can be a significant problem in terms of rehabilitation.

Memory disorders may contribute to sustaining unawareness, but unawareness is not a direct function of the inability to remember.

Sources of unawareness (from Langer and Padrone, 1992)

1. not having the information, or having the raw data but not knowing how to interpret it
2. having the information but not being able to glean the full implications (severity or meaning is minimised)
3. denial

Psychogenic v neurogenic unawareness

Type 2 above may be neurologically or emotionally based. Type 3 is emotionally based. Distinguishing between neurologically and emotionally based unawareness is problematic. The two are not mutually exclusive.

Forms of unawareness (from Schacter and Prigatano, 1991)

Many dimensions to unawareness:

1. Levels of unawareness. Unawareness of deficit v unawareness of consequences.
2. Neural bases of unawareness. May be different neurological bases of unawareness (e.g. some evidence that anosognosia of hemiplegia is associated with right inferior parietal lesions, other types of unawareness may be associated with frontal damage, and relate to “self-awareness”).
3. Specificity of awareness. Research suggests that different measures tap different aspects of awareness. Not simply aware/unaware. Also can have awareness of one deficit but not of another.
4. Partial/implicit knowledge of deficits. Sometimes there is behavioural or linguistic evidence of awareness even with explicit denial.
5. Defensive denial. Important to distinguish between defensive denial and organically based unawareness, but often difficult. Not mutually exclusive.

Treatment approaches

Treatment approaches must take into account the hypothesised basis of the unawareness. In the case of defensive denial it is important to consider whether, and to what extent, the denial is interfering with rehabilitation and adjustment. Denial may at times be functional. A sensitive approach is essential and a balance may need to be sought between colluding in unrealistic expectations, and overwhelming the individual with exposure to a reality which is too threatening at that stage.

Treatment approaches include:

- psychotherapeutic approaches, especially in cases of emotionally based denial;
- provision of information and explanation (e.g. discussing assessment findings and discussing implications, etc.);
- opportunities for development of awareness of deficits through exposure to functional situations requiring those skill;
- feedback, including opportunities for self-evaluation and comparison.

The “catastrophic reaction”

A “catastrophic reaction” can occur when an individual is exposed to a situation which highlights deficits which are overwhelming to the individual and too threatening to face. This can lead to distress, anger, withdrawal from activity etc. If such a situation arises, always inform the psychologist or one of the other therapy staff, as appropriate follow-up will be necessary.

Further reading


L.C.
1995
Session 10  Memory Impairments

There is a vast literature from cognitive psychology on models of memory and far more than can be covered here. If you want to pursue this there are some good references in Wilson and Moffat (1992). The aim here is to give a very brief outline of two theories of memory; to consider the kinds of memory impairment most frequently found following acquired brain injury; and to look at methods of rehabilitation and management of memory impairments.

Theoretical aspects

(1) Tripartite models (developed from Atkinson and Shiffrin)

<table>
<thead>
<tr>
<th>brief sensory memory systems, eg iconic (visual) and echoic (auditory)</th>
<th>temporary storage system “STM”/ “primary memory”/”working memory” (modular)</th>
<th>long-term memory episodic v semantic procedural v declarative etc.</th>
</tr>
</thead>
</table>

(a) very brief - deficit likely to reveal itself as perceptual impairment;

(b) increasingly referred to as “working memory”, incorporating the concept of separate, modality-based interactive systems under the control of a “central executive”. This system provides the temporary storage of information needed for the performance of other cognitive tasks, for conversation etc.;

(c) common conceptual distinctions in LTM include:-

- episodic v semantic memory. Semantic memory refers to the storage of knowledge (e.g. factual information). Episodic memory refers to the storage and recall of personally experienced events (e.g. whether you have had lunch). The distinction is useful but the debate continues on whether they represent separate memory systems.

- procedural v declarative learning. Procedural learning refers to the acquisition of perceptual, motor or intellectual skills e.g. learning to solve a puzzle or ride a bike. Typically this ability is preserved even in cases of severe amnesia. The individual may demonstrate the skill even when having no recollection of having learned it. Declarative learning refers to the conscious acquisition of information (i.e. you know that you know it).

- prospective memory. This refers to the ability to remember to do things at a particular time in the future.

- autobiographical memory. This refers to memory for personal autobiographical information. It is often unimpaired, even with dense amnesia.
(2) Models of memory as an information-processing system

Usually incorporate the following stages:

- attention
- encoding
- storage
- consolidation
- retrieval

Includes work on organisation of material, levels of processing, encoding specificity etc.

Neuroanatomical correlates of memory

Structures involved in the memory system include the hippocampus and hippocampal gyri; mesial temporal lobe structures; lateral temporal cortex; dorsomedial nucleus of the thalamus; and frontal lobe structures (the latter are particularly related to allocating attention, organising and temporal sequencing of memories). Damage may be unilateral or bilateral and reflect the different functioning of the two cerebral hemispheres.

Disorders of memory following brain injury

Some common terms that may be encountered in reports:

PTA (post-traumatic amnesia) - the temporary state of confusion and disorientation following trauma, during which there is no continuous memory. Duration often regarded as an indicator of severity and prognosis, but an unreliable measure and difficult to define operationally.

Retrograde amnesia - inability to recall events occurring prior to the injury. Typically this presents as a temporary amnesia, covering a variable period but shrinking over time, often to just a short period pre-trauma. Occasionally more permanent.

Anterograde amnesia - impairment of new learning following brain injury. Common following traumatic brain injury and certain other conditions. Very important factor in terms of functional independence.

Primary/secondary amnesia. Primary amnesia results directly from the injury. Secondary amnesia is a result of other cognitive impairments such as attentional deficits. In practice, primary amnesia is rarely found in isolation from other deficits.

Factors to consider in assessment and rehabilitation

1. Severity of impairment.
2. Interaction with other cognitive factors. Pure amnesia is rare. Memory problems are most commonly found in association with other cognitive deficits (e.g. }
attention; language; visuo-perceptual abilities; executive dysfunction) which affect memory function and also the ability to use compensatory strategies.

3. Specific or general. E.g. verbal v non-verbal. Specificity may relate to other cognitive deficits rather than memory per se (e.g. poor performance on a “non-verbal” memory test may result from a perceptual impairment).

4. Anterograde memory impairment is more common than retrograde memory loss. Where long-term retrograde loss does occur, it affects autobiographical information and can be very distressing, involving a loss of personal history and sense of self.

5. Stage in processing at which memory is disrupted. Using the information processing model, identification of the stage(s) involved is important for devising an effective rehabilitation programme.

**Approaches to rehabilitation**

1. **Restoration**

Attempts have focused on repetitive practice/drilling. No generalised effect on memory functioning has been found. Memory is not like a muscle whose function can be improved with practice.

2. **Compensatory strategies**

**Internal** aids include various mnemonic strategies and visual imagery techniques. Experimental studies show some such strategies can improve performance even in amnesic subjects. However, no study has shown generalisation to naturalistic settings. Most impose a heavy demand on other cognitive systems which may be impaired. They are most useful for teaching specific pieces of information. Generalisation is problematic. Some successful strategies are described in Wilson and Moffat (1992).

**External** aids include

- organisational/storage devices, such as notebooks, personal organisers etc.
- prospective memory aids, such as alarms, timer buzzers, calendars etc.
- environmental modification, such as reminder notes, labeling, environmental organisation etc. These may be self-generated or organised by others.

Use of external aids will not usually be spontaneous and must be taught and practised systematically.

**Other compensatory techniques** include specific teaching methods such as the method of vanishing cues, and the use of implicit or procedural learning.
What can RAs do to help residents with memory problems?

1. Know your resident. Do you know which residents have memory problems and to what extent?
2. Familiarise yourself with the strategies being implemented with each individual. Who has a memory book? Do they need prompting to use it to store and/or retrieve information?
3. Be thorough and consistent in following documented strategies relating to training in memory book use.
4. During key worker sessions, help residents review their use of memory books and other aids. Are they storing old shopping lists or "to do" lists which can then be confused with current information?
5. Help residents structure their environment so that fewer demands are made on memory. Organising belongings, doing things at a regular time (e.g. straight after a meal), keeping to familiar routines can all help. For example, showering every day can become a routine. Showering every other day requires the ability to remember whether you showered yesterday.
6. Encourage residents to use their own resources to discover or retrieve information. Instead of answering a question directly, encourage residents to think whether they have the information available to them. Use hierarchical prompting strategies (i.e. from general to specific) to increase independence.
7. Remember that most residents with memory impairments have particular difficulty with large amounts of orally presented information. This will be made worse by any information processing deficits and receptive language impairments. Keep important messages clear and simple. Reduce non-essential information. Check that the resident has grasped the essential points. If information is written into a memory book, you may (dependent on the individual resident) need to check its accuracy. It is not helpful if residents write down information incorrectly or incompletely!
8. Incorporate memory strategies into functional situations as much as possible. If you are going shopping with a resident, do they need to make a list? Encourage the use of ongoing lists (things to buy, things to do) which are added to as required. Make sure items are deleted immediately they are no longer needed. Training good habits requires regular and consistent practice.
9. Remember the importance of attention in memory processes. Things will not be remembered if they were not registered in the first place!
10. Finally, be collaborative and not directive in your approach. Many people with memory impairments are quite sensitive about it.

Further reading


L.C. 1995
Session 11 Social, emotional and family issues

This handout is a little different from usual in that it was (intentionally) prepared after the session. The aim of the session was to get you, the RAs, thinking about the issues which might be relevant to a fictional resident and his family. As a result of this exercise, a large number of potential issues were identified, which have been summarised in the attached diagram.

There are two important points to remember about the diagram. First, it is not all-inclusive. There are many more “branches” and “sub-branches” which could have been included. Second, the main “branches” are not really independent of each other. Each will be interrelated with several others and anything happening within one part of the system may impact on the whole system.

Some of the aspects covered by the diagram were more readily identified than others. Issues relating to finance and housing, for example, were quickly identified. We are familiar with these and rehabilitation and discharge planning take these into account. There was much less awareness of aspects such as sexual needs of an individual or a couple. Discussion of this topic raised questions such as “What privacy do we provide for a married couple when the spouse comes to visit?” “How openly do we help residents consider and address their concerns about sex in the context of physical disability?” “What are the opportunities for residents in shared rooms to masturbate in privacy?” It is very easy to fall into the trap of thinking of those with brain injury and/or physical disabilities as asexual.

The session also helped raise awareness of the complexity of the social and family issues. If residents or their families are not always “sweetness and light” with us, we need to remember just what they may be trying to cope with.

Another major consideration raised in the session was how we, as staff, link with and impact on the system for each resident. We are not neutral in our impact!

The session raised far more questions than answers and many of the RAs who attended felt that more time needed to be devoted to discussing some of the issues raised. (This can be done in the weekly support meetings).

For those of you who were unable to attend the session, it is worth spending some time thinking about one or two of our residents, using the diagram as a guide, and try to identify what issues may be relevant in each case. How are these issues impacting on our rehabilitation efforts? Are there any issues which you can identify which are not being addressed by that individual’s current programme?

L.C.
April 1995
SECTION IV

RESEARCH AUDIT
WOMEN'S PERCEPTIONS OF STEREOTACTIC FINE NEEDLE ASPIRATION CYTOLOGY AS AN AID TO THE DIAGNOSIS OF IMPALPABLE SCREEN DETECTED BREAST LESIONS

LINDA COX

DEPARTMENT OF PSYCHOLOGY
UNIVERSITY OF SURREY
1990

This thesis is submitted in partial fulfilment of the requirements for the degree of Master of Science in Clinical Psychology
This research comprised an exploratory study of women's subjective experience of stereotactic fine needle aspiration cytology as an aid to the early diagnosis of breast cancer.

Subjects were 73 women who attended a review clinic following an abnormal result from mammographic screening. No alterations to routine procedures at the clinic were made for the purpose of this study.

A standard interview protocol was used to gather information on subjective response to the procedure, including satisfaction with provision of information. Preference for information was assessed using the Krantz Health Opinion Survey (Information Sub-Scale). Subjects completed a comparative grid and rating scale to assess stereotactic fine needle aspiration and three other medical procedures on a number of dimensions. Further comparative measures were obtained by the use of card sorts involving ten medical investigations.

Approximately half the subjects rated some aspect of pain or discomfort as being the worst part of the procedure. Staff attitude and approach was seen as a significant mediator. Suggestions for improvements to the procedure centred on waiting times, both before and during clinic attendance as well as waiting for results. There was a high level of satisfaction with the quantity and helpfulness of information. Satisfaction with information was not correlated with preference for information, suggesting that clinical judgement on
appropriate levels of information for individual subjects was generally accurate.

Comparative measures suggested that while stereotactic fine needle aspiration was rated as being comparable to a dental filling in terms of pain or discomfort, the diagnostic implications were difficult to dissociate from the procedure, which was seen as more frightening and less quickly over and forgotten.

Three distinct groups emerged from the card sorts, with stereotactic fine needle aspiration being most closely associated with the mammogram and smear test. Card sorting procedures showed no consistent pattern of categorisation of medical investigations. A number of different dimensions were used and these were frequently cut across by the use of discrete categories relating to parts or functions of the body or type of illness.

The implications of these findings for services providing stereotactic fine needle aspiration cytology are discussed.
1. BREAST CANCER

1.1 Epidemiology

Breast cancer is the commonest cancer affecting women in England and Wales, with about 21,000 new registrations and 13,000 deaths annually (Mortality Statistics, 1984). Both incidence and mortality have risen steadily in the western world over the past 20 years (Brinkley et al, 1984; Williams & Buchanan, 1987).

There are marked national and regional variations in the incidence of the disease, (Williams & Buchanan, 1987) and an increase in incidence with rising social class has been noted in Europe and the USA (Henderson et al., 1984).

Approximately one in twelve women in the U.K. will develop breast cancer at some time.

1.2 Treatment

Recognition of breast cancer as a disease entity dates back at least to the ancient Egyptians and some form of surgery for the disease was known in ancient Greece and Rome. The radical mastectomy, involving removal of the breast, pectoral muscles and axillary lymph nodes, was the generally accepted method of treatment through the first half of the twentieth century. This treatment was based on the assumption that the progress of the disease consisted of three sequential phases: a local phase when the disease is confined to
the breast; extension of the disease with progressive involvement of the lymph nodes; and a final phase with wide dissemination. It has now become recognised that the progress of the disease is variable and there may be systemic involvement before any signs of spread beyond the breast can be detected. (Veronesi & Costa, 1982). The radical mastectomy lost favour as studies indicated that less extensive operations such as simple mastectomy did not significantly affect survival rates (Brinkley & Haybittle, 1971; Hamilton et al., 1974; Forrest et al., 1977, Fisher et al., 1977; 1985) and these modified forms of mastectomy have now become predominant. More recently, investigations have focussed on comparisons of mastectomy with breast conserving techniques in which only a portion of the breast tissue is removed. This technique is not appropriate in all cases, but controlled studies indicate that with carefully selected patients with early breast cancer conservative methods do not adversely affect survival (Sarrazin et al. 1983; Veronesi et al. 1981).

As a result of better understanding of the disease and the broad identification of operable and inoperable stages of breast cancer, improved selection of patients for surgery has been possible, leading to an increase in the 10-year survival rate following mastectomy to 50% by the 1950s. In spite of subsequent developments in diagnostic procedures, surgical techniques and adjuvant therapies this 10-year survival rate has remained much the same (Ray & Baum, 1985, p3).
In addition to surgery, women are often given additional treatment in the form of various combinations of radiotherapy, chemotherapy or endocrine therapy.

2. SCREENING

2.1 Evidence in support of mass breast screening

In view of the very high incidence and mortality associated with breast cancer, mass screening is an attractive approach offering the prospect of earlier detection with subsequent potential benefits in terms of treatment options and reduction in mortality.

A number of studies have attempted to assess the long term benefits of screening programmes. The two most widely quoted studies are the Health Insurance Plan (HIP) Study in the United States (Shapiro et al., 1982; Strax, 1984) and the Two-Counties trials in Sweden (Tabar et al., 1985), although other non-randomised trials have also been reported (Verbeek et al, 1984, Collette et al, 1984). Reports from the HIP study indicated a 30% reduction in mortality rates over 10 years. In the Swedish study reported by Tabar et al (1985) there was again evidence of a reduction in mortality in the screened group which became evident from the 4th year and increased to 31% by the 7th year of follow up, although Williams and Buchanan (1987) point out that this represents only seven deaths per 100,000 per year prevented by screening. Neither the HIP nor the Swedish study was able to demonstrate any benefit from screening for women under the age of 50. One of the difficulties
associated with the evaluation of screening programmes is the length of time needed to assess any reduction in mortality rates. This means that newly published results inevitably relate to techniques and equipment which may since have been substantially refined.

2.2 Arguments against breast screening.

There are a number of methodological and statistical problems associated with screening trials and the HIP study in particular has been criticised on a number of counts (Skrabanek, 1985; Haagensen et al, 1981). Skrabanek has challenged the conclusion that breast cancer is curable by early surgery, contending that apparent improvements in mortality rates are artefactual. Skrabanek's interpretation of the data has in itself been challenged (Baum, 1985; Chamberlain, 1985). Baum (1985) argues that even if Skrabanek were proved to be correct in terms of length of survival, there is impressive evidence for an improvement in the quality of life as a result of early detection, since mastectomy can usually be avoided and there is clear evidence that local recurrences are less common for small tumours.

Other arguments against mass screening have been summarised by Ray and Baum (1985, pp 76-77.) There is concern that a negative finding, especially on first screening, could lead to a false sense of security and women may be less inclined to return for follow up or to report immediately any symptoms occurring between screening intervals. Second, screening programmes
inevitably generate an increased biopsy rate because of the large numbers of screen-detected lesions in otherwise asymptomatic women. The majority of these lesions are subsequently found to be benign conditions requiring no treatment. Linked to this is the concern that there is insufficient understanding of the prognosis of some of the abnormalities detected. Thus there is a possibility that some women may undergo treatment as a result of the detection of abnormalities which may not have developed into cancers had they gone untreated. Any form of breast surgery is associated with high levels of psychological distress (Maguire, 1976; Scott, 1983) and all surgery carries a small risk of surgical or anaesthetic mishap.

A further concern relates to exposure to the effects of ionizing radiation. Although it is generally felt that with modern techniques delivering a very low dose of radiation the risk is minimal (Baum, 1988), it can still be argued that mass screening exposes large numbers of women to an unnecessary risk.

It has also been suggested that screening itself subjects women to psychological stress, making them more aware of their vulnerability to breast cancer. In addition, between 5 and 10% of women screened are recalled for further investigations. Although the majority of these women will subsequently be found not to have cancer, their recall is likely to increase their anxiety further. In particular there is concern that since women coming forward for screening are asymptomatic, the subsequent discovery through screening
of suspicious areas, even if later found negative, may lead to ongoing worries that in future a cancer may be developing in the absence of symptoms. The indications from the limited research undertaken to date indicate that there is no general long-term increase in psychiatric morbidity as a result of screening and recall (Dean et al., 1986; Ellman et al, 1989). However, it is important to recognise that psychological distress, especially in the short term, may be present in the absence of psychiatric morbidity. Dean et al., working in Edinburgh, studied a group of women who had taken part in routine screening with normal results. The study was carried out 6 months after screening. Although no overall increase in psychiatric morbidity was found compared with a control sample, 8% of the screened group felt more anxious about developing breast cancer. 21% of the group were examining their breasts more than once a week, compared with the recommendation of monthly examinations.

2.3 Breast screening in the UK.

In the UK a multi-centre trial of early detection of breast cancer was started in 1979 involving two screening groups (Guildford and Edinburgh), two breast self-examination and four control groups. The first results were published in 1988 (UK Trial of Early Detection of Breast Cancer Group, 1988) and indicated a mortality reduction of 20% (when adjusted for differences in pre-trial rates) in the two screened populations compared
with control groups after 7 years. This result fell just short of statistical significance but was in line with the results of the HIP and Swedish studies.

In the meantime, a working group on breast cancer screening was set up in 1985 to consider the evidence concerning mass screening and to make recommendations concerning screening in the UK. The report of this working group (Forrest Report) was published in 1986 and recommended the implementation of a national screening programme for all women between the ages of 50 and 64. The recommendations have been accepted in principle by the present government but the resource implications (particularly in terms of trained personnel) are such that it will be several years at least before a national screening programme is in place.

3. STEREOTACTIC FINE NEEDLE ASPIRATION

3.1 Development and introduction.

As indicated above, one of the main disadvantages of mass mammography is the identification of large numbers of non-palpable lesions, many of which would not require surgery if adequate diagnostic techniques were available. Fine needle aspiration cytology (the drawing off of cellular material for cytological examination) has been a valuable tool in the management of palpable lesions for some time (Feldman & Covell, 1985) and in 1976 a stereotactic fine needle biopsy technique was developed in Sweden for sampling the tiny impalpable lesions being detected with mammographic screening (Nordenstrom et al,
This technique was quick (approx. 15 minutes), suitable for out-patient application and could be used for lesions as small as 2-3 mm. In Italy, Ciatto et al (1989) confirmed Swedish findings that by combining mammographic results with cytologic findings a significant reduction in the benign-to-malignant biopsy ratio could be achieved.

The studies published to date indicate that the diagnostic accuracy obtained with stereotactic fine needle aspiration of impalpable lesions is consistent with that of conventional fine needle aspiration of palpable lesions (Feldman & Covell, 1985), although the accuracy of sampling is particularly susceptible to levels of experience and expertise. Although published studies indicate no problem with false positive results, there are inevitably some cases of false negative results, hence the need to take account of radiological as well as cytological findings when the latter are inconclusive.

In the United Kingdom, stereotactic fine needle aspiration biopsy has recently been assessed in Edinburgh (Dent et al, 1989), although in this study the procedure was carried out pre-operatively and not as an aid to management of cases. At the Jarvis Screening Centre in Guildford a procedure based on that used by Andersson in Malmo (Andersson, 1990) has been in use since July 1989. The use of an average of two needle samples in this procedure contrasts with that in some other centres where up to 16 needle passes may be made. The procedure
involves the patient sitting at the mammograph apparatus with the breast held between two compression plates while a stereoscopic pair of films is taken at angles of +/- 15. The exact site of the area for sampling is determined by placing the stereoscopic images in a digitaliser, where the associated computer enables the coordinates in the x, y and z planes to be determined. This is linked with the needleholder, allowing insertion of the needle through the calculated point. An additional stereoscopic pair of films is taken to confirm the needle site from which the sample is taken, allowing any necessary adjustments to be made. Two cylindrical samples through the lesion are normally taken and the resultant material sent for cytological examination. The woman remains in the mammograph apparatus, keeping as still as possible, throughout this procedure which takes approximately 15 minutes. Both the radiological and cytological findings are discussed by a team of clinician, cytologist and radiologist before any management decisions are made.

3.2 Advantages and disadvantages.

A number of advantages may derive from the use of stereotactic fine needle aspiration as an aid to diagnosis. First, a reduction in biopsy rate can be achieved by identifying those cases where a clear diagnosis of a benign condition can be obtained. In these cases the women can quickly be reassured.
reduction in biopsy rate is of considerable advantage both from a psychological and medical viewpoint and is also likely to result in a significant financial saving. As well as reducing the benign to malignant biopsy rate, stereotactic fine needle aspiration can provide a much quicker diagnosis than conventional biopsy, with consequent benefits in terms of patient well-being and medical management.

A further major advantage is in the management of cases where the cytological examination gives a clear diagnosis of malignancy before surgery. Without this information it would usually be necessary for the women to have initial investigative surgery, followed by definitive surgery once the diagnosis of malignancy has been established. Dent et al (1989) point out that with a clear diagnosis before surgery a single, definitive operation may be carried out, allowing for appropriate preparation and counselling of the patient.

Samples deemed to be inadequate must be ignored and management decisions made on the basis of clinical and radiological findings. Women with highly suspicious radiological findings but inadequate cytological findings must be referred to a surgeon but this represents a much smaller group than would otherwise be referred.

The arguments against stereotactic fine needle aspiration cannot be totally separated from the arguments against mass screening, i.e. large numbers of women may be subjected to potentially stressful procedures when
only a very small proportion will be found to have malignant conditions. In addition to the stresses which may be entailed by the procedure itself, the women will be subjected to a period of acute anxiety while waiting for the results. A number of studies have indicated that for women finding a breast lump, the worst period is that between finding the lump and obtaining a diagnosis (Maguire, 1976; Jamison et al, 1978; Fallowfield et al, 1987). There are clear parallels here with women awaiting the results of cytological examination and it is reasonable to assume that for many women the period between carrying out the test and obtaining the result will be extremely stressful.

No studies have been published to date indicating women's reactions to the stereotactic fine needle aspiration procedure itself.

4. PREPARATION FOR AVERSIVE MEDICAL INTERVENTIONS

4.1 Theoretical considerations.

There is now a considerable body of research literature concerning the preparation of patients for surgery and other potentially aversive medical procedures by the use of various psychological techniques, including provision of information, psychotherapeutic, modelling, behavioural, cognitive-behavioural and hypnotic procedures. These interventions are generally based on the assumption that high levels of anxiety and fear will impede adjustment and recovery. Janis (1958) found a curvilinear relationship, with surgical patients with
moderate levels of pre-operative anxiety adjusting better than those with high or low pre-operative anxiety. Other research has failed to provide unambiguous support for this finding (Auerbach, 1980; Auerbach, Martelli & Mercuri, 1983; Johnson, Leventhal & Dabbs, 1971) and many researchers have assumed a more linear relationship, with high levels of anxiety seen as impeding adjustment and/or recovery. Auerbach, Martelli & Mercuri (1983) suggest that these contradictory findings may at least partly be accounted for by different patient samples. Subjects in their study were subjected to a short-term out-patient procedure, whereas Janis's subjects were inpatients with more serious medical conditions. Many of the techniques used in preparation for aversive medical procedures are aimed directly or indirectly at reducing levels of anxiety.

An alternative approach is based on the development of coping strategies, the assumption being that maladaptive coping strategies are more likely to lead to increased anxiety, anger or depression (Cohen & Lazarus, 1979). It has also been suggested that provision of appropriate coping techniques engenders a sense of control and that this may be central to the reduction of distress (Janis, 1958; Lazarus, 1966).

Reviews of the various intervention studies (Anderson & Masur, 1983; Cohen & Lazarus, 1979; MacDonald & Kuiper, 1983; Mumford, Schlesinger & Glass, 1982; Reading, 1979) indicate that most of the methods used can be effective, but that other factors such as patient
characteristics must be taken into account (Auerbach et al. 1976; Cohen & Lazarus, 1973, Miller & Mangan, 1983). Differences in patient samples and outcome measures also make comparison of these studies problematic.

4.2 Provision of information.

Volicer and Bohannon (1975), in an investigation of hospital-related stress experiences, found that lack of communication of information is perceived by patients as a major stressor, and it has been suggested that this lack of information may inhibit the use of appropriate coping strategies and lead to feelings of lack of control (Edelmann, 1990).

Two broad categories of information are discussed in the literature: procedural, i.e., a description of what is to happen, why, when and how, and sensory, an indication of what sensations might be expected both during and after the relevant medical intervention. Some studies have attempted to compare the effects of each type of information separately (Johnson, Morissey & Leventhal, 1973; Fuller, Endress & Johnson, 1978; Johnson, 1983) and there are some indications that sensory information is more helpful, but there are methodological difficulties in providing sensory information without a certain amount of procedural information. It is also possible that while each type of information may be beneficial, different mechanisms are involved and the choice of outcome measure may favour one type of information over the other.
Kendall et al (1979) investigated the combined effects of procedural and sensory information provision for patients undergoing cardiac catheterization and found better adjustment for those patients in the information group compared with an attention placebo and a standard hospital procedure control group. Other studies have indicated that provision of information may increase anxiety and that personal characteristics play an important part in determining the response to particular intervention packages. Miller & Mangan (1983) distinguished between information seekers (monitors) and information avoiders (blunters) and found that psychophysiological arousal in patients undergoing colposcopy examinations was lower when the level of preparatory information was matched to their personal style. Auerbach, Martelli and Mercuri (1983) considered preference for information (measured by the Information subscale of the Krantz Health Opinion Survey (Krantz et al, 1980)) and found that subjects with a high preference for information showed much better adjustment to dental surgery when they received specific as opposed to general preparatory information. Congruence between patient preference for information and information specificity was the best predictor of adjustment compared with locus of control and pre-operative anxiety, although anxiety level just prior to surgery was also a significant factor. This study also gave support to previous findings (Di Matteo, 1979) that the interpersonal relationship between the patient and health care provider
is an important factor in determining patient adjustment and satisfaction.

Fuller, Endress and Johnson (1978) looked at the role of provision of information in an aversive medical examination and found that preparatory sensory information reduced the number of observable distress behaviours and physiological response associated with a routine pelvic examination, although there was no significant difference in self-reported fear. Fuller et al suggest that sensory information mediates better coping with distressing situations through a reduction in physical reactivity, rather than an alteration in the cognitive experience of emotion. This disparity between physiological response and subjective arousal is in line with the findings of Miller and Mangan (1983), who found that high levels of information were associated with a reduction in physiological response but an increase in subjective arousal. This increase in subjective arousal found by Miller and Mangan, compared with no effect on self-reported fear in the Fuller et al study, may in part be accounted for by differences in emphasis in the presentation of information. Fuller et al laid emphasis on the description of the sensory experiences as being typical and normal, thus providing a degree of reassurance (although the beneficial effects may have been limited by the fact that many of the women had undergone a similar examination many times before). The role of reassurance was studied by Mokros (1977), who looked at the relative effects of reassuring sensory
information, reassuring procedural information (ie concerning the safety of the equipment and the procedure) and ordinary sensory information (what to expect). He found that a combination of reassuring and ordinary sensory information produced the least emotional response in patients undergoing gastroscopic examination.

Schultheis, Peterson and Selby (1987) suggest that there are two factors which have contributed to the conflicting findings on provision of information. First they refer to differences in the specific content of the sensory information. They found that some studies emphasised the disagreeable sensations while others gave a more neutral description. In some cases information may be phrased to give an impression that all patients will experience a disagreeable sensation, while others suggest that some patients may experience discomfort. The labels chosen to describe the experience may also be relevant. Second, there appeared to be a difference in effectiveness of sensory information relative to the particular medical intervention studied. Schultheis et al noted that patients undergoing short, diagnostic procedures generally appear to benefit from sensory information, while those undergoing surgery may display increased anxiety unless the sensory information is accompanied by some form of coping instruction.
SECTION 2 THE PRESENT STUDY

1. AIMS

Although there has been considerable research interest in the psychological effects of mastectomy and other forms of breast surgery there has been relatively little investigation of women's experience prior to surgery and even less of the screening process. Ellman et al (1989) looked at psychiatric morbidity among women recalled for further investigation after an abnormal screening result, compared with women attending for routine screening and women being investigated for specific breast symptoms. She found a slight but not significant difference in psychiatric morbidity between the routine and recall groups, but anxiety symptoms were much more common in women in the recall group. Three months later there was no significant difference between the two groups, and the results were comparable with those obtained for community samples of women in the same age range.

These results, together with those of Dean et al (1986), discussed earlier, go some way to answering concerns that the psychological costs of mass screening may outweigh the benefits of early detection in the small percentage of women found to have cancer. However these studies, like the majority of studies in the field of breast cancer, are concerned primarily with psychiatric morbidity, especially anxiety and depression, at the expense of other aspects of the women's experience. It
can be seen from earlier discussion that stereotactic fine needle aspiration can save many women much of the distress associated with surgical biopsy, either by avoiding surgery altogether or by allowing the surgeon to proceed with appropriate preparation and counselling of the patient. Against this must be offset any psychological distress caused by the procedure itself. With the introduction of this procedure it is increasingly important to obtain a wider understanding of women's reactions to the process of screening for breast cancer. The purpose of this study is to go some way towards meeting this need by an exploratory investigation of women's response to the experience of stereotactic fine needle aspiration.

In considering women's reactions to stereotactic fine needle aspiration it is important to take account of the overall context in which the technique is employed. This study investigated woman attending a clinic at the Jarvis Screening Centre in Guildford. In the majority of cases women attending the clinic will initially have gone forward for routine screening as part of an ongoing programme and as a result of that initial screen between 5 and 10% will have been recalled for further investigation. These investigations include repeat mammograms, followed if necessary by magnification mammograms and/or different views, together with clinical examination. By this stage the majority of women attending the clinic will have been cleared of any suspected malignancy. For those remaining, existing
anxiety levels will inevitably have been raised by the increasing probability that something genuinely suspicious has been found. Thus the performance of stereotactic fine needle aspiration and any anxiety or distress which may be caused by the procedure itself is overlaid by an increased awareness of personal vulnerability on the part of the patient.

In terms of the procedure itself, it is likely to be considered aversive by the majority of women. Most women will have experienced the insertion of needles into other parts of their anatomy, whether for injection or immunisation or for the withdrawal of blood for testing. Very few will have experienced insertion of a needle into the breast and so generally the procedure will be one to which it is not possible to bring the benefit of any previous experience of what might be expected or any indication of the sensitivity of breast tissue to such treatment. Thus there may well be high levels of initial anxiety resulting both from the overall context and the unknown and unusual qualities of the forthcoming procedure.

The first aim of this study was to explore women's subjective response to the procedure, both in terms of how distressing that procedure may be and also in terms of those aspects of the experience which reduced or contributed to that distress. The second aim was to consider the role of provision of information. Although the literature on provision of information is somewhat equivocal there are indications that provision of
appropriate information may be beneficial, particularly for short, diagnostic procedures. It was not feasible in this study to consider experimental manipulation of levels of information. All women were provided with some procedural and sensory information as a matter of routine at this clinic, although it was clear from preliminary discussions that the amount and level of information provided was varied in accordance with the clinician's judgement. The second aim of the study then was to examine the amount of information the women had and the extent to which they saw this information as affecting their response to the procedure.

Many potentially unpleasant procedures are carried out regularly as a matter of routine. By focussing attention on any one of these procedures it is possible for a distorted picture to emerge. Personal communications suggest that some workers in this field feel that the potential psychological distress caused by screening and subsequent further investigations may have assumed an undue importance not attributed to the procedures by the women themselves. A third aim of this study was to obtain a broader understanding of women's response to stereotactic fine needle aspiration by investigating the way it is perceived in relation to other medical procedures.

In summary then, this is an exploratory study with three main aims. First, to examine the women's subjective experience of stereotactic fine needle aspiration; second, to consider the role of provision of
information; and third, to look at the way in which women perceive the procedure in relation to other medical procedures.

2. METHOD

Approval was obtained from the Ethics Committee of the South West Surrey Health Authority to conduct this piece of research.

2.1 Subjects

All women undergoing stereotactic fine needle aspiration at the Jarvis Screening Centre, Guildford, between August 1989 and March 1990 were invited to take part in the study (91 women). Of these 75 agreed to take part. It was not possible to include 2 of these women in the study for practical reasons, giving a total sample of 73 women (80% of the total invited). The time between aspiration and interview ranged from 1 to 33 weeks, with a mean of 15 weeks.

2.2 Design

This research is based on both within and between group designs. For between group comparisons a number of different independent variables were identified based on initial analysis of the data. A number of dependent variables were used.
2.3 Materials

(i) Questionnaire 1 (see Appendix A)

This researcher-completed questionnaire consisted of three main categories of question: first, demographic information; second, questions concerning previous investigations for non-routine breast examinations; and third, questions regarding the outcome of the stereotactic fine needle aspiration and subsequent diagnosis and management.

(ii) Questionnaire 2 (see Appendix B)

This second researcher-completed questionnaire contained questions about the stereotactic fine needle aspiration procedure, including the provision of information and levels of satisfaction with that information.

(iii) Comparative Grid and Rating Scale (Appendix C)

The comparative grid and rating scale consisted of two parts which were completed by subjects under the guidance of the researcher. For the first part (the grid), subjects were asked to rate four different medical procedures on a 0-3 rating scale along ten dimensions. For the second part, subjects were asked to rate the same four medical procedures on a 0-10 scale for pain and for distress.

The four medical procedures were stereotactic fine needle aspiration, dental filling, smear test and blood test. The three comparison procedures were chosen, after
discussion with relevant professionals, on the basis of various properties which might be perceived as providing some similarity with the target procedure. Thus a blood test was chosen because it involves the insertion of a needle and the withdrawal of a substance from the body; a smear test is a procedure which may lead to the diagnosis of a cancer or precancerous state; a dental filling involves the patient in the use of technical apparatus, holding an uncomfortable physical position and potentially involves the patient in some degree of pain or discomfort from the procedure itself. All three procedures were likely to have been experienced by the majority of women in the subject group at some stage.

(iv) Krantz Health Opinion Survey (Information Sub-scale) (see Appendix D)

The Krantz Health Opinion Survey is a self-administered questionnaire developed by Krantz et al (1980) as a measure of preference for active involvement in health care. It consists of two sub-scales, one measuring preference for behavioural involvement (ie self-care and active participation) and one measuring preference for information. The Information Sub-Scale of the KHOS (KHOSI) was chosen for a number of reasons. The literature indicates that there are individual differences in preference for information in medical contexts and that these differences may affect response to medical procedures, either directly or in relation to the level of information provided. The KOHSI was
designed specifically to measure preference for information in a medical setting. It is short (7 items) and easy to administer. Normative scores are available for college populations (Krantz et al, 1980) and the available reliability data gives a Kuder Richardson 20 reliability of .76 and a test-retest reliability of .74 for the whole scale and .59 for the Information subscale. Validity data is available in Krantz et al (1980) and Auerbach, Martelli and Mercuri (1983).

(v) Card Sorts  (see Appendix B)

Subjects were asked to sort ten cards, each showing the name of a medical or dental investigation, viz.:-

- chest X-ray
- stereotactic fine needle aspiration
- ECG
- blood test
- dental examination
- barium enema
- smear test
- barium meal
- mammogram
- endoscopy

These investigations were selected as representative of the range of routine and specialised investigations most likely to be encountered by women in this age range, based on information from medical personnel and a small sample of women in the age range concerned. Each subject was shown the set of cards and asked to indicate any investigations which she had not personally experienced. For these cards a brief, standard explanation of the procedure was given. The card sort was administered in two parts.
(a) Subjects were asked to sort the cards into groups in any way which made sense to them. No constraints were placed on the number of groups or the number of cards in each group. Subjects were also asked to indicate the basis for their groupings.

(b) Subjects were asked to place the cards in order according to the perceived degree of unpleasantness of each procedure.

2.4 Procedure

All eligible subjects were contacted by letter from the Jarvis Screening Centre and invited to participate in the study. All those agreeing to take part were contacted by the author, who made an appointment to interview them either in their own home or at the Clinic, according to each woman's choice. At the interview the purpose of the study was explained in more detail, subjects were informed that participation was voluntary, that all identifying information would be treated as confidential and that the interview could be stopped at any stage should the subject so wish.

Each subject was first asked the information in Questionnaire 1. The order of administration of the remaining measures was randomised to control for any order effects.
3. RESULTS

Statistical analyses were carried out using the SPSSx computer package.

3.1 Demographic information

The main demographic information is given in Table 1. The mean age was 57.2, ranging from 47-75. 82.2% of the women were married and 56.2% were in full or part-time employment. Although the sample included women from the whole range of social class, classes 4 and 5 made up only 12.3% of the sample, with classes 1 and 2 making up 63%. This reflects the social class distribution of the geographical locality from which the sample was obtained.

3.2 Medical background

45.2% of the women had some previous experience of non-routine breast investigations (including recall from a routine screening). 20.5% had previously had a benign condition diagnosed and 1 subject had previously been diagnosed as having cancer. (It should be noted that in this and subsequent sections, diagnoses are based on the subjects' own understanding and information and not confirmed from medical records.) 73.6% attended the Clinic as a direct result of an abnormal result from a routine screening. 19.4% were being reviewed following recall from a previous routine screening and 6.9% had been referred from other sources.
The results of the stereotactic fine needle aspiration and subsequent outcomes are shown in Table 2.

Table 1. DEMOGRAPHIC DATA FOR SAMPLE

<table>
<thead>
<tr>
<th>AGE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Median</td>
<td>57 years</td>
</tr>
<tr>
<td>Range</td>
<td>47-75 years</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MARITAL STATUS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>single</td>
<td>4.1%</td>
</tr>
<tr>
<td>married</td>
<td>82.2%</td>
</tr>
<tr>
<td>divorced</td>
<td>6.8%</td>
</tr>
<tr>
<td>widowed</td>
<td>6.8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHILDREN</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>mean no.</td>
<td>2.06</td>
</tr>
<tr>
<td>none</td>
<td>13.7%</td>
</tr>
<tr>
<td>1 or more</td>
<td>86.3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EDUCATION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>school (14-16)</td>
<td>57.5%</td>
</tr>
<tr>
<td>school (17-18)</td>
<td>20.5%</td>
</tr>
<tr>
<td>college</td>
<td>15.1%</td>
</tr>
<tr>
<td>university</td>
<td>6.8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SOCIAL CLASS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>24.7%</td>
</tr>
<tr>
<td>2</td>
<td>38.4%</td>
</tr>
<tr>
<td>3</td>
<td>24.7%</td>
</tr>
<tr>
<td>4</td>
<td>8.2%</td>
</tr>
<tr>
<td>5</td>
<td>4.1%</td>
</tr>
<tr>
<td>Table 2. MEDICAL BACKGROUND OF SAMPLE</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Previous experience of non-routine breast investigations</td>
<td>45.2%</td>
</tr>
<tr>
<td>Previous diagnoses - malignant</td>
<td>1.4%</td>
</tr>
<tr>
<td>- benign</td>
<td>20.5%</td>
</tr>
<tr>
<td>Result of stereotactic fine needle aspiration</td>
<td></td>
</tr>
<tr>
<td>- malignant</td>
<td>6.9%</td>
</tr>
<tr>
<td>- benign</td>
<td>63.9%</td>
</tr>
<tr>
<td>- not clear</td>
<td>26.4%</td>
</tr>
<tr>
<td>- not yet known</td>
<td>2.8%</td>
</tr>
<tr>
<td>Outcome</td>
<td></td>
</tr>
<tr>
<td>Return to routine screening</td>
<td>21.1%</td>
</tr>
<tr>
<td>Review in 6-12 months</td>
<td>43.7%</td>
</tr>
<tr>
<td>Referral to surgeon followed by</td>
<td></td>
</tr>
<tr>
<td>- review</td>
<td>2.8%</td>
</tr>
<tr>
<td>- biopsy</td>
<td>28.2%</td>
</tr>
<tr>
<td>- mastectomy</td>
<td>1.4%</td>
</tr>
<tr>
<td>Diagnosis following surgery</td>
<td></td>
</tr>
<tr>
<td>- cancer/'precancerous''</td>
<td>8.3%</td>
</tr>
<tr>
<td>- benign</td>
<td>11.1%</td>
</tr>
<tr>
<td>- not sure</td>
<td>6.9%</td>
</tr>
<tr>
<td>- not yet known</td>
<td>2.8%</td>
</tr>
</tbody>
</table>
3.3 Subjective experience

The women's responses to Questionnaire 2 are set out in detail in Appendix F.

All the women had a reasonable understanding of why the stereotactic fine needle aspiration had been carried out, with 61% giving a detailed explanation. The main advantages were initially perceived as speedy diagnosis (49.3%) and possibly avoiding surgery (30.1%). Fewer women had thought there would be any disadvantages, with possible pain or discomfort being the most frequently mentioned (16.4%). 8.2% (6 subjects) said they had felt some concern about the effects of disturbing any malignant cells but only one of these women had mentioned this concern to the doctor.

No single aspect of the procedure emerged as being consistently worse than others. Pain or discomfort during the aspiration itself was the most frequently mentioned (15.1%), followed by pain from compression of the breast, maintaining an uncomfortable position and anxiety/tension (12.3% each).

Staff attitude was consistently rated as the best aspect of the procedure (61.6%). The qualities particularly appreciated were an open approach and caring and considerate behaviour. In addition, a further 15.1% felt that the best part was being kept well informed and feeling involved in decisions.

Most women felt they had about the right amount of information (procedural 91.8%; sensory 84.9%) and 94.5% found it very or quite helpful. 37% thought that being
kept informed of what was happening during the course of the procedure was particularly helpful. Aspects relating to provision of information are discussed more fully below.

Suggested improvements to the procedure centred mostly on reduced waiting times. 15.1% said they would have liked a quicker appointment, 27.4% would have liked less waiting at the clinic itself and 24.7% said they would have liked a quicker result.

All of the sample felt that the test was a reasonable one to expect women to undergo, although a small number (5.5%) expressed some reservations (e.g. "I suppose so if there's no other alternative except surgery").

3.4 "Unpleasantness" measure

An overall "unpleasantness" measure was obtained by factor analysis of responses to the comparative grid and rating scale. One principal factor was extracted for each of the four procedures and the main factor relating to stereotactic fine needle aspiration was used in subsequent analyses as a measure of perceived unpleasantness. Details of the factor analysis and comparison across the four procedures are given in Section F below.

Of the demographic variables, the only significant predictor of perceived unpleasantness was marital status, with married women obtaining higher "unpleasantness" scores than those who were not married including those
widowed or divorced (T=2.22, df=70, p=<0.05). There was no relationship between perceived unpleasantness and either medical outcome or length of time between aspiration and interview.

3.5 Provision of information

Scores on the Information subscale of the KHOS (KHOSI) covered the full range from 0-7 with a mean of 3.137 and a standard deviation of 2.11. This is lower than the norms quoted by Krantz et al (1980) for college students but more in line with that found by Auerbach, Martelli and Mercuri (1983) in a sample of dental extraction patients. The reliability of the scale was found to be 0.7362 (Krombach's Alpha). There was no correlation between KHOSI scores and rated "unpleasantness" of the stereotactic procedure.

The amount of procedural and sensory information recalled was assigned to categories by the author as shown in Appendix F. There was a small but significant correlation between time since aspiration and amount of information recalled (procedural information, r = .2061, p = <.05; sensory information, r = .2859, p = <.01). For subsequent analysis the categories were collapsed into two groups - minimal and good recall. These ratings, together with subjects' ratings of satisfaction with quantity of information and assessment of its helpfulness are shown in Table 3. Overall, there was greater satisfaction with the procedural information (p = <0.05), with 91.8% feeling the quantity was about right and 80.8%
finding it very helpful. For sensory information the level of satisfaction was a little lower, with 84.9% feeling the quantity was about right and 65.8% finding it very helpful. If the categories are collapsed into a simple helpful/not helpful distinction the difference for the two types of information disappears, with 94.5% rating both types of information as quite or very helpful.

There was no relationship between time since aspiration and satisfaction with information.

Table 3. INFORMATION RECALL AND SATISFACTION

<table>
<thead>
<tr>
<th></th>
<th>Procedural</th>
<th>Sensory</th>
<th>Z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount recalled -</td>
<td>%</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimal recall</td>
<td>26.0</td>
<td>58.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good recall</td>
<td>74.0</td>
<td>41.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantity -</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too much</td>
<td>1.4</td>
<td>0.0</td>
<td>1.9604</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>About right</td>
<td>91.8</td>
<td>84.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too little</td>
<td>6.8</td>
<td>15.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helpfulness -</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very helpful</td>
<td>80.8</td>
<td>65.8</td>
<td>2.2938</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Quite helpful</td>
<td>13.7</td>
<td>28.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not very</td>
<td>5.5</td>
<td>15.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at all</td>
<td>0.0</td>
<td>1.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
There was a significant relationship between amount of information recalled and both satisfaction with the quantity of information provided and degree of helpfulness (Table 4). (For the purpose of this analysis the rank order values for satisfaction with quantity and helpfulness were converted to expected normal scores following the procedure described by Bradley (1968).)

Table 4. Satisfaction with information in relation to amount of information recalled (minimal v good recall)

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity of information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- procedural</td>
<td>71</td>
<td>2.93</td>
<td>&lt;.005</td>
</tr>
<tr>
<td>- sensory</td>
<td>71</td>
<td>2.40</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Helpfulness of information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- procedural</td>
<td>71</td>
<td>3.82</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>- sensory</td>
<td>71</td>
<td>3.82</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

The relationship between amount of information recalled and scores on the KHOSI was analysed by T-Test. Those with good recall for procedural information had higher mean scores on the KHOSI (see table 5) but there was no significant difference for recall of sensory information.
Table 5. KHOSI scores for minimal v good recall of procedural information.

<table>
<thead>
<tr>
<th></th>
<th>mean</th>
<th>sd</th>
<th>df</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>minimal recall</td>
<td>2.053</td>
<td>1.957</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>good recall</td>
<td>3.518</td>
<td>2.044</td>
<td>71</td>
<td>2.72</td>
<td>&lt;.01</td>
</tr>
</tbody>
</table>

The relationship between KHOSI scores and satisfaction with information was also examined. Ratings were collapsed into two groups for each of the information satisfaction variables (satisfied/not satisfied with quantity of information; helpful/not helpful). The results were analysed using non-parametric analysis of variance owing to the small numbers in some groups. No significant difference between the KHOSI scores in relation to satisfaction with either procedural or sensory information was found.

Correlations between satisfaction with information and perceived unpleasantness of the procedure are shown in Table 6. There were small but significant correlations with quantity of sensory information and with perceived helpfulness of both sensory and procedural information, the largest correlation being with quantity of sensory information.
Table 6. Correlations between information variables and perceived unpleasantness

<table>
<thead>
<tr>
<th></th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quantity of information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>procedural</td>
<td>.1419</td>
<td>N/S</td>
</tr>
<tr>
<td>sensory</td>
<td>.3806</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>Helpfulness of information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>procedural</td>
<td>.2581</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>sensory</td>
<td>.2833</td>
<td>&lt;.01</td>
</tr>
</tbody>
</table>

3.6 Comparability

Mean ratings for the comparative grid and rating scale were analysed using the Friedman non-parametric analysis of variance (Table 7). The results indicate that stereotactic fine needle aspiration was seen as more similar to a dental filling than to a smear or blood test, especially in terms of painfulness, discomfort, distress and anticipatory anxiety. It was differentiated from a dental filling primarily in terms of it being a more frightening experience and one that is over and forgotten less quickly.

The grid and rating scale scores for each of the four medical procedures were analysed using principal component analysis. The loadings and Eigenvalue for the main factor for each procedure are given in Table 8. There is considerable common ground in the loading of
Table 7. FRIEDMAN ANALYSIS OF COMPARATIVE GRID

<table>
<thead>
<tr>
<th></th>
<th>Dental Filling</th>
<th>Smear Test</th>
<th>Stereo- tactic Test</th>
<th>Blood Chi Square</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.95</td>
<td>2.48</td>
<td>2.59</td>
<td>2.47</td>
<td>16.567</td>
</tr>
<tr>
<td>2.</td>
<td>1.89</td>
<td>1.46</td>
<td>1.81</td>
<td>1.11</td>
<td>25.191</td>
</tr>
<tr>
<td>3.</td>
<td>1.04</td>
<td>0.81</td>
<td>0.85</td>
<td>0.60</td>
<td>6.659</td>
</tr>
<tr>
<td>4.</td>
<td>1.66</td>
<td>0.73</td>
<td>1.48</td>
<td>0.85</td>
<td>35.509</td>
</tr>
<tr>
<td>5.</td>
<td>1.59</td>
<td>1.68</td>
<td>1.31</td>
<td>1.55</td>
<td>4.035</td>
</tr>
<tr>
<td>6.</td>
<td>0.05</td>
<td>1.32</td>
<td>0.51</td>
<td>0.04</td>
<td>47.252</td>
</tr>
<tr>
<td>7.</td>
<td>2.07</td>
<td>1.73</td>
<td>2.10</td>
<td>1.30</td>
<td>18.038</td>
</tr>
<tr>
<td>8.</td>
<td>0.64</td>
<td>0.51</td>
<td>0.95</td>
<td>0.25</td>
<td>14.801</td>
</tr>
<tr>
<td>9.</td>
<td>0.63</td>
<td>0.61</td>
<td>0.95</td>
<td>0.44</td>
<td>9.815</td>
</tr>
<tr>
<td>10.</td>
<td>2.43</td>
<td>1.85</td>
<td>2.29</td>
<td>1.51</td>
<td>26.674</td>
</tr>
<tr>
<td>Pain</td>
<td>4.51</td>
<td>2.11</td>
<td>4.29</td>
<td>1.63</td>
<td>59.945</td>
</tr>
<tr>
<td>Distress</td>
<td>3.60</td>
<td>2.34</td>
<td>3.90</td>
<td>1.25</td>
<td>38.699</td>
</tr>
</tbody>
</table>

Key.
1. The more you know in advance the better
2. An unpleasant experience
3. Not as bad as people might think (reverse score)
4. A painful experience
5. All right if you keep your mind on other things
6. It is embarrassing
7. Thinking about it beforehand is the worst bit
8. A frightening experience
9. Over and forgotten quite quickly (reverse score)
10. Involves a moderate degree of discomfort

the primary factor for each procedure with the items loading most heavily on these four factors being indicators of "unpleasantness". Taking 0.5 as a cut off, the factors for all four procedures load on Item 2 (an unpleasant experience), Item 4 (a painful experience)
Table 8. PRINCIPAL COMPONENT ANALYSIS OF COMPARATIVE GRID AND RATING SCALE

(for key to Item nos. see Table 7)

<table>
<thead>
<tr>
<th>Item</th>
<th>Dental Filling</th>
<th>Smear Test</th>
<th>Stereotactic Test</th>
<th>Blood Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>.02428</td>
<td>.03945</td>
<td>.03734</td>
<td>.00545</td>
</tr>
<tr>
<td>2.</td>
<td>.63202</td>
<td>.66584</td>
<td>.59826</td>
<td>.52123</td>
</tr>
<tr>
<td>3.</td>
<td>.40272</td>
<td>.20088</td>
<td>.40143</td>
<td>.22039</td>
</tr>
<tr>
<td>4.</td>
<td>.65259</td>
<td>.52582</td>
<td>.63713</td>
<td>.56278</td>
</tr>
<tr>
<td>5.</td>
<td>.00271</td>
<td>.00811</td>
<td>.00207</td>
<td>.00557</td>
</tr>
<tr>
<td>6.</td>
<td>.09091</td>
<td>.38904</td>
<td>.31434</td>
<td>.00515</td>
</tr>
<tr>
<td>7.</td>
<td>.24339</td>
<td>.21143</td>
<td>.13461</td>
<td>.25410</td>
</tr>
<tr>
<td>8.</td>
<td>.34398</td>
<td>.51381</td>
<td>.42606</td>
<td>.33199</td>
</tr>
<tr>
<td>9.</td>
<td>.09041</td>
<td>.29188</td>
<td>.41471</td>
<td>.14624</td>
</tr>
<tr>
<td>10.</td>
<td>.21107</td>
<td>.43111</td>
<td>.42121</td>
<td>.40646</td>
</tr>
<tr>
<td>Pain</td>
<td>.63435</td>
<td>.60619</td>
<td>.58054</td>
<td>.58338</td>
</tr>
<tr>
<td>Distress</td>
<td>.59136</td>
<td>.64674</td>
<td>.59989</td>
<td>.46392</td>
</tr>
</tbody>
</table>

Eigenvalue 3.9198 4.4924 4.5676 3.5067
% of var. 32.7 37.4 38.1 29.2

and the pain rating, with three of the four also loading on the distress rating. The main difference in the composition of the four factors lies in the relative weightings of the key items rather than in the items themselves. If the cut off point is lowered to .4 a clearer distinction emerges. Both the dental filling and blood test load at this level on five items, the smear test on six items and stereotactic fine needle aspiration on eight items. Thus the "unpleasantness" factor for this latter procedure is of a more multi-
faceted nature than the other procedures. Of the eight items loading at this level, seven are common to at least one of the other procedures, the distinctive item being Item 9, indicating that stereotactic fine needle aspiration is not over and forgotten quite quickly.

The mean ratings for the comparative grid were also subjected to correspondence analysis. Item 6 ("It is embarassing") was excluded from this analysis as it related significantly to the smear test only and grossly distorted the representation. The resultant plot, shown in Figure 1, reflects the pattern which emerged from the analysis of variance and again represents the stereotactic fine needle aspiration as being generally more similar to a dental filling but differentiated from the other procedures by being more frightening and less easily forgotten.
3.7 Card sort

Part 1 of the card sort (free sort into groups) was analysed using multiple scalogram analysis (MSA). Since interpretation for MSAs with large numbers of subjects is problematic, three separate MSAs were carried out using the first, middle and last 15 subjects respectively. The composite plot for the last 15 subjects is shown in
Figure 2. Those for the other two groups are given in Appendices G and H.

Figure 2  MSA on card sort of last 15 subjects

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>chest x-ray</td>
<td>6</td>
<td>stereotactic</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>ECG</td>
<td>7</td>
<td>blood test</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>dental examination</td>
<td>8</td>
<td>barium enema</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>smear test</td>
<td>9</td>
<td>barium meal</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>mammogram</td>
<td>10</td>
<td>endoscopy</td>
<td></td>
</tr>
</tbody>
</table>

Three main groupings emerge from the plot in Figure 2. Group 1 comprises dental examination, blood test, ECG and chest x-ray; Group 2 comprises smear test, mammogram...
and stereotactic fine needle aspiration; Group 3 consists of barium meal, barium enema and endoscopy. Examination of the data for each of the 15 subjects indicates that categorisation of the 10 procedures may be in terms of bipolar or continuous dimensions (eg. had/not had; routine/specialised; OK/unpleasant; invasive/non-invasive) or in discrete categories not related to other characteristics or dimensions (eg. cancer test; tests related to particular parts of the body or bodily functions). Subjects were not consistent in their method of categorisation, such that any one subject might use a combination of bi-polar dimensions, continuous variables or discrete categories in her sort, resulting in groupings which were not mutually exclusive. As a result of this, it is less easy to identify clear dimensions on the plot and more appropriate to describe the data in terms of characteristics of the groups.

Group 1 (dental examination, blood test, ECG, chest x-ray) is a loose group characterised primarily by being relatively familiar and not generally unpleasant. The routine/specialised dimension cuts across this group as does invasive/non-invasive. There is a small sub-group of chest x-ray and ECG characterised by being associated with the heart. The second group (smear test, mammogram and stereotactic fine needle aspiration) is characterised by comprising female tests, associated with cancer. The procedures in this group differ on the dimension of
routine/specialised but are generally seen as involving some degree of discomfort. Group 3 (barium enema, barium meal and endoscopy) is a tightly knit group of investigations characterised as being unfamiliar, specialised, unpleasant, invasive and connected with the digestive system.

The picture presented by the plots for the first and middle 15 subjects is very similar, with only two main points of difference. For the first 15 subjects (Appendix G) the association between the procedures in Group 1 is much looser. This group of subjects had a larger mean number of groupings and a larger number of single item groupings than the others (Table 9) and the procedures in Group 1 are those most frequently found in single item groupings.

Table 9. Mean number of groupings and "single item" groupings

<table>
<thead>
<tr>
<th></th>
<th>Mean no. of groupings</th>
<th>Mean no. of single item groupings</th>
</tr>
</thead>
<tbody>
<tr>
<td>First 15 subjects</td>
<td>4.3</td>
<td>2.0</td>
</tr>
<tr>
<td>Middle 15 subjects</td>
<td>3.3</td>
<td>0.73</td>
</tr>
<tr>
<td>Last 15 subjects</td>
<td>3.0</td>
<td>0.33</td>
</tr>
</tbody>
</table>

The plot for the last 15 subjects (Appendix H) is very similar to that in Figure 2 except for the relative position of the smear test. This group of subjects used the discrete categories of "cancer tests" and "female
tests" less frequently, thus weakening the major association between smear test and the remaining Group 2 items.

Part 2 of the card sort (order of unpleasantness) was analysed using the Friedman non-parametric analysis of variance and the mean rankings are given in Table 10.

Table 10. UNPLEASANTNESS RANKINGS

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Mean Rank</th>
<th>df</th>
<th>Chi Square</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>chest x-ray</td>
<td>1.95</td>
<td>9</td>
<td>434.205</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>blood test</td>
<td>3.37</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dental examination</td>
<td>3.63</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECG</td>
<td>3.99</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>smear test</td>
<td>4.57</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mammogram</td>
<td>5.16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>stereotactic fine needle</td>
<td>6.76</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>barium meal</td>
<td>7.63</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>barium enema</td>
<td>8.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>endoscopy</td>
<td>9.38</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The stereotactic fine needle aspiration is ranked 8th out of the ten procedures, with only barium enema, barium meal and endoscopy being ranked as more unpleasant. The order of ranking reflects very closely the three groupings shown on the MSA in Figure 2, with the four Group 1 procedures having the lowest ranks, followed by the Group 2 procedures and finally the Group 3 procedures.
4. DISCUSSION

4.1 Subjective experience

With a procedure of this nature it is clearly difficult to separate reaction to the procedure itself from reaction to the implications of diagnosis. In addition, the stereotactic fine needle aspiration formed only a part of what was for most of the women a long morning at the clinic, involving a number of mammographic x-rays, some of which were themselves painful, and a clinical examination. During this time they usually saw other women arrive and leave again with satisfactory results. The women's responses must to some extent be seen as reflecting these factors.

The women in this sample were generally well informed about the reasons for undertaking the procedure and were able to see clear personal benefits as likely to accrue, particularly in terms of a quick diagnosis and possible avoidance of surgery. The majority did not anticipate any significant disadvantages and no single factor emerged as being consistently unpleasant. Just over half the women mentioned some aspect of physical discomfort or pain as being the worst part of the experience. The procedure takes approximately 10-15 minutes and interview data suggests that this can seem a very long time indeed. Staff attitude was clearly seen as an important variable in mediating the experience. This is consistent with similar findings by Di Matteo (1979) and Auerbach, Martelli and Mercuri (1983). Two
main aspects of staff attitude emerged as significant: a caring approach with recognition and acknowledgement of the women's anxieties; and active involvement of the women by provision of clear explanations, opportunities to see x-rays etc.

The main concerns centred on waiting times, whether for the initial appointment, waiting at the clinic itself or waiting for the results. This is very much in line with other research which has indicated that the period between finding a breast lump (ie the first indication that there is a possibility of breast cancer) and diagnosis is particularly stressful (Maguire, 1976, Jamison et al, 1978, Fallowfield, 1987). 42% of Jamison's subjects reported this period as being even more stressful than subsequent surgery. For some women this period of anxiety began on receipt of the recall letter, while for others it was not until after attendance at the clinic. It is certainly important to recognise that even a carefully worded recall letter may be taken by the recipient as an indication that she is thought to have cancer.

There was considerable variation in women's perception of the degree of unpleasantness of the procedure but marital status emerged as the only demographic variable with which it was associated. The finding that married women report higher unpleasantness ratings is perhaps surprising since it might be expected that they would enjoy better social support than the single, widowed or divorced. It is possible that this
finding is a reflection of the potential interpersonal significance of the diagnosis for this group.

There is no doubt that for the majority of women in this study, attendance at the recall clinic and the subsequent performance of stereotactic fine needle aspiration was a stressful experience. However, as discussed below, the results suggest that it is the implications of the possible diagnosis rather than features of the procedure itself which is the main focus of concern. Given the particular context, all the women felt that stereotactic fine needle aspiration was a reasonable test to expect women to undergo.

4.2 Provision of information

The range of scores on the KHOSI indicated considerable variation in preference for information. However, there was no relationship between KHOSI scores and perceived unpleasantness of the procedure. Auerbach, Martelli and Mercuri (1983) found that patients with a high preference for information showed better adjustment when given specific rather than general information and vice versa and this would lead to the expectation that with a standard level of information provision there would be a difference in adjustment between those with a high or low preference for information. The absence of any such finding can perhaps be explained by the fact that this study did not incorporate any control over the provision of information. Discussion with the clinician and observation by the author indicated that the quantity and
style of provision of information, particularly procedural, was varied in accordance with clinical judgement. Good judgement in terms of matching quantity and style to personal preference would be expected to counter any differences in adjustment which might otherwise have occurred. This is supported by the finding that there was no significant relationship between KHOSI scores and satisfaction with information, a relationship which would have been expected if a standard information format had been used.

The finding of a significant relationship between amount of information recalled and satisfaction with information is not a surprising one. The present study does not, however, shed any light on whether those who recall more information subsequently rate themselves as more satisfied with it or whether those who find the information helpful and appropriate remember more of it.

Although the majority of women expressed satisfaction with the quantity and helpfulness of both procedural and sensory information, there was slightly less satisfaction with the latter. Sensory information has been identified by a number of studies as being of importance in adjustment, particularly to short term outpatient diagnostic procedures (Johnson, Morrissey & Leventhal, 1973; Fuller, Endress & Johnson, 1978; Johnson, 1983; Mokros, 1977). In this study satisfaction with quantity and helpfulness of sensory information were correlated with lower ratings of perceived unpleasantness. There was a similar correlation with
helpfulness of procedural information but not with quantity. It is possible that this latter difference reflects individual variations in the extent that women are able to use procedural information to mediate their experience. It is important to bear in mind that these correlations, while statistically significant, are not large and account for only a small proportion of the variance.

4.3 Comparison with other medical procedures

Analysis of the comparative grid and rating scale again suggests the importance of the potential diagnostic implications when looking at stereotactic fine needle aspiration in relation to other medical procedures. The stereotactic procedure and dental filling were differentiated from smear test and blood test in terms of painfulness, discomfort, distress and anticipatory anxiety. Thus smear tests and blood tests appear to be seen as fairly routine and not involving much discomfort. Although the stereotactic procedure was seen as sharing a number of the characteristics of a dental filling, the dimensions on which it differed - being more frightening and not quickly over and forgotten - suggest that it may be the implications of the diagnosis that are of particular importance. The suggestion that factors over and above the physical discomfort of the procedure are of importance is supported by the factor analyses of the four procedures. Using the principle factor for each procedure as a primary measure of unpleasantness, this
factor loaded significantly on eight variables for the stereotactic fine needle aspiration compared with five or six for the other procedures. This suggests that for the former, unpleasantness is multifaceted and not simply related to physical discomfort.

It is interesting to compare the stereotactic procedure with a smear test, which also carries with it the possibility of diagnosis of cancer or a precancerous state and has been generally regarded as an aversive procedure (Magee, 1975; Osofsky, 1967; Fuller, Endress & Johnson, 1978). However, the results of this study suggest that compared with stereotactic fine needle aspiration a smear test is not approached with the same degree of anticipatory anxiety and is over and forgotten more quickly. This can perhaps be explained by two factors. First, mass screening for cervical cancer has been available for some considerable time and most women in this study will have experienced a number of smear tests, generally with negative results. Thus it will have been experienced in the main as a routine checkup with no particular expectation of positive results. In addition, it is probable that most of the women will be aware that a smear test can detect precancerous changes long before any malignancy may develop and that such changes can be treated with expectations of complete success. In contrast, stereotactic fine needle aspiration is not part of a routine check up (as mammography may be), but is only used when there are other suspicious findings. In addition, the women may
hold less optimistic expectations of cure and the methods of treatment may well be perceived differently.

The card sorts were included in this study to gain a broader understanding of the comparative perception of stereotactic fine needle aspiration and other medical investigations and to consider the ways in which women conceptualise and differentiate such procedures. Three main groupings emerged from the free card sort. Group 1 was a fairly loose group comprising blood test, chest x-ray, ECG and dental examination. Group 2 comprised smear test, mammogram and stereotactic fine needle aspiration, with smear test being less closely associated with the other two. Group 3 was a very close knit group comprising barium meal, barium enema and endoscopy. The most common criteria for sorting were a number of dimensions which can be summarised as routine/specialised, "had"/"not had" and OK/unpleasant, together with some discrete categories which often cut across these dimensions, notably cancer tests, female tests or tests relating to particular parts or functions of the body. This mix of sorting criteria meant that no clear dimensions could be identified which reliably differentiated between the three groups of procedures, although some trends were evident. Group 1 procedures were in the main seen as less unpleasant and more routine than those in group 3, with group 2 procedures occupying an intermediate position with considerable intra-group variation on these dimensions. This trend is supported
by the results of the second card sort, where the rank orderings according to degree of unpleasantness follow closely the progression from group 1 procedures through group 2 to group 3. Groups 2 and 3 were also characterised by the use of discrete categories, notably relating to parts or functions of the body or the type of illness suspected. It is the use of these discrete categories which appears to account for the relative tightness of these two groups compared with group 1, for which no discrete characteristics common to the whole group emerged. Thus it seems that the relationship between the various procedures listed on the cards is a function of the interaction of two factors: first the identification of discrete characteristics, especially if common to the whole group, which increases cohesiveness; and second, the use of bipolar or continuous dimensions which may serve either to unite members of the group or to differentiate them. This is particularly evident in Group 2 (smear test, mammogram and stereotactic fine needle aspiration), where the uniting characteristic features are female tests relating to cancer (with a subgroup of tests relating to the breast) whereas the dimensions of routine/specialised and OK/unpleasant tend to cut across the group, weakening the association.
4.4 Implications for interventions and future research

The results of this study carry a number of implications for the development of services involving stereotactic fine needle aspiration. In terms of physical discomfort, the stereotactic fine needle aspiration was not seen as significantly worse than the average dental filling. However, there are other factors which contribute to its unpleasantness which appear to relate more to the diagnostic implications than to the characteristics of the procedure itself. For many women the arrival of the recall letter signals the start of a period of stress and anxiety which continues at least until the results are known. It is clear that for most women some degree of stress and anxiety is inevitable but this can be mediated by a staff approach based on recognition of the woman as an individual. The approach at the clinic used in this study was frequently compared very favourably with that found in a typical hospital out-patients department. As well as a considerate and caring approach, provision of information was clearly appreciated by the women. Although this study does not contribute new understanding to previous research findings on provision of information, the results are compatible with those findings and suggest that clinical judgement in matching level of information to individual preference can contribute to high levels of satisfaction. The results also suggest that special consideration should be given to the sensory information provided,
since this has been identified as being of particular benefit for short, diagnostic outpatient procedures (Schultheis et al, 1987). In this study, satisfaction with sensory information was slightly lower than for procedural information. In this context it is important to bear in mind Schultheis et al's comments on the importance of the content as well as the quantity of sensory information, which were discussed earlier.

The main aims of this study were to examine women's subjective experience of stereotactic fine needle aspiration, to consider the role of provision of information and to compare perception of that procedure with other medical investigations. The first of these aims was to some extent limited by the decision not to interview women at the time the procedure was undertaken. In addition, in order to include as large a group of subjects as possible, some women were interviewed up to 6 months after their clinic visit. However, time between clinic visit and interview had no effect on perceived unpleasantness.

The extent to which the role of provision of information could be examined was limited since it was not feasible in this study to control for this variable. Although it would appear that the use of clinical judgement in determining the extent and nature of information given has worked effectively at this clinic, one potential line of further research would be to compare this approach with standardised information formats. This is one area that appears to be missing
from the voluminous literature on provision of information.

The approach to the comparative aspects of this study was guided less directly by previous research, since this seems to be relatively uncharted territory. Time constraints and a limited supply of subjects meant that it was not feasible to carry out a full pilot study and the instruments used, in particular the comparative grid, could usefully be refined in the light of the results of this study. The method of administration of the card sort procedure used in this study contrasts with that adopted in some other studies (eg Crassna, 1989) by allowing a totally free sort with no constraints. Crassna asked her subjects to sort cards into two groups such that membership of one group precluded membership of the other. Each subject was allowed up to three separate sorts. While this method undoubtedly eases analysis and interpretation of the results, it does not identify the way in which subjects naturally conceptualise and categorise. The present study indicates that when given no artificial constraints, subjects do not categorise in terms of mutually exclusive characteristics but use a combination of bipolar or continuous dimensions and discrete categories.

The free card sort highlighted the difficulties which are often encountered in balancing the desire to obtain rich and ecologically valid material with the use of artificial constraints which clarify collection and
interpretation of the data but may not give a clear picture of the way subjects function in their daily lives. Despite the limitations described above it is hoped that this study gives a clearer picture of the subjective experience of stereotactic fine needle aspiration and the way in which it is perceived in relation to other investigative medical procedures.
REFERENCES


Crassna, M.


Edelmann

Ellman


Krantz,


Mokros, K.L. (1977)


PART A

1. Date of birth
2. Age
3. Marital status
   i. Single
   ii. Married
   iii. Divorced
   iv. Widowed
4. Occupation
5. Level of education
   i. Left school at 14-16
   ii. Full-time until 18
   iii. College beyond 18
   iv. University
6. Partner's occupation
7. Children in full-time education
8. Have you previously had any investigation of suspected breast abnormalities?
   i. Clinical examination
   ii. Mammogram
   iii. Ultrasound
   iv. Fine needle aspiration
   v. Other
   vi. None
9. What were the results then?
   i. No abnormality
   ii. Abnormality (not malignant)
   iii. Abnormality (malignant)
   iv. Don't know
10. What were the results of the needle test carried out at the Jarvis Centre?
    i. Cancer present or probable
    ii. Benign - no cancer present
    iii. Not clear
11. Who gave you the results of the test?
   i. Jarvis Centre
   ii. G.P.
   iii. Surgeon

12. What was the outcome?
   i. All clear, normal 3-yearly review
   ii. Earlier review
   iii. Referral to surgeon and
       a. review
       b. biopsy
       c. mastectomy

13. Did you have any additional treatment?
   i. Return to routine screening programme
   ii. Outpatient review
   iii. Radiotherapy
   iv. Chemotherapy
PART B

1. Why do you think the fine needle aspiration was done?

2. What did you think would be the advantages of the procedure?

3. What did you think would be the disadvantages of the procedure?

4. What was the worst thing about the procedure itself?

5. What was the best thing about the procedure itself?

6. What information was given to you about
   (a) the procedure, i.e. what was going to be done
   (b) how you would feel, i.e. what sensations to expect at the time or afterwards.

7. Do you think the information you had about the procedure was
   (a) too much
   (b) about right
   (c) too little

8. Do you think the information you had about the procedure was
   (a) very helpful
   (b) quite helpful
   (c) not very helpful
   (d) not at all helpful

9. Do you think you had enough information about how you would feel?
   (a) too much information
   (b) about right
   (c) too little information
10. Do you think the information you had about how you would feel was
   (a) very helpful
   (b) quite helpful
   (c) not very helpful
   (d) not at all helpful

11. Was there any type of information you felt was particularly helpful?
   (a) knowing why it was being done
   (b) knowing what was going to be done
   (c) being kept informed of what was happening during the procedure
   (d) knowing what sensations to expect
   (e) other
   (f) none

12. Do you think there was anything that could have been done to make the experience better?

13. Do you think it was best to carry out the test immediately or would you have preferred the opportunity to come back on another day?
   (a) immediately
   (b) another appointment

14. Do you think this is a reasonable test to expect women to undergo?
0 = Don't agree/ doesn't apply  
1 = Disagree slightly  
2 = Agree generally  
3 = Agree strongly

<table>
<thead>
<tr>
<th>Dental Filling</th>
<th>Smear Test</th>
<th>Stereo Procedure</th>
<th>Blood Test</th>
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The more you know in advance the better for you
It is an unpleasant experience
It is not as bad as people might think
It is a painful experience
It is all right if you keep your mind on other things
It is embarrassing
Thinking about it beforehand is the worst bit
It is a frightening experience
It is over and forgotten quite quickly
It involves a moderate degree of discomfort

Please rate each of the above procedures on a 10-point scale in terms of (a) how painful and (b) how distressing you consider each to be.

/ / / / / / / / / / /  
0: at all  
5: moderately  
10: extremely

<table>
<thead>
<tr>
<th>Painful</th>
<th>Distressing</th>
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<td>Dental filling</td>
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<td>Smear test</td>
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<td>Stereo procedure</td>
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<td>Blood test</td>
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PART D (K.H.O.S.I.)

1. I don't usually ask the doctor or nurse many questions about what they're doing during a medical examination. AGREE/DISAGREE

2. I'd rather have doctors and nurses make the decisions about what's best than for them to give me a whole lot of choices. AGREE/DISAGREE

3. Instead of waiting for them to tell me, I usually ask the doctor or nurse immediately after an examination about my health. AGREE/DISAGREE

4. I usually ask the doctor or nurse lots of questions about the procedures during a medical examination. AGREE/DISAGREE

5. It's better to trust the doctor or nurse in charge of a medical procedure than to question what they are doing. AGREE/DISAGREE

6. I usually wait for the doctor or nurse to tell me the results of a medical examination rather than asking them immediately. AGREE/DISAGREE

7. I'd rather be given many choices about what's best for my health than to have the doctor make the decisions for me. AGREE/DISAGREE
PART E

1. First Sort

Please sort these cards into groups in any way that makes sense to you.

(CHEST X-RAY, ECG, DENTAL FILLING, SMEAR TEST, MAMMOGRAM, STEREOTACTIC FINE NEEDLE ASPIRATION, BLOOD TEST, BARIUM ENEMA, BARIUM MEAL, ENDOSCOPY)

2. Second Sort

Please sort these cards into order according to the degree of unpleasantness of the procedure.

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
APPENDIX F

1. Why do you think the fine needle aspiration was done?

   - Inaccurate explanation: 0%
   - Minimal explanation: 38.4%
   - Detailed explanation: 61.6%

2. What did you think would be the advantages of the procedure?

   - Re-assurance/confirmation that all OK: 12.3%
   - Diagnosis: 26.0%
   - Speedy diagnosis: 49.3%
   - Avoiding surgery: 30.1%

3. What did you think would be the disadvantages?

   - Probable pain/discomfort: 16.4%
   - Possible effect of disturbance to cells: 8.2%
   - Concern about the results: 5.5%
   - Fear of needles: 2.7%

4. What was the worst thing about the procedure itself?

   - Problems inserting the needle: 6.8%
   - Pain/discomfort from insertion of needle: 9.6%
   - Pain/discomfort from aspiration of cells: 15.1%
   - Keeping still: 11.0%
   - Uncomfortable position: 12.3%
   - Pain from compression of breast in machine: 12.3%
   - Anxiety/tension: 12.3%
   - Other: 6.8%
   - None: 13.7%
5. What was the best thing about the procedure itself?
   - Staff attitude: 61.6%
   - Being kept informed/feeling involved: 15.1%
   - Interesting: 2.7%
   - Immediate availability: 2.7%
   - Other: 17.8%

6. What information was given to you about (a) the procedure and (b) how you would feel?
   (recall assigned by the author into the following categories)
   - (a) none recalled: 8.2%
   - inaccurate: 1.4%
   - minimal: 16.4%
   - average: 31.5%
   - detailed: 42.5%
   - (b) none recalled: 12.3%
   - inaccurate: 0%
   - brief: 46.6%
   - detailed: 41.1%

7. Do you think the information you had about the procedure was
   - too much: 1.4%
   - about right: 91.8%
   - too little: 6.8%

8. Do you think the information you had about the procedure was
   - very helpful: 80.8%
   - quite helpful: 13.7%
   - not very helpful: 5.5%
9. Do you think the amount of information you had about how you would feel was
   too much 0%
   about right 84.9%
   too little 15.1%

10. Do you think the information you had about how you would feel was
   very helpful 65.8%
   quite helpful 28.8%
   not very helpful 4.1%
   not at all helpful 1.4%

11. Was there any type of information you felt was particularly helpful? (more than one answer accepted)
   knowing why it was being done 12.3%
   knowing what was going to be done 11%
   being kept informed of what was happening during the procedure 37%
   knowing what sensations to expect 5.5%
   other 24.7%
12. Do you think there was anything that could have been done to make the experience better?

- Local anaesthetic 5.5%
- Reduced waiting at clinic 27.4%
- Comfier surroundings 12.3%
- Quicker appointment 15.1%
- Changes to invitation letter 9.6%
- Quicker results 24.7%
- Other 15%

13. Do you think it is best to carry out the test immediately or come back another day?

- Immediately 97.3%
- Another day 2.7%

14. Do you think this is a reasonable test to expect women to undergo?

- Yes 95.9%
- Yes (with some reservations) 4.1%
- No 0%
Criteria for assignment to categories

Question 6(a)

Inaccurate - a significant misunderstanding of the procedure

Minimal - a sketchy description excluding major aspects of the procedure

Average - a reasonable description incorporating the major aspects of the procedure, i.e. the taking of mammographic x-rays; the calculation of the exact site; the taking of a needle sample for analysis.

Detailed - a description including greater detail than that required for the "average" category, e.g. a description of the localisation procedure incorporating the concept of computerised calculation of the site or the determination of co-ordinates from information from films taken at two different angles etc.; the taking of a second pair of films to check the position of the needle in the site; or similar level of additional detail.
Question 6 (b)

Brief - recall of one item of sensory information
Detailed - recall of two or more items of sensory information

Criteria for collapsing of categories

6(a) minimal recall = none, inaccurate, minimal
   good recall = average, detailed

6(b) minimal recall = none, inaccurate, brief
   good recall = detailed.
### MSA on card sort of first 15 subjects

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<thead>
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<tr>
<td>1</td>
<td>chest x-ray</td>
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<tr>
<td>2</td>
<td>ECG</td>
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<tr>
<td>3</td>
<td>dental examination</td>
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<tr>
<td>4</td>
<td>smear test</td>
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<td>5</td>
<td>mammogram</td>
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<td>6</td>
<td>stereotactic</td>
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<td>7</td>
<td>blood test</td>
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<tr>
<td>8</td>
<td>barium enema</td>
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<td>9</td>
<td>barium meal</td>
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<td>10</td>
<td>endoscopy</td>
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## MSA on card sort of middle 15 subjects

<table>
<thead>
<tr>
<th></th>
<th>Procedure</th>
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<tr>
<td>1</td>
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<td>5</td>
<td>mammogram</td>
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IS THE LEITER INTERNATIONAL PERFORMANCE SCALE A USEFUL TOOL FOR THE CLINICAL NEUROPSYCHOLOGIST?

An exploratory investigation into the clinical utility of the LIPS in a neuropsychological rehabilitation setting
ABSTRACT

Acquired severe brain injury may result in impairments which render the use of many standardised neuropsychological assessment tools impossible or problematic. The heavy reliance of many assessment tools on relatively intact language skills, whether receptive, expressive or both, poses particular problems. This study comprises an exploratory investigation of the clinical utility of the Leiter International Performance Scale (LIPS) as a tool for the neuropsychological assessment of people with acquired brain injury, with particular reference to those for whom verbally-mediated assessments are inappropriate.

The main aims of the study were to investigate, through examination of the literature and a series of case studies, the range of cognitive skills assessed by the LIPS compared with the Raven's Standard Progressive Matrices (SPM); to investigate what additional qualitative information may be obtained from the LIPS compared with the SPM; to consider the extent to which any additional qualitative and quantitative information contributed to the development of a rehabilitation programme in the cases examined; and to examine the correlation between scores obtained on the LIPS and the SPM in the cases examined.

Subjects were ten residents taking part in a neuropsychologically oriented rehabilitation programme. Assessment with the LIPS and SPM took place as part of routine initial or repeat assessment procedures.
The LIPS was found to provide information on a wider range of cognitive skills than the SPM, although there were difficulties with interpretation and quantification of the data obtained. A greater amount of qualitative information was recorded during administration of the LIPS. In the ten cases studies, it was found that the qualitative and quantitative data from the LIPS were used to a greater extent to assist in clinical decisions regarding the planning of individual rehabilitation programmes. However, there were a number of significant limitations in the interpretation of this information, which are discussed. In the two cases where it had been possible to administer the Wechsler Adult Intelligence Scale-Revised (WAIS-R), it was not felt that there was any significant additional information gained by using the LIPS. However, where administration of the WAIS-R was not possible, it was felt that within the limitations identified, the LIPS could provide information which the clinician could use to guide further investigation and in planning rehabilitation programmes. Comparison of IQ scores obtained from the LIPS and the SPM showed that in these ten case the LIPS IQ was always lower, with considerable individual variation. Doubts were raised about the validity of the LIPS IQ score as an indicator of overall intellectual functioning in subjects with acquired brain injury.
INTRODUCTION

Neuropsychological assessment

Neuropsychology has been defined as the branch of psychology that focuses on relationships between brain functions and behaviour (Sohlberg and Mateer, 1989). An important aspect of the work of neuropsychologists in clinical settings is neuropsychological assessment. Lezak (1983) describes some of the many different reasons for carrying out neuropsychological assessments, including “to aid in diagnosis; to help with management, care and planning; to evaluate the effectiveness of a treatment technique; to provide information for a legal matter; or for research” (p.98). As she goes on to point out, an understanding of the reasons for assessment in any individual case is essential in order for the neuropsychologist to know what kind of information to seek. Assistance in diagnosis, once the most widely recognised role for the neuropsychologist, is decreasing in importance with the advent of advanced scanning techniques. The growth of brain injury rehabilitation services has placed an increasing emphasis on assessment to help with management, care and planning, including the development and evaluation of rehabilitation programmes.

Patients referred for rehabilitation are known to have brain injury, and in many cases the nature and extent of the injury may be relatively well documented. What is required of the neuropsychologist is not an answer to the question “does this person have a brain injury?”, but an understanding of how the injury impacts on cognitive
functioning and other behaviours, together with indications of how the problems identified may be addressed. Cohen and Mapou (1988) describe the purpose of neuropsychological assessment in a rehabilitation setting as the determination of "what cognitive strengths and deficits, along with sensory and motor impairments, underlie a patient's ability to function adaptively and independently" (p. 12). To this might be added an understanding of the individual's psychological status, since this can significantly impact, both on performance during assessment and on response to rehabilitation. Lezak (1983) comments that neuropsychological examinations "cannot be adequately conducted nor can test scores be properly interpreted in a psychological or social vacuum" (p. 4). She argues that in addition to psychometric skills and an understanding of the human nervous system and its pathologies, the neuropsychologist must have a range of clinical skills, which enable him or her to understand and take into account a wide variety of different types of information which may be relevant in interpreting individual performance. This information is not usually available from the test scores alone, and Lezak argues that both qualitative and quantitative evaluation is essential. Qualitative information can provide important clues to both neurological and non-neurological factors which may be affecting an individual's performance.

Since the concept of brain injury carries with it the implication of impairment of functioning, neuropsychological assessment has traditionally adopted the paradigm of deficit measurement. This involves comparison of present performance with some notion of what might constitute a normal performance in the absence of brain injury. The latter is generally established by using normative data relating to particular
assessment tools, in conjunction with information about, or estimates of, the individual’s premorbid level of functioning. This approach enables the examiner to say something about a patient’s current level of functioning and the extent to which it may differ from expected performance. Whilst this information is useful, its limitations must be recognised. Leaving aside questions of validity and reliability, which apply to all assessment measures, there are a number of specific limitations which impact significantly on interpretation of assessment results. First, it must be recognised that test behaviour cannot be directly equated with real-life performance. Tryon (1979) refers to the “test-trait fallacy”, in which performance is confounded with ability. It has long been recognised that some individuals with known brain injury can perform very well in most formal assessments, which are usually highly structured, but may have enormous difficulty in functioning at a concomitant level in their domestic or work situations. Equally, some individuals who do very poorly on conventional neuropsychological assessments, manage to cope surprisingly well in their everyday environment.

Secondly, performance on many, or most, tests involves several different areas of cognitive functioning. The test score alone, will give no indication of the reasons for poor performance and can, at times, be positively misleading. For example, a low score on a memory test will provide no useful information on memory functioning, if the subject had difficulty attending to the material in the first place. This issue is of particular significance in interpreting results of tests which were not designed with brain-injured subjects specifically in mind. In such cases, (and indeed with many specially designed assessment tools) test items were not constructed in accordance
with models of neuropsychological functioning and cannot be seen as “pure” measures of any particular aspect of functioning. Many test items require the subject to draw on a range of different cognitive skills for satisfactory performance. Quantitative information alone will not enable the neuropsychologist to draw any useful conclusions on the nature of any underlying deficits. Poor performance on the WAIS-R Block Design, for example, may result from various visuo-spatial problems, constructional apraxia, difficulties in planning and organisation or extreme motor slowing (Lezak, 1983, pp. 285-286). Observation and recording of the qualitative aspects of the performance can help tease out the different strands (Kaplan, 1983). Qualitative information can also be used to indicate deficits in areas of functioning which are not directly assessed by the task in question. It is quite possible to pass a test, while doing so in a manner that is highly suggestive of organic impairment, and which can indicate avenues for further investigation.

The death knell of psychometric deficit measurement as the main focus of neuropsychological assessment in rehabilitation settings is sounded by Sohlberg and Mateer (1989), who argue that “mere tabulations of deficits as defined by particular psychometric tests need to be replaced by descriptions of behavioural and cognitive strengths and weaknesses, statements about practical implication of the cognitive profile and guidance in therapeutic intervention” (p.65). Qualitative data, obtained by direct observation of behaviour during interview and assessment, can be used in ways which go beyond assisting in the interpretation of test performance, and can be particularly pertinent in a rehabilitation setting. Sohlberg and Mateer include in this
category behaviours such as affective presentation; capability for self-regulation; response to distraction; communicative abilities; and indications of levels of insight.

Lezak (1983) points out that the range of qualitative observations which can be made is restricted by the nature and format of the test. Multiple choice tests, or those using automated response modes, do not generally allow for any detailed observations of behaviour except where these are exceptionally bizarre. In general, qualitative data from such assessments may be restricted to what can be deduced from analysis of error patterns or from any extraneous behaviours.

**Choice of assessment tools**

Cohen and Mapou (1988) argue that in rehabilitation settings particularly, a more fruitful approach is grounded in the single case investigation methodology developed by Luria (1966) and incorporating a hypothesis testing approach rather than the use of fixed assessment batteries (Lezak, 1983; Walsh, 1978; 1985). On this basis, the examiner forms certain hypotheses based on his or her professional knowledge of neuropathology and cognitive neuropsychology, and on initial information about the individual, and tests these out, progressively refining the hypotheses in the light of information obtained during assessment. This will most often be done by the use of an initial "core" assessment battery, supplemented as necessary by tests appropriate to the particular hypotheses in question. Whilst individual neuropsychologists will have their own personal preferences for a core test battery, certain patterns are generally adopted. Use of ready-made neuropsychological test batteries is not common in the UK.
most wide-spread approach is the use of a broad measure of intellectual functioning, usually the Wechsler Adult Intelligence Scale-Revised (WAIS-R), supplemented by a range of assessments looking at more specific areas of functioning. On the basis of performance on the "core" battery, hypotheses may be developed which require further investigation.

The WAIS-R

The WAIS-R consists of eleven sub-tests, which between them can provide quantitative information on a wide range of cognitive skills. The sub-tests make up two separate scales, the verbal scale consisting of six sub-tests and the performance scale of five sub-tests. It is this breadth which makes the WAIS-R so useful as a neuropsychological assessment measure, as it not only permits comparison of present and estimated pre-morbid levels of functioning, but allows comparison of performance on the verbal and performance scales, as well as comparisons between different sub-tests within each scale. The nature of the test, and of its administration, also provides rich opportunities for gathering a substantial body of qualitative information on the performance of individual subjects. As a result of the widespread use of the WAIS-R for neuropsychological assessment purposes, a large body of literature has been developed which helps the clinician in evaluating and interpreting both the quantitative and qualitative data obtained (e.g. Lezak, 1983).

Administration of the WAIS-R to subjects with acquired brain injury may at times be problematic, or even impossible. Use of some or all of the performance scales may be
hindered by sensory or motor deficits, often associated with brain injury. Deficits in receptive language may affect administration of most of the sub-tests in either scale, and expressive language difficulties may make it impossible to administer any part of the verbal scale. Where use of the WAIS-R is substantially compromised by such factors, neuropsychologists will often wish to use another test of general intellectual functioning. One test which is widely available, and which can be used with patients with impairments of language and all but the most severe motor deficits, is Raven’s Progressive Matrices

Raven’s Progressive Matrices

Raven’s Progressive Matrices (RPM) has been described as “a series of visual pattern matching and analogy problems pictured in nonrepresentational designs. It requires the subject to conceptualize spatial, design and numerical relationships ranging from the very obvious and concrete to the very complex and abstract” (Lezak, 1983, p.502). Raven himself described it as “a test of a person’s capacity to form comparisons, reason by analogy and develop a logical method of thinking, regardless of previously acquired information” (Raven, 1948, pp.12-13). There are three forms of the matrices, the Standard Progressive Matrices (SPM), most widely used for adult populations, the Coloured Progressive Matrices (CPM), designed for use with young children and with adults with impairments which affect their ability to grasp the nature of the instructions, and the Advanced Progressive Matrices (APM), for use with those of above average ability levels.
Like the WAIS-R, Raven's Progressive Matrices were not designed for neuropsychological populations, but there is a growing body of literature on their use in this field and Court and Drebning (1990) provide a useful overview. Much of the work centres on the role of visual perceptual abilities, and in particular of unilateral visual neglect, on RPM performance. The multiple choice format of the RPM lends itself readily to analysis of position preferences in responses. Court and Drebning, summarising work done in this area, note that position preference has usually been found to be more frequent and more severe in right hemisphere lesions than left, and comment that this has often been attributed to the influence of unilateral neglect, which is more common following right hemisphere lesions. Campbell and Oxbury (1976) found that evidence of neglect on RPM performance could be detected even when it was no longer evident from drawing and copying tasks. Various studies describe methods which have been undertaken in an attempt to reduce the effect of neglect by rearranging test presentation (e.g. Gainotti et al., 1986; Piercy and Smyth, 1962; Derenzi et al., 1965). Court and Drebning (1990) argue that while these techniques may help minimise the effects of neglect on RPM performance, they remain inadequate, and scores of subjects with significant position preferences "should not be interpreted as an unequivocally valid measure of intellectual ability".

There has been less study of the effect of other right hemisphere functions on performance and Court and Drebning comment that only one study has controlled for the confounding influence of neglect. Basso et al. (1973), after partialing out the effects of neglect and aphasia, found a significant relationship between both visual pattern discrimination, and ability to adopt a categorical attitude, to RPM performance,
suggesting that successful performance on the RPM involves functions located in both hemispheres.

The effect of aphasia on RPM scores has also attracted much attention. Aphasics have been found to obtain lower scores than non-aphasics in a number of studies (e.g. Boller and Vignolo, 1966; Ulatowska et al., 1983; Villardita, 1985). Studies comparing aphasics with non-aphasic left-hemisphere damaged subjects have produced conflicting results. Basso et al. (1973) and Gainotti et al. (1986) found lower scores among their aphasic subjects, whereas Boller and Vignolo did not find such an effect. In reviewing a range of studies, Court and Drebning (1990) indicate that the type of aphasia is particularly relevant, with those including auditory comprehension deficits affecting RPM performance more significantly than those with purely expressive deficits. Again, research findings seem rather contradictory, and some studies (Archibald et al., 1967; Kertesz and Hooper, 1982) found that only in global aphasia was a significant difference evident, suggesting that the relevant factor is not the auditory comprehension deficit, but the complete impairment of language functioning. Court and Drebning conclude that it is not yet possible to say whether the relationship between aphasia and RPM performance is a representation of diminished intellectual functioning or the confounding effect of specific impairment of linguistic ability.

Work by Zaidel and Sperry (1973; 1981) with commissurotomy patients looked at the role played by each of the two cerebral hemispheres. Their work suggests that either hemisphere can be used to solve the RPM, but each does so in a very different way, with the left hemisphere tending to use verbalisation and sequential reasoning skills,
and the right using a more “gestalt” approach. It was found with commissurotomy patients, that performance was relatively impaired compared with normal controls, suggesting that in the intact brain performance is enhanced by interhemispheric integration. This concept of dual competency is supported by work by Villardita (1985), who found that performance on items involving most analogic reasoning was particularly disrupted by left hemisphere damage, whereas items that did not draw heavily on analogic reasoning were most affected by right hemisphere damage. An additional factor found to affect RPM performance is constructional apraxia (e.g. Arrigoni & De Renzi, 1964; Kertesz & Hooper, 1982) and Costa et al. (1969) found an association between apraxia and position preference scores, regardless of which hemisphere was affected.

Court and Drebning (1990) found only limited information on RPM performance within particular neuropsychological populations, and the role of frontal lobe functioning, so often affected by closed head injury, had not been investigated. Lezak (1983) suggests that the frontal lobe functions of initiation, planning and self-monitoring are less likely to be required in performance on the RPM than on some other tasks, due to the relatively structured format. Nevertheless, one might expect that some types of frontal lobe impairment would affect performance on the more complex and abstract items, where conceptual and hypothesis testing skills and goal management come into play and where working memory becomes a more significant factor. Carpenter, Just and Snell (1990) found a significant correlation between performance on RPM and the Tower of Hanoi puzzle (a test requiring forward planning and goal management skills). The also found that “lesioning” the goal
management component of a computer simulation of superior performance on the Advanced Progressive Matrices, resulted in a greater number of errors. They concluded that a major source of individual differences in the RPM derives from the ability to generate and maintain goals in working memory. Since generation and maintenance of goals is an ability that is generally regarded as related to frontal lobe functioning, it seems likely that impairment of this region will affect performance on the more complex RPM items.

The RPM has a number of limitations to its use as part of a neuropsychological assessment. Since both hemispheres, and a number of different regions of the brain, have been implicated in its performance, it is of little use in its standard format for localisation purposes, at least without detailed analysis of the pattern of errors. In addition, the association of impaired performance with a number of different factors such as visual field defects, unilateral neglect, aphasia and apraxia, can make interpretation of the results in terms of intellectual functioning problematic. A third limitation is that the multiple-choice format does not readily lend itself to the collection of qualitative data, the importance of which has already been discussed. Finally, while RPM performance can be related to a number of different cognition functions, including visual-perceptual skills, praxis, reasoning and concept-formation, the format does not readily allow the clinician to evaluate performance according to these different dimensions.

This latter limitation stems from the very basis on which RPM was developed, and what it is that it actually measures. This has been the subject of some considerable
debate. The test manual and associated material refers to RPM as a measure of Spearman's eductive ability (Raven, Court & Raven, 1983) and it has been widely regarded as one of the best measure of g. This view has been challenged by others, who argue that multiple factors are involved, and the debate continues. The intentionally unimodal nature of the RPM, whilst an attractive feature for some purposes, is a disadvantage in terms of any form of programme planning, for school as well as neuropsychological populations (Mills, Ablard & Brody, 1993). There have been attempts to break down the cognitive processes involved in solving the matrices, often by considering the different items as measuring simple perceptual abilities, simple analogies and those requiring complex analysis. Raven (1995) believes that this approach has not proved satisfactory. He argues that perception and reasoning represent a continuum, rather than discrete processes, and that perception inevitably involves conceptual activity. Thus he sees the different items in the RPM as measuring different levels of cognitive ability, rather than different types of ability. It is not the purpose of this paper to evaluate these differing views in detail. Suffice to say that the concept of measuring a "pure" general intellectual ability is of very limited interest to the rehabilitation neuropsychologist, who needs to know more about the process than the product.

More recently, research has begun to focus on this "process". Carpenter, Just and Snell (1990) recorded the eye fixation patterns and verbal comments of subjects attempting the APM, and concluded that subjects induced the rules governing item solution on an incremental basis, and that that the number of rule tokens affected the error rates. However, they argued that the presence of a larger number of rule tokens
does not so much affect the processes that induce the rules, but the goal management processes “that are required to construct, execute and maintain a mental plan of action during the solution of those problems” (p410). Whilst these findings are clearly of relevance to the clinical neuropsychologist, they are of limited use in individual assessment. The study was carried out using the Advanced Progressive Matrices, which would not normally be used with a clinical population. Whilst the general findings are still relevant, the proportion of complex problems in the CPM and SPM is considerably reduced, indicating that it may be necessary to identify those items placing the heaviest burden on goal management skills in order to interpret the results. However, as indicated above, there may be many other factors affecting performance in clinical populations, and it may be any of these, rather than goal management deficits, which affects the performance of any particular individual. Whilst this is true of other tests such as the WAIS-R, the structure of some tests makes it easier to tease out the relevant factors.

Another area of investigation is from the field of special education, where process, rather than simply product, is again of importance in determining remedial approaches. Watts (1985) refers to work by Feuerstein and his colleagues (Feuerstein, 1979; Feuerstein et al., 1980) in assessing and teaching learning disabled children using the Learning Potential Assessment Device (LPAD), which includes the SPM or CPM among its measures. Feuerstein conceives of assessment as a dynamic process, involving active examiner participation, in which specific “deficient cognitive functions” (DCFs) are identified and temporarily remedied in the process of the interaction between the examiner and subject. This is presumably similar to the
testing the limits" approach adopted by many clinical neuropsychologists and described by Lezak (1983). Feuerstein's LPAD approach requires a great deal of time and specific training on the part of the examiner, and Watts (1985) investigated the possibility of using Feuerstein's deficient cognitive functions as the basis for post hoc error analysis of the RPM. Feuerstein envisaged the cognitive act as encompassing three information processing phases, involving input, elaboration and output. Watts created operational definitions of some of the DCFs at the input and elaboration stage, and used these to analyse errors on RPM. Watts acknowledges that additional DCFs can be observed using Feuerstein's original clinical approach, but suggested that these could be better observed on other instruments in the LPAD battery. Using a sample of 12 subjects on whom LPAD assessments had been completed, Watts rescored the SPM data using the operational definitions and then rank ordered subjects according to the degree of deficiency at the input and also at the elaboration phase. He compared these results with a rank ordering of the original full LPAD data and found a correlation of .93 (Spearman) for the "input" data and .52 (p<.05) for the "elaboration" data. Whilst the correlation for "elaboration" may be statistically significant, it still leaves a large amount of variance unexplained, particularly as Watts found that DCFs at the elaboration phase occur almost twice as often as those at the input phase. Watts concluded that this method might be particularly beneficial in terms of evaluation of groups of subjects.

Whilst this approach may prove an interesting area for further research involving adult neuropsychological populations, it is not known to what extent Feuerstein's DCF's,
and the identification of RPM distracter items in these terms, is applicable to this client group.

In summary, RPM has a number of drawbacks in terms of its usefulness to the rehabilitation neuropsychologist. It is not, at present at least, possible to use the data to draw up any description of relative cognitive strengths and weaknesses, severely restricting its usefulness in determining an individual rehabilitation programme. Performance is affected by damage to either hemisphere and to various areas of the brain, but there is little opportunity to tease out the relevant contributions of different impairments without exhaustive analysis of error patterns. The opportunity for qualitative evaluation is severely limited. Finally, there is some evidence that the client group for whom the RPM is most likely to be selected rather than the WAIS-R, i.e. those with dysphasia, may be particularly disadvantaged compared with subjects without language impairment.

The Leiter International Performance Scale

Another test of general intellectual ability, which requires no expressive or receptive language for its administration, is the Leiter International Performance Scale (LIPS). The LIPS has been widely used in the intellectual assessment of the deaf and with people with learning disabilities who have impairments of language. The scale covers the age range from 2 to 18 years, rendering it potentially useful for an adult population, although no normative data is available for adults. There are four sub-tests per year up to the age of 10, and then four per two years to the 18-year level, which consists of 6
tests. Scoring provides for calculation of a “mental age” which can then be converted to an IQ. The materials consist of a wooden frame with eight stalls, together with a stimulus strip and a number of wooden blocks for each sub-test. Each strip depicts a number of stimulus items which, when the strip is placed on the frame, align with the empty stalls. The blocks for each test depict the various response items and, in some cases, distracter items. The subject’s task is to place each block in the stall corresponding to the appropriate stimulus item. Test items range from simple matching at the two year level, to complex reasoning by analogy at the higher levels, and include completion of sequences (with only the first and last stimulus items depicted), block designs and a range of tasks involving spatial imagery.

The LIPS has a number of attractions for the neuropsychologist working with clinical populations. Administration of the test requires no receptive or expressive language, such that it can be administered even to those with global aphasia. For much of the test, only gross motor skills are necessary, i.e. the ability to push a block into a designated stall or to clearly indicate to the examiner the target stall. (The block design tests require some degree of fine motor skills, especially on the later items, and may need to be omitted in some cases.) With the exception of the later block design items, all tests are untimed, such that subjects with either motor or cognitive slowing are not, generally, disadvantaged. However, the nature of the test provides rich opportunities for gathering qualitative information regarding the individual’s approach to tasks and response to cognitively challenging situations. Previous clinical use by the author suggests that the test is generally attractive to the subject, an observation shared by Ratcliffe and Ratcliffe (1979).
There are, however, a number of drawbacks to its use with an adult neuropsychological population. As already mentioned, there are no normative data for adults, with the manual suggesting that all subjects over 13 should be scored according to the 13 year norms. No information is therefore available regarding the effects of age on test performance for adults. A second difficulty is the limited validity data. There have been a number of validations studies comparing the LIPS with other, more widely used, assessments such as the Stanford Binet and the Wechsler Scales (see Ratcliff & Ratcliff (1979) for a review of validity findings). However, these studies mainly involve children, and most have only small sample sizes, often from very specific client groups. Compared with the Stanford Binet, LIPS IQs were generally found to be lower, especially for higher ability subjects. Correlations with the Wechsler scales (WISC) were mostly in the high .70s, although correlations with the WISC Verbal Scale were generally lower. Again, individual cases revealed a tendency for LIPS IQs to be a little lower than those obtained from the WISC, although this was less marked than with the Stanford Binet. These results suggest that the LIPS may be scaled too low, despite Leiter's (1952) adjustment of 5 IQ points to counter this tendency.

Literature search has not revealed any studies comparing the LIPS with either the WAIS or WAIS-R, and the only reported comparisons with Raven's Matrices (CPM) were with hearing impaired children (Musgrove & Counts, 1975; Ritter, 1976), where correlations of .65 and .79 were found. Ratcliff and Ratcliff (1979) suggest that the lower average scores on the LIPS, found in the various validation studies, may result
partly from standardisation weaknesses in the LIPS, but also from the “all or none” scoring system. A subject may place 6 of the 8 blocks correctly, demonstrating an understanding of the nature of the task, but if the remaining two blocks are transposed for whatever reason, no credit is given. This is particularly relevant at the higher end of the scale, where each sub-test is worth six-months credit.

Although the LIPS has been used quite widely with some client groups, a search of the literature has not revealed any studies in which it has been used for neuropsychological assessment. Thus there is no body of information on which to draw in interpreting LIPS performance following brain injury, nor any information on the effects on performance of impairments such as those known to affect the RPM. Black (1973) used the LIPS with children with either acquired or developmental aphasia, and concluded that that the LIPS was adequately reliable for use with aphasic children. However, this study concerned itself primarily with test-retest reliability and did not compare performance of aphasic and non-aphasic children.

The LIPS, like the Wechsler Scales, is multi-dimensional, making use of a range of different cognitive tasks. Whilst this is one of its strengths as a potential neuropsychological assessment tool, it is also a weakness in that satisfactory performance on many of the tasks requires a number of very different cognitive skills. Whilst the experienced examiner may be able to use qualitative information to help identify the reasons for difficulty on any task, this will not be evident from the scores alone. Unlike the WAIS/WAIS-R, there are no separate norms for individual sub-tests, since the LIPS is designed on the basis of a developmental progression. For this
reason, Levine et al (1975) developed a clinical profile to assist in the interpretation of LIPS results. Levine and his colleagues categorised each of the various sub-tests according to the skills necessary for problem solution, using three basic assumptions: that the LIPS involves skills contingent upon visual perception; that the basic and all encompassing variable encountered throughout the LIPS is the principle of belongingness; and that motor aspects of the LIPS are merely executive. Their paper gives no indication of the basis on which Levine and his colleagues reached their conclusions regarding component skills. There does not appear to have been any attempt at factor analysis or other formal methodology. It seems that the profile has been developed on the basis of inspection of the items and description of the skills thought to be involved. Thus it amounts to little more than a systematic presentation of the kind of evaluation which might be made by any competent practitioner. Since many of the sub-tests draw on a number of cognitive skills for satisfactory completion, individual tests may appear in different sections of the clinical profile, and it remains for the examiner to use clinical judgement to tease out which of the skill areas may be deficient when a subject fails an item.

These drawbacks to the use of the LIPS for neuropsychological assessment are substantial, and it would certainly not be the tool of choice where the Wechsler Scales could reasonably be administered. However, given the limitations to the use of Ravens Progressive Matrices for the neuropsychologist interested in developing individual rehabilitation programmes, the LIPS is of potential interest in those situations where administration of the WAIS-R is not appropriate. As a measure of overall intellectual ability, the results must be treated with caution. Validity studies involving children

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suggest that the LIPS may underestimate IQ compared with more established scales. In addition, there is no body of literature concerning the effects of brain injury, and in particular of acquired aphasia, on LIPS performance. Nevertheless, the range of cognitive skills assessed, and the opportunity for qualitative evaluation of performance, suggest that the LIPS may have some value in rehabilitation settings, where process is of particular importance.
2. THE PRESENT STUDY

2.1 Aims

The purpose of the present study was to conduct a preliminary investigation into the clinical utility of the Leiter International Performance Scale as a tool for the neuropsychological assessment of patients in a brain injury rehabilitation setting, with particular reference to those for whom verbally-mediated assessments are inappropriate. Clinical utility, in this context, may be defined as a combination of the provision of additional information not readily available from other sources; the usefulness of such information in planning rehabilitation programmes; and the cost-effectiveness of the tool in relation to other tools and the preceding factors. In order to assist in determining clinical utility, information obtained from the LIPS was compared with that obtained from Raven’s Standard Progressive Matrices (SPM).

The specific aims were:

1. To examine, through a series of case studies, whether information covering a wider range of cognitive skills can be obtained from the LIPS compared with the SPM in assessment of subjects with acquired brain injury.

2. To examine what additional qualitative information may be obtained from the LIPS compared with the SPM.

3. To consider the extent to which this additional qualitative and quantitative information contributed to the development of a rehabilitation programme in the cases examined.

4. To examine the correlation between scores obtained on the LIPS and the SPM in the subjects examined.
5. To consider the relative costs of the LIPS and the SPM in time and money.

2.2 Hypotheses

As this is an exploratory study, hypotheses have not been formulated for the full range of areas to be investigated. Two hypotheses have been formulated on the basis of the author's previous clinical experience with both the LIPS and the SPM, and a review of the literature:

1. Data obtained from the LIPS will provide specific information on a wider range of cognitive skills than that obtained from the SPM.
2. Observation of performance on the LIPS will provide a wider range of qualitative information than that obtained from observation of performance on the SPM.

2.3 Method

2.3.1 Subjects

The subjects were all residents admitted for assessment and/or rehabilitation to a community-based rehabilitation unit catering for adults with acquired brain injury. All residents requiring initial assessments between December 1994 and July 1995 were included in the study, together with two residents requiring routine reassessment. Information obtained from two former residents assessed in June/July 1994 was also included. A total of ten subjects were included in the study.
2.3.2 **Design**

This research is an exploratory study based on a series of individual case studies, with appropriate grouping of data.

2.3.3 **Materials**

Standard, commercially available forms of the Leiter International Performance Scale and of Raven's Standard Progressive Matrices were used. Raven's Coloured Progressive Matrices was used with one subject.

2.3.4 **Procedure**

Assessments for the purpose of this study were all carried out as part of routine initial or repeat neuropsychological assessments. In addition to the two measures used in this study, additional neuropsychological assessment measures were also administered in accordance with normal practice and clinical judgement. Assessments were all carried out either by the author (a chartered clinical psychologist employed at the unit concerned) or an assistant psychologist, under the overall direction and supervision of the clinical psychologist. The same tester completed both parts of the assessment for each individual.

Assessments took place in a quiet room on the unit. Assessments generally took place over a number of sessions, varying in length from half to one hour each, according to clinical judgement of each subject's capacity for sustained effort. The Raven's SPM was always completed within one session. The LIPS was generally administered over a number of sessions. Each test was administered in accordance
with the standard instructions. In the case of one subject, the instructions for the SPM were given in Portuguese, by an interpreter. The order of administration of the two tests in each case was determined by clinical convenience and the time available within a session.

Qualitative observations were recorded contemporaneously during each assessment and further comments were noted where appropriate from direct observation of the results. Observations were not made according to any preconceived criteria, but were confined to the kinds of observations normally made by the assessors as part of ordinary clinical practice.
3. RESULTS

3.1 Demographic information

A total of 10 subjects took part in the study. Demographic information is given in Table 1. Eight subjects were male and two female. Ages ranged from 23 to 55 and time between injury/illness and current assessment ranged from 6 to 31 months. One subject had a global aphasia; five had some degree of dysphasia; one a mild nominal dysphasia; one was anarthric and used a communication aid; and two had no known impairment of language. Time between injury and assessment ranged from 6-12 months for initial assessments, and 11-31 months for reassessments.

<table>
<thead>
<tr>
<th>Subject no.</th>
<th>sex</th>
<th>age</th>
<th>diagnosis</th>
<th>language impairment</th>
<th>time since injury or illness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>44</td>
<td>Closed head injury</td>
<td>dysphasia</td>
<td>24 months</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>23</td>
<td>Closed head injury</td>
<td>limited English</td>
<td>12 months</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>47</td>
<td>Ruptured anterior communic. artery aneurysms</td>
<td>mild nominal dysphasia</td>
<td>7 months</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>32</td>
<td>Closed head injury</td>
<td>dysphasia</td>
<td>11 months</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>49</td>
<td>Closed head injury</td>
<td>dysphasia</td>
<td>6 months</td>
</tr>
<tr>
<td>6</td>
<td>M</td>
<td>35</td>
<td>Closed head injury</td>
<td>dysphasia</td>
<td>9 months</td>
</tr>
<tr>
<td>7</td>
<td>M</td>
<td>29</td>
<td>Closed head injury</td>
<td>anarthria</td>
<td>31 months</td>
</tr>
<tr>
<td>8</td>
<td>M</td>
<td>45</td>
<td>Closed head injury</td>
<td>dysphasia</td>
<td>8 months</td>
</tr>
<tr>
<td>9</td>
<td>M</td>
<td>50</td>
<td>Right CVA</td>
<td>none</td>
<td>7 months</td>
</tr>
<tr>
<td>10</td>
<td>M</td>
<td>55</td>
<td>Left CVA</td>
<td>global aphasia</td>
<td>10 months</td>
</tr>
</tbody>
</table>

3.2 Assessment results - case studies

Results of the assessments, including a discussion of the quantitative and qualitative information gained, and the usefulness of this information in formulating plans for rehabilitation, is given in the individual case studies.
MT is a 44 year old man admitted for further rehabilitation 14 months after sustaining a severe closed head injury, resulting in left extra-dural haematoma and left fronto-temporal contusions. Prior to his accident, MT had been employed as a laboratory technician. He had left school at 16 with no qualifications, and background information suggested he may have been dyslexic. MT was severely dysphasic, with receptive abilities a little better than expressive, if presented within a clear context. The severity of his dysphasia made formal assessment and interpretation of results problematic. Yes/no responses were unreliable. None of the verbal items from the WAIS-R could be administered. Shortly before admission he had been assessed using Raven’s SPM, with a score of 24 (25th percentile). Informal assessment had indicated that he could match pictures, words, letters, numbers and colours, but there appeared to be difficulties with object recognition. On admission, MT frequently misused objects during his morning routine and domestic activities, suggesting a visual object agnosia. Assessment suggested a moderate impairment of memory, although only memory for visual material could be assessed. Further assessment of perceptual abilities showed that MT could accurately match even complex visual information, and was able to perform well on tests of spatial perception. On the WAIS-R, he had some difficulties with block design, initially tending to arrange the blocks outside the 2x2 format, although he was able to self-correct and achieved an age-scaled score of 8. He did much worse on the object assembly task, where he obtained a scaled score of 1, and this and other tasks suggested his main difficulty was in converting visual information into a meaningful whole. For example, on a concealed cubes test
(VOSPB), he was able to count the visible faces on the cubes, but not to determine the number of whole cubes. Other test results indicated rigidity of thinking and some perseveration, indicative of frontal lobe impairment.

The LIPS was not available at the time of MT's initial assessment, but was used as part of a reassessment 24 months post-injury. On the LIPS, MT obtained an adjusted age score of 9 years 1 month, giving a LIPS IQ of 70. The basal year was seven and a combination of pass/fails was obtained for years 8 to 12. His clinical profile from the LIPS indicated:

- spatial imagery problems
- visual acuity poor on fine discrimination
- difficulty with more complex perceptuo-constructional tasks (block designs)
- possible weakness on quantitative discriminations (but confounded by spatial imagery/perceptual problems on same tasks)
- genus matching weak

Qualitative observations indicated the following:

- shows awareness when having difficulty
- does not generalise a correct solution
- uses a trial and error approach on many tasks
- does not check spontaneously
- able to make corrections when prompted to check
- has difficulty organising block designs into square shape
- unable to identify some objects depicted pictorially
- perseverates on unsuccessful attempts
- slow
- has difficulty grasping the nature of some tasks
- perseveres even when having difficulty
- sustains concentration

On Raven's SPM, MT obtained a score of 32, giving an IQ of 97 using Peck's conversion. Qualitative observations were:
- no signs of impulsivity in decisions
- very slow

The SPM gave very limited information beyond the score itself, and the score composition was very close to that expected. The difference in scores between the SPM and the LIPS is very marked. Performance on the LIPS showed very clear difficulties with perceptual/constructional tasks and with genus matching. Since these two areas contribute very significantly to the final score, weaknesses in these areas will have a disproportionate effect on that score.

The information from the LIPS profile was used in a number of ways. The impairments on perceptual/constructional tasks had already been explored during previous assessment, so no further investigation was necessary. The possible weakness in quantitative discriminations was investigated further and no significant problems were found, confirming that difficulties on this task resulted from the perceptual impairments already described. Visual acuity was tested by an ophthalmologist and
new glasses were prescribed, but this was not considered to have been a significant factor in MT’s overall performance, since his new prescription was not substantially different. MT’s poor performance on genus matching tasks had to be interpreted with caution in the light of his known difficulties with object recognition, a factor which was also indicated by qualitative observation.

The qualitative information indicated a number of possible approaches to rehabilitation. MT did not spontaneously check his responses, but was able to identify errors when prompted to check. This suggested that he would benefit from a programme aimed at encouraging the habit of spontaneous checking in everyday activities such as money management and self-medication. His tendency to perseverate on responses which were clearly not producing the desired result, suggested that instruction in simple problem-solving strategies may be beneficial, although this approach was constrained by MT’s severe dysphasia. The need for such strategies was also indicated by his tendency to a trial and error approach. His difficulties in generalisation indicated that he would need to systematically practise new skills in a variety of different situations. MT’s awareness when he was having difficulty with a task, and his ability to sustain concentration and to persevere in the face of difficulties, suggested that he would be an appropriate candidate for intensive rehabilitative input. This had, in fact, already been proven by his good response to rehabilitation, with significant improvements in functional independence.

Case Study 2
RF was a 23 year old Portuguese speaker, with very limited English. He had made a good physical recovery following a head injury sustained as a pedestrian in a road traffic accident 9 months prior to his admission. Medical records indicated that initial GCS was 6, and CT scan showed right parietal and occipital fractures; diffuse left swelling with midline shift; and left frontal contusions and haemorrhage. He had 40% useful vision in his left eye. RF was from a rural background, most of the family working in the building industry in their native country. RF had been in national service and had worked in the building trade before coming to England, where he was working as a kitchen assistant at the time of the accident.

Initially, RF was often unco-operative, and very rigid in his behaviour. He was reported by the referring hospital to have been dysphasic in both English and Portuguese, although this appeared to have largely resolved. Formal assessment by a speech and language therapist was problematic due to his very limited English. Initial neuropsychological assessment was carried out with the aid of a Portuguese-speaking interpreter. Because of translation difficulties, none of the verbal sub-tests from the WAIS-R was used except for digit span. On this, and four of the performance sub-tests, his scores were consistently at or below the 1st percentile. On the Rivermead Behavioural Memory Test, his performance indicated a severe, generalised impairment of memory. On the Visual Object and Spatial Perception Battery, RF failed three of the five object perception tests and one of the spatial tests. Further assessments using the Behavioural Inattention Test and the Benton Visual Form Discrimination Test showed that he could attend to the full visual field when this was a specific task requirement, but that he did not readily attend to peripheral information on both right
and left, unless specifically directed. There were no indications of the impact of RF’s perceptual deficits in functional situations. As expected from his known history of frontal impairment, RF had difficulty in switching between concepts, and in tasks involving planning and problem solving. RF also had difficulty in tasks involving sequencing, although well-learned sequences remained intact.

The LIPS was not available at the time of initial assessment, but was administered two months later (one year post-injury). On the LIPS, RF obtained an adjusted age score of 8 years 5 months, giving a LIPS IQ of 65. This is consistent with his performance on the 5 WAIS-R sub-tests. The basal year was five and a combination of pass/fail scores was obtained for years 6 to 10. The clinical profile from the Leiter indicated:

- poor visual acuity for fine discriminations
- simple quantitative discriminations satisfactory
- no other marked relative strengths or weaknesses

Qualitative observations indicated the following:

- shows awareness of having difficulty
- does not generalise a correct solution
- trial and error approach
- spontaneously checks
- spontaneously corrects where possible
- very slow on all tasks
- perseverates on some unsuccessful attempts
- perseveres even when having difficulty
- sustains concentration
In this case Raven’s CPM was used, with RF obtaining a score of 23. This represents a performance at the 50th percentile for children of 8 to 8 1/2 years, consistent with his LIPS age score. Qualitative observations were:

- very slow
- initial difficulty grasping the concept on second item

Although no IQ equivalent could be calculated for the CPM, RF’s age scores on the LIPS and CPM were very similar. The LIPS clinical profile indicated a relatively even distribution of abilities, consistent with his WAIS-R performance. Qualitative observations from the LIPS suggested that RF was a suitable candidate for a rehabilitation programme within the constraints of his overall severe limitations in intellectual functioning. His conscientious and thorough approach to tasks, spontaneously checking and correcting, when he was able to do so, indicated that, once taught, he could be expected to carry out routine tasks satisfactorily. (This proved to be the case with activities of daily living, in which he was punctilious). This suggested the possibility of a return to carefully supervised, unskilled work within the family business in Madeira. RF’s visual acuity was assessed and considered to be within normal limits.

Case Study 3

JK is a 47 year old woman who was admitted for rehabilitation four months after surgery for evacuation of a left frontal sub-dural haematoma and clipping of bilateral anterior communicating artery aneurysms. Prior to her illness, JK had been employed
as a nursing auxiliary. Physically, she had made an excellent recovery. On admission, her speech was repetitive, with some naming difficulties. Her memory was clearly impaired, and this was confirmed by subsequent testing. She displayed high levels of anxiety, and interview indicated minimal insight into any cognitive difficulties. She was able to attempt all items from the WAIS-R, but her performance on the verbal items had to be interpreted with some caution. At that time her overall performance fell within the borderline range for verbal, performance and full-scale, although there was considerable variation between sub-scale scores, with the best score (average range) on Digit Span. Re-assessment 6 months later showed a general improvement, with all scores falling in the low average range except for Information (impaired) and Digit Span (average)

JK was assessed with the LIPS and SPM approximately midway between the two WAIS-R assessments, in order to assist in some management decisions regarding possible return to work. On the LIPS, JK obtained an adjusted age score of 8 years 5 months, giving a LIPS IQ of 65. The basal year was 7, with no tests passed above the 8 year level. The clinical profile indicated no significant areas of relative strength or weakness. Qualitative observations indicated the following:

- shows no awareness when making errors except on block designs
- not able to generalise a correct solution
- trial and error approach
- does not check spontaneously or when prompted
- indications of spatial/perceptual problems on constructional tasks
- sometimes able to demonstrate awareness of a concept but makes some errors in execution
- perseverates on errors in block design tasks
- tendency to give up easily on block design tasks

On Raven’s SPM she obtained a score of 32, giving an IQ of 97 using Peck’s conversion. Qualitative observations were that there were a number of spontaneous corrections. The discrepancy between the Raven’s and LIPS scores is very large and particularly unexpected given the consistency of her LIPS profile, with no significant areas of relative weakness distorting the overall score. One factor in explaining this discrepancy is the “all-or-nothing” scoring system on the LIPS. On several tasks JK was able to place most blocks correctly, making only one error or transposing two blocks. She received no credit for such items. However, this is unlikely to account for the full extent of the difference. It is also interesting to note that on the SPM she made a number of immediate, spontaneous corrections, in contrast with her complete lack of checking on the LIPS items. A possible explanation may be that she gave the initial response before completing her scan of the eight possible responses. If she automatically continued her visual sweep of the response items, then she may have registered an obvious alternative and substituted this for her original answer. Several of her “corrections” were also incorrect. The second WAIS-R assessment, which was also generally consistent across sub-tests, produced a result midway between the LIPS and Raven’s scores.
The LIPS profile did not highlight any particular areas of strength or weakness on which to focus rehabilitation efforts. However, the qualitative observations provided a number of indicators. JK showed a complete lack of awareness of any errors, with the exception of block design tasks. The reason for the latter is almost certainly related to her difficulty in constructing a square design when more than two component pieces were required. Since only a square will fit into the stall, acknowledgement of the error was almost unavoidable. This unawareness of deficit, coupled with absence of any checking behaviour, indicated a major area on which to focus in rehabilitation. On several tasks, she had demonstrated a grasp of the underlying concept, but had made an error in placing one or two of the blocks, suggesting that functional performance could be improved by systematic checking. The focus on these areas was important not only in helping JK improve functional performance in everyday tasks, but also in helping her make realistic plans regarding future employment. JK’s difficulties in more complex block design tasks, coupled with other qualitative observations, indicated the need to investigate further whether these difficulties arose from spatial/perceptual impairments or from a “frontal” deficit in planning and organisation. Further investigation suggested the latter, indicating possible benefits from work on developing organisation and planning skills.

Case Study 4

HD is a 32 year old woman who sustained a severe head injury as a pedestrian in a road traffic accident, 4 1/2 months prior to admission. Full details are not available, but she is known to have sustained contusions to the left frontal and parietal areas. Her physical recovery was generally good, but she was initially unable to speak, unco-
operative, and at times physically aggressive. These features quickly improved and at the time of her admission her speech was functional in most ordinary situations, although there were residual receptive and expressive language impairments. She was by this time co-operative and very well motivated, although she demonstrated minimal awareness of any cognitive problems other than with language. HD was educated to A level standard and prior to her accident had been setting up her own business. She was able to complete most of the sub-tests from the WAIS-R 7 months post-injury, although performance on several of the verbal tests was significantly affected by her language impairment. All scores fell in the impaired/borderline range, between the 2nd and 9th percentiles for her age group. She had a moderate to severe impairment of memory, with particular difficulty with auditory-verbal memory, but demonstrated surprisingly good recall for personally meaningful information, and she quickly learned to use an adapted personal organiser as a memory aid. Attention was severely impaired (Test of Everyday Attention), with particular difficulty with selective and divided attention and attentional switching.

HD appeared to make rapid improvements in cognitive functioning, and reassessment 11 months post-injury seemed advisable. The LIPS was used to avoid the effects of any residual language impairments and because the WAIS-R could not be repeated after such a brief interval. On the LIPS, HD obtained an adjusted age score of 11 years 9 months, giving a LIPS IQ of 90. The basal year was 8, with a combination of pass/fail scores for years 9 to 14. The clinical profile indicated:

- weakness on more complex perceptuo-constructional tasks
- visual acuity good
- symbolic transformation good
- spatial imagery good
- quantitative discrimination good
- genus matching weak (best for designs)

Qualitative observations indicated the following:
- shows awareness when having difficulty
- able to generalise from a correct solution
- not spontaneously checking, initially
- checking improved on later items
- spontaneously self-corrects after checking, where possible
- able to demonstrate awareness of concept but makes some errors
- very slow
- careful and systematic
- does not perseverate on errors - gives up if unable to find a solution
- perseveres when having difficulty
- sustains concentration

On Raven’s SPM, HD obtained a score of 40, giving an IQ of 98 using Peck’s conversion. The only qualitative observation was that she was careful and systematic.

Her performance on the Leiter indicated that there were no major spatial/perceptual difficulties. Problems with more complex block designs appeared to relate primarily to limited problem solving abilities. The profile indicated that she retained a number of
important abilities, but was weakest on the more abstract genus matching tasks, where a degree of abstract reasoning ability was required. Qualitative observations indicated that HD was a good candidate for intensive cognitive rehabilitation. She was careful and systematic, with good concentration and perseverance and was aware when she was having difficulty, and able to generalise. She possessed a number of basic skills but tended to make errors through lack of checking. Interestingly, on later items she spontaneously checked with a reasonable degree of consistency. Between test sessions she had been prompted about the importance of checking on some budgeting tasks and appeared to have generalised the strategy spontaneously. The need for some further reinforcement of the strategy was indicated. The other main feature of her performance was a weakness in planning and problem solving strategies. This was addressed through specific group and individual training in these areas. Her relative strength on basic skills and “concrete” tasks, but poor abstract reasoning skills, indicated the need for a structured programme aimed at developing logical thinking skills and a further hierarchical skills-based programme to develop systematic strategies in areas such as budgeting.

HD was eventually able to return to independent living in her own flat, supported initially by an outreach programme.
Case Study 5

GD is a 49 year old man who sustained a closed head injury 5 months prior to admission. CT scan had shown a contused left temporal lobe with subarachnoid haematoma and GD underwent a left craniotomy with evacuation of the haematoma and resection of the contused anterior-inferior temporal lobe. He had made a good physical recovery, but was disorientated for time and place and had a moderate receptive and expressive dysphasia. Earlier, high levels of paranoia had reduced, but some mild paranoid interpretations of situations were still evident. In interview, GD showed no awareness of cognitive impairments, being preoccupied by the physical evidence of his operation. Prior to his accident, GD had been employed as a farm worker and his literacy was limited. His language impairments rendered administration of the verbal scale of the WAIS-R inappropriate. Recognition memory for visual information was satisfactory, but recall of verbal and visual information was poor, as was prospective memory. Recall of designs indicated some qualitatively abnormal features and confabulation and perseveration were evident on a number of items (RBMT; RMT; WMS-R).

On the LIPS, GD obtained an adjusted age score of 9 years 4 months, giving a LIPS IQ of 72. The basal year was 7, with a combination of pass/fail scores for years 8 to 12. (GD passed no tests at the 10 year level and only one at the 12 year level. In the case of the latter, completion of this particular task was considerably facilitated by GD picking up the correct combinations of 2 out of 3 blocks by chance. It is unlikely that GD would have completed this task had he initially picked up a different combination. Exclusion of this item would result in a LIPS IQ of 68.) The clinical profile indicated
very poor genus matching
possible poor spatial imagery/quantitative discrimination (confounded in the same task)
visual acuity weak for fine discrimination
able to make simple progressive discriminations
concretist matching satisfactory at early levels; difficulty on more complex matching/constructional tasks

Qualitative observations indicated the following:
- quick and confident on easier items
- tendency to trial and error approach on harder items
- sometimes checks (variable)
- liable to change correct responses to incorrect
- shows no awareness that unable to complete task correctly, without clear environmental cue
- able to demonstrate understanding of concept but makes some errors
- perseverates on some unsuccessful attempts
- perseveration in thinking/verbal explanations
- tends to give up easily

On Raven’s SPM, GD obtained a score of 14. This is below the 3rd percentile and no conversion to IQ can be made using Peck’s formula. Qualitative observations were:
- initially impulsive, responded to prompts to check all response items
- response set evident on set E (10 responses in the same position)
examination of earlier responses revealed a tendency to pick an exact match if available, otherwise a position preference evident.

In this case, the format of the SPM may have served to facilitate a tendency to perseveration and response set. This tendency was evident on the LIPS, but to a lesser extent. The evidence of a position preference indicates that the SPM result cannot, by itself, be taken as indicative of intellectual functioning. In the event, both the SPM and LIPS gave results within the 2nd-5th percentile range. The LIPS profile, however, shows that GD is able to demonstrate some skills at a basic level. In addition, on several tasks, including some at the 14 year level, he was able to demonstrate a clear grasp of the concept, but made some errors, thereby gaining no score. His profile was generally consistent with his known medical history of anterior-inferior temporal lobe damage and likely frontal lobe involvement. GD’s complete lack of awareness of any difficulties with the tasks attempted, was consistent with his general presentation on the unit, where he was noted to be reluctant to participate in any rehabilitation activities or to respond to attempted interventions aimed at developing functional skills. The profile and qualitative observations confirmed that GD was unlikely to benefit from a cognitive rehabilitation approach and would best be helped by an emphasis on assessing and developing functional skills. He was subsequently able to demonstrate good basic money management and personal ADL skills, but remained dependent on others for organisation and initiation of almost all activity. He remained largely unaware of his deficits and difficult to engage in rehabilitation activity. Unfortunately, GD subsequently developed post-traumatic epilepsy and both cognitive and ADL functioning deteriorated significantly.
Case Study 6

GR is a 35 year old man who sustained a severe head injury 8 months prior to admission. Medical reports indicated multiple injuries, including diffuse brain injury, with a basal skull fracture and intra-cerebral haematoma in the left frontal and parietal lobes. At the time of admission GR was mobile but required ongoing physiotherapy. Prior to the accident, GR had been employed in a post-graduate professional capacity and was regarded as a high-flier. The referring hospital reported an initial loss of autobiographical memory. He had a severe receptive and expressive dysphasia which rendered the verbal scale of the WAIS-R inappropriate. Nine months post-injury his scores on the performance scale ranged from borderline to superior. Weakest scores were on Digit Symbol, where he was very slow, and Object Assembly, where he tended to construct the more difficult items by matching lines and edges, rather than by having any conceptualisation of what he was constructing. On memory tests (RBMT; WMS-R), recognition memory was good, prospective memory was variable and memory for verbal information was, as expected, particularly weak. Digit span was very poor, although maximum backward span was equal to forward span. At this time GR was extremely pre-occupied with personal matters and his poor performance on digit span and some memory tasks may well have been affected by this. On the Wisconsin Card Sorting Test, GR was able to complete the test but made a very high percentage of perseverative errors.
On the LIPS, GR obtained an adjusted age score of 12 years 4 months, giving a LIPS IQ of 95. The basal year was 9 and a combination of pass/fail scores was obtained for years 10 to 16). The clinical profile indicated:

- satisfactory visual acuity
- quantitative discrimination relatively weak
- some difficulty with higher level block designs (variable)
- genus matching reasonable but variable

Qualitative observations indicated the following:

- aware when having difficulty
- able to generalise a correct response
- tendency to trial and error approach
- does not check spontaneously
- able to use environmental cues to detect errors (e.g. last unplaced block not appropriate to only empty stall)
- slow
- careful and systematic (not necessarily accurate)
- occasional difficulty grasping concept of task
- perseveres
- sustains concentration

On Raven’s SPM, GR obtained a score of 48, giving an IQ of 112 using Peck’s conversion. Qualitative observations were:

- spontaneously corrected several items
slow and deliberate

- sometimes indicated if not sure of a response

The qualitative observations from the Raven's are generally consistent with those from the LIPS, although more limited, the only difference being in the tendency to spontaneous self-correction. (Possible reasons for this were discussed in Case Study 3). The Raven's IQ is substantially higher than that calculated from the LIPS and in itself may give a false expectation of GR's level of functional ability. Performance on the LIPS (and on other assessment tests) suggested that GR was able to perform well on tasks where he could draw on old skills or where the nature of the task was immediately obvious to him. He had greater difficulty in novel situations, at times expressing his bewilderment at what was required, for example in some genus matching tasks. This was consistent with his behaviour on the unit, where he showed very poor functional problem solving skills. His generally good level of intellectual functioning, together with the qualitative observations from the LIPS, particularly his awareness when having difficulty, his systematic approach, perseverance and ability to generalise a simple strategy, suggested that GR was a suitable candidate for intensive cognitive rehabilitation. The profile and qualitative observations also helped identify a number of areas on which to focus. The main difficulties demonstrated on the LIPS were a tendency to make undetected errors, and poor problem solving skills (determining what was required and generating alternative strategies). The former indicated a need to increase awareness of inaccuracy and to develop the habit of checking on tasks where accuracy was important. This was addressed through systematic practice. Problem solving and flexibility of thinking were addressed
through practice in logical thinking exercises and by group and individual training in problem solving strategies. GR's relatively weak quantitative discrimination skills were further investigated, revealing a significant deficit in computational skills requiring structured intervention.

GR was able to return to independent living in his own flat, while attending the unit on a day basis for continuing work on areas of difficulty.

Case Study 7
ML is a 29 year old man who sustained a closed head injury 16 months prior to admission. No detailed medical information is available with the exception of a CT scan 5 months post-injury. This showed a marked increase in size of the lateral and third ventricles, especially on the right; atrophy of the right hemisphere; and asymmetry of the sulci, particularly in the frontal region. There were also areas of low attenuation involving the right frontal and right parieto-occipital regions. ML is largely wheelchair dependent, has limited use of his right hand and is extremely slow in all motor activities. He is anarthric and uses an electronic communication aid. He wears an eye patch to eliminate blurring and double vision. Given ML's largely intact language skills, it was possible to administer parts of the WAIS-R during initial assessment, although this was limited as ML did not at that stage have a communication aid and relied on an alphabet board and written responses, which were constrained by his motor impairments. On verbal sub-tests, scores ranged from low to high average, with the weakest scores on Vocabulary and Comprehension. A contributing factor to the latter score may have been the need for lengthier answers. Performance on the Mill
Hill Vocabulary Scale was at the 25th percentile, compared with 75th percentile on Raven’s SPM. Memory was poor (RMT; RBMT; WMS-R), with a particular weakness for recognition of faces, and there were some perseverative features to his recall of designs.

The LIPS and a repeat SPM were included as part of a routine reassessment, 31 months post-injury and 15 months post admission.

On the LIPS, ML obtained an adjusted age score of 13 years 1 month, giving a LIPS IQ of 101. The basal year was 8 and a combination of pass/fail scores was obtained for years 9 to 16. The clinical profile indicated:

- strong on matching/constructional tasks
- spatial imagery satisfactory
- quantitative discriminations satisfactory
- genus matching relatively weak
- symbolic transformation good
- sequencing/progressive discriminations good

Qualitative observations indicated:

- slow initiating motor activity
- able to generalise from a correct solution
- shows awareness when having difficulty
- some spontaneous checking/correction
- perseveres
On Raven's SPM, ML obtained a score of 52, giving an IQ of 115, using Peck's conversion. The only qualitative observation was that he had commented on difficulty in focusing on the patterns and needed a short break.

Again there is a marked discrepancy on the Raven's and LIPS IQs, with the SPM result being considerably higher. Reassessment on the full WAIS-R (omitting only Digit Symbol) gave a verbal IQ of 98 and a pro-rated performance IQ of 87, the latter being affected by ML's motor slowing. These overall scores are more in line with the LIPS score, but his WAIS-R profile again showed his best sub-test performances (Arithmetic and Similarities) as commensurate with his performance on the SPM. The patchy profile obtained on the LIPS (with mixed pass/fail performances from test ages 9-16), and the "spiky" WAIS-R profile (scaled scores ranging from 6 to 13), contrast with the SPM results, which largely conform to expected distribution. This suggests that the SPM is less sensitive to some of the cognitive deficits that affected ML's performance on the LIPS and WAIS-R.

From a rehabilitation perspective, the SPM results would have been of only limited use in planning a rehabilitation programme. (In this instance, the aim was not to devise a rehabilitation programme, but to reassess cognitive functioning prior to discharge.) The SPM score indicates that under the right conditions ML is able to function intellectually at a high average level, but gives no information on the range of strengths and weaknesses revealed by the LIPS and WAIS-R. At the time of assessment, ML
had participated in the rehabilitation programme for 15 months and was preparing for discharge to his own flat, with carer support. However, the LIPS profile shows some relative strengths which may be of use for developing leisure activities following discharge.

In this case study, it has been possible to consider information obtained by the LIPS in comparison with the WAIS-R. In the main, the results are very similar. Both indicate a similar overall level of functioning across a range of different tasks, although performance tasks on the WAIS-R are more affected by motor slowing than is the case on the largely untimed LIPS. The weakness on genus matching identified by the LIPS would not have been picked up by the WAIS-R, where Similarities, the most obviously similar task, gave ML his best result. This difference may be due to the greater degree of structure on Similarities. On the LIPS genus matching task there is no instruction, and the subject must deduce what is required. ML has always shown poor problem solving skills in functional situations. However, the WAIS-R enabled identification of persistent relative weaknesses on some verbal tasks which could not have been identified by the LIPS. Overall, the limited additional information from the LIPS compared with the WAIS-R is unlikely to justify the time involved in administering both instruments.

Case Study 8

FJ is a 45 year old man who sustained a severe closed head injury 7 months prior to admission. This resulted in a left temporal fracture and frontal contusions. He subsequently developed a large subfrontal and parietal subdural haematoma and
underwent a craniotomy for evacuation of the haematoma and partial left frontal lobectomy. He later underwent further surgery for relief of hydrocephalus. FJ had a history of heavy alcohol use. On admission and throughout his stay he was disoriented for time and place and was often extremely confused. He rarely initiated any purposeful activity except for restless pacing or sustained efforts to force open the doors of the unit. He was confused in his sequencing, frequently misused objects and showed no awareness of safety. He had a mild dysphasia and his communication abilities were variable.

On informal assessment, FJ was able to copy simple designs, but showed clear difficulty in organising more complex visual information. Assessment of what was at first thought to be a visual object agnosia, revealed no consistency of errors across a task in which he was required to name and identify the use of 18 common objects presented in pictorial, real object and hidden object formats. He was also able to identify some objects which he frequently misused in day to day situations.

On the LIPS, FJ obtained an adjusted age score of 5 years 2 months, giving a LIPS IQ of 40. The basal year was 3 and he obtained a mixture of pass/fail scores for years 4 and 5. His clinical profile indicated that he was:

- able to match by colour, shape and number separately, but not combined
- complete only one genus matching task, with some encouragement

Qualitative observations indicated:
- sometimes shows awareness when having difficulty
- no spontaneous checking
- difficulty grasping concept of tasks other than matching
- gives up easily
- able to sustain attention if no delay between presentation of tasks

FJ was unable to compete any items on Raven's SPM, being unable to grasp what was required of even the first item. He quickly became agitated. The CPM was presented at a later date, with an identical result.

Administration of the LIPS permitted some basic assessment of intellectual functioning. This indicated that FJ had suffered a generalised and very substantial impairment in cognitive functioning and initially, at least, efforts should be concentrated on developing simple functional personal and domestic ADL skills. In the event, while FJ co-operated with assessment, he would not tolerate regular intervention in his activities and became agitated. His condition deteriorated further following medical complications and he was removed from the unit.

Case Study 9

PO is a 50 year old man who had sustained a right CVA 6 months prior to admission. CT revealed a intracerebral haemorrhage in the right basal ganglia, with extension into the right lateral ventricle. On admission, he was able to walk independently, though with some difficulty, but his left arm remained hemiplegic. Assessment using the WAIS-R revealed low average scores on all the verbal sub-tests. On the performance
test, scores were generally lower (in the borderline range overall), and PO had particular difficulty with perceptuo-constructional tasks. Further assessment showed impairments in tasks involving perceptual organisation and spatial relationships, although object perception was satisfactory. On scanning tasks, PO showed a very disorganised search pattern. Memory for verbal information was excellent, but memory for visual information was impaired. In discussion, PO was unwilling to acknowledge any difficulties other than those associated with his physical impairments.

On the LIPS, PO obtained an adjusted age score of 7 years 8 months, giving a LIPS IQ of 59. The basal year was 5, and a combination of pass/fail scores was obtained for years 6 to 10. The clinical profile indicated:

- visual acuity very weak
- spatial imagery reasonable
- simple quantitative discriminations reasonable
- difficulties on complex block designs
- genus matching weak

Qualitative observations were:

- tendency to trial and error approach
- sometimes able to demonstrate awareness of concept but still makes some errors
- difficulty grasping nature of some tasks but does not acknowledge this
- poor error judgement - tends to alter correct items
- slow
On Raven's SPM, PO obtained a score of 19, giving an IQ of 79 using Peck's conversion. No qualitative observations were made. The Raven's IQ was almost identical to PO's full scale IQ from the WAIS-R (80), and probably not far from his previous level of functioning. It was, however, 20 points higher than the LIPS IQ. The latter is also significantly lower than PO's performance IQ on the WAIS-R (74). The reason for this discrepancy is unclear. Whilst PO's poor scanning strategy may have disadvantaged him on the LIPS, it would be expected that there might be a similar disadvantage on the multiple choice SPM.

Most of the information from the LIPS clinical profile was already available from other assessment tools in this case. The qualitative information from the LIPS suggested that PO has difficulty in adequately grasping the nature of novel tasks and that he does not indicate when he is unsure about his response. Whilst this could be due to unawareness, his tendency to rearrange his responses, including correct items, suggests that he is at least partly aware of his difficulty and that this is more likely to be a defensive behaviour. Interview indicated a resistance to the notion that he had any problems other than physical ones, and PO did prove rather resistant to intervention. The focus of rehabilitation was placed on improving functional skills and establishing routines, and PO was able to return to supported independent living.
In this case, the LIPS was included as a supplementary assessment and not part of the main battery, and added little additional information, beyond the qualitative observations, which supported impressions gained from other situations. However, as a measure of intellectual functioning, the discrepancy between the LIPS IQ and that obtained from the SPM and WAIS-R is of note.

Case Study 10

TH is a 55 year old man who was admitted nearly 10 months after sustaining a right CVA, resulting in a dense right hemiparesis and global aphasia. TH was educated to graduate level and prior to the stroke was working in a professional capacity. Due to his global aphasia, it was not possible to administer most standard assessments. TH’s receptive language ability is heavily dependent on a clear context and is not reliable for assessment purposes. His family reported that he was able to indicate by his responses in social contexts that he had understood and had views on issues raised with him. Observation on the unit supported the view that in a social and context-rich environment, reception language was enhanced, but was not fully reliable. In daily living activities, there were initially major sequencing difficulties. Attempts at informal assessment were largely unsuccessful, as TH often failed to understand what was required of him, despite the presence of physical prompts and “pantomiming” of instructions.

On the LIPS, TH obtained an adjusted age score of 7 years 8 months, giving a LIPS IQ of 59. The basal year was 4, with mixed pass/fail scores for years 6 to 9. The clinical profile indicated:
- ability to complete simple matching tasks involving colour, form and number
- difficulty on more complex block designs
- poor visual acuity for fine discriminations
- very weak genus matching
- weak spatial imagery and/or quantitative discrimination (confounded)
- progressive discriminations/sequencing weak

Qualitative observations indicated:
- frequent difficulty/inability in grasping concept of task
- indicates when having difficulty understanding task
- gives up easily, does not try to guess

On Raven’s SPM, TH obtained a score of 11. This was below the 2nd percentile and it was not possible to calculate an IQ using Peck’s conversion. Qualitative information indicated:
- very quick either to respond or give up
- frequent prompts to check all response items did not improve performance
- test discontinued during set D as TH clearly indicated the items were too hard

Scores on both SPM and the LIPS were below the 2nd percentile, and indicated a level of cognitive impairment which was greater than expected from social interactions.
Qualitative observations were similar for both tests. Perceptual abilities were clearly sufficient for basic matching purposes, and it is therefore unlikely that this would account for TH’s difficulties on both these non-verbal tests. As indicated earlier, global aphasia has been associated with poorer performance on Raven’s Matrices (Archibald et al., 1967; Kertesz & Hooper, 1982), and it is possible that the complete disruption of language has a similar effect on LIPS performance. The most striking feature of TH’s performance was his difficulty in determining the task requirement on several LIPS items, and his marked weakness on genus matching tasks. The two may, of course, be connected, since his relatively better performance on concrete matching compared with genus matching tasks may simply relate to the more obvious nature of the task requirements. A similar feature was noted in performance on the SPM. TH’s performance clearly indicated that he would function best if he were helped to develop regular routines in a well-structured and familiar environment, where he did not have to rely on problem solving or eductive skills. Rehabilitation efforts focused on increasing independent functioning in domestic ADL and leisure skills and on facilitating communication. TH’s physical and communication difficulties were such that he would always require a supported living environment.
3.3 **Qualitative information**

A summary of the qualitative information obtained from the LIPS and the SPM is shown in Tables 2 and 3. A total of 94 items of qualitative information were either recorded contemporaneously or readily identifiable from the LIPS assessments, compared with 23 items of qualitative information from the Raven’s assessments.

Once summarised, sixteen categories of qualitative observation were noted from the

<table>
<thead>
<tr>
<th>TABLE 2</th>
<th>Qualitative information recorded during LIPS assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Yes/no entries relate to specific observations. “-“ indicates no observation made in this category. “var” = variable)</td>
<td></td>
</tr>
<tr>
<td><strong>Subject no.</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>Indicates awareness of wrong response/difficulty</strong></td>
<td>yes</td>
</tr>
<tr>
<td><strong>Able to generalise a simple strategy</strong></td>
<td>no</td>
</tr>
<tr>
<td><strong>Trial and error approach</strong></td>
<td>yes</td>
</tr>
<tr>
<td><strong>Spontaneous checking</strong></td>
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</tr>
<tr>
<td><strong>Checks after prompting</strong></td>
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</tr>
<tr>
<td><strong>Spontaneously corrects response after checking</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>Changes correct items after checking</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>Gross spatial-perceptual errors</strong></td>
<td>yes</td>
</tr>
<tr>
<td><strong>Demonstrates acquisition of some concepts despite errors</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>Slow</strong></td>
<td>yes</td>
</tr>
<tr>
<td><strong>Careful/systematic</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>Perseverates on errors</strong></td>
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</tr>
<tr>
<td><strong>Difficulty grasping some task requirements</strong></td>
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</tr>
<tr>
<td><strong>Unable to identify some object depicted</strong></td>
<td>yes</td>
</tr>
<tr>
<td><strong>Perseveres when having difficulty</strong></td>
<td>yes</td>
</tr>
<tr>
<td><strong>Sustains concentration</strong></td>
<td>yes</td>
</tr>
</tbody>
</table>
LIPS and ten from the SPM. A greater proportion of categories for the SPM were idiosyncratic, with 40% of categories relating to only one subject, and a further 30% relating to two subjects, compared with the LIPS, where one category (6%) related to only one subject, and thirteen of the sixteen categories were used for between four and ten of the subjects.

### TABLE 3 Qualitative information recorded during Raven’s assessments

(Yes/no entries relate to specific observations. "-" indicates no observation made in this category)

<table>
<thead>
<tr>
<th>Subject no.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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<tbody>
<tr>
<td>Impulsive - not checking all options</td>
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<td>-</td>
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<td>-</td>
<td>yes</td>
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<td>-</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>Careful and systematic</td>
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<td>-</td>
<td>-</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>Does not indicate awareness when clearly in difficulty</td>
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<td>-</td>
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</table>

### 3.4 Usefulness of information from the LIPS

Examination of the case studies indicates that in all cases where assessment was undertaken to assist in planning rehabilitation, information from the LIPS contributed to clinical decisions regarding the type of programme offered, and in particular was useful in suggesting the balance between cognitive and functional approaches. Quantitative information from the clinical profile was used in some cases as an
indicator of areas requiring more detailed investigation. Qualitative information was used to help interpret some of the quantitative data, as well as to indicate specific interventions, such as problem solving strategies or routine checking. In comparison, information from the SPM in most cases only indicated an overall level of intellectual functioning. Whilst this may be useful in indicating those whose intellectual functioning is so significantly impaired that they are unlikely to benefit from cognitive strategies, the SPM data did not generally contribute to clinical decisions regarding particular intervention strategies, nor was there any indication in most cases of factors which might affect an individual’s response to rehabilitation.

In the two cases where it had been possible to administer a full WAIS-R without any concerns about the effects of dysphasia on test performance, the LIPS did not add significantly to the information already available.

### 3.5 Comparison of LIPS and SPM scores

The IQs obtained from the LIPS and SPM for each subject are shown in Table 4. In four cases it was not possible to calculate an IQ from the SPM. In one case this was because the CPM had been administered, and in the remaining three cases, the SPM score was below the point at which Peck’s conversion operates. In all cases where it was possible to calculate an IQ score for both assessments, the IQ obtained from the SPM was higher than that from the LIPS. This discrepancy ranged from 8 to 33 IQ points.
The correlation between raw scores on the LIPS and SPM were calculated. For this purpose, unadjusted age scores (in months) for the LIPS were used as raw scores. Data from only 9 subjects were used as no SPM score was available for one subject (CPM was administered). Spearman's rho was used in view of the small number of cases, and a correlation coefficient of 0.88 was found ($p = .002$). This result must be treated with great caution in view of the limited number of subjects.

TABLE 4 Comparison of LIPS and SPM IQs

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<th>Subject No.</th>
<th>LIPS IQ</th>
<th>SPM IQ</th>
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<tr>
<td>10</td>
<td>59</td>
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* = not possible to calculate IQ

3.6 Comparative costs

The current published cost of the LIPS is £1395 as a complete set. The cost of the SPM starter pack is £210. Both prices exclude VAT.

The mean time taken to complete a LIPS assessment was 2 hours 1 minutes (range 45 minutes to 3.5 hours) and to complete a SPM assessment was 28 minutes (range 20-40 minutes).
4. **DISCUSSION**

This was an exploratory study, with a number of identified aims, each of which is discussed below.

4.1 **Range of cognitive skills assessed**

For the purposes of this study, the clinical profile developed by Levine et al. (1975) (Appendix A) was used in each of the ten case studies, to assist in interpretation of quantitative information obtained from the LIPS. This profile comprises 8 test constructs, such as concretist matching, spatial imagery and quantitative discriminations, two of which are subdivided providing a total of 16 constructs. No such profile is available for the Ravens Matrices. Indeed, Raven (1995) argues that performance on different parts of the SPM should not be used to indicate qualitatively different areas of cognitive functioning. Thus, for neuropsychological purposes, the two tests may be seen to be serving rather different purposes. Whilst both might be used to obtain an indication of overall levels of cognitive functioning, in these ten cases the SPM was not found to contribute to the identification of relative strengths and weaknesses in the cognitive functioning of any individual. With certain limitations discussed below, the clinical profile obtained from the LIPS was used both to provide information on the relative level of functioning in different areas, and to suggest the need for further investigation. This was either to provide more detailed information on an identified area of deficit, or to help tease out which of a possible number of factors may be underlying difficulty on certain types of task. As discussed earlier, the Levine et al. paper did not provide any formal rationale for the breakdown of LIPS performance into the categories used in the clinical profile, and in the absence of any
more systematic study, particularly from a neuropsychological perspective, it would be wise for any examiner to interpret the results as suggestive, rather than indicative, of deficits in particular areas of functioning, and to use other information, where appropriate, to supplement the findings.

Use of the clinical profile gives rise to a number of additional criticisms and caveats. The number of sub-tests contributing to any particular area of functioning varies considerably. For example, there are a total of 11 items shown as contributing to “concretist matching - colour”, covering the age range from 2 to 16 years, whereas “spatial imagery” has eight identified component tests, 7 of which are at the 14 year level or above. Some of the identified constructs have only one or two contributory items. Since each subject will attempt only those items appropriate to their ability level, the amount of information on some areas of cognitive functioning is necessarily limited. This also imposes limitations in terms of comparing levels of functioning across different areas. While the LIPS profile can, within the limitations discussed above, be used to give an indication of the relative level of functioning of an individual in different areas of the profile in terms of the age levels at which they begin to fail, it is not possible to say with any accuracy that an individual is performing at the level of a child of a certain age in the specified area of functioning, since the various areas are not all represented at each age level. Thus, the information can be given only in a rather descriptive way, and functioning in different areas cannot be directly compared in the same way that is possible with scaled scores on the various WAIS-R sub-tests.
A more important criticism of the profile concerns the constructs themselves, as identified by Levine et al (see Appendix A). In the main, these constructs are descriptive and often rather vague, and may bear little relationship to constructs of relevance to the clinical neuropsychologist. For example, it is questionable to what extent the construct “progressive discriminations”, broken down further into four subheadings of “form transformation”, “pattern completion”, “limited cues” and “density”, is helpful, and certainly begs the question of precisely what cognitive skills are involved in completing each of these items. Levine et al. state that “Generically, this involves the ability to comprehend the relationship between stimuli. Each stimulus bears a constant relationship to the stimuli preceding and following it” (p. 48). Whilst this in itself seems reasonable, there is no evidence in their paper to indicate whether matching blocks of increasingly large squares, with a stimulus card depicting increasingly large circles (“form transformation”), calls upon the same cognitive skills as completing a progression in which only the first and last stimulus items are shown (“limited cues”). In terms of developmental progression in normal children, it may be the case that the tasks represent different points on the same continuum. However, the latter task requires the subject first of all to deduce what is required (i.e. a progressive sequence) and then to determine what are the relevant features of the stimuli to which he or she must attend, beyond going on to consider the detailed relationships between individual stimuli. This task would appear to involve a number of functions often affected by frontal lobe impairment, and testing outside the strict boundaries of the normal administration might be necessary to determine at what point in the process the difficulty arose. For example, it would be of interest to the neuropsychologist to know
whether the subject was able to complete the test item if given a more structured explanation of the task requirement.

Some of the categories clearly compound a number of very different cognitive functions. Within the "symbolic transformations" category, the first of the two test items comprises a simple coding task, similar in format to the WAIS-R Digit Symbol test, but untimed and with only eight items, while the second, at the 16-year level, not only introduces an additional dimension to the coding, but also requires the subject to store that dimension in memory (without any specific instruction to do so). This test is then categorised under both "symbolic transformation" and "immediate recall". Whilst successful completion of the task might be said to indicate a satisfactory performance in both categories, failure does not, in itself, tell the examiner anything about what was causing the difficulty, and use must be made of qualitative observations to try to determine the problem area.

Even when a test item is only shown as falling into one category on the profile, passing or failing that test item cannot, in itself, be taken as indicative of a deficit in a particular cognitive process, since many processes may contribute to successful task completion, and it is again necessary to look to qualitative information or other tests to tease out the relevant factors. This is not a problem unique to the LIPS, since it applies equally to interpretation of the WAIS-R sub-tests (Lezak, 1983; Kaplan, 1983).

Within the limitations imposed by these constraints, for the ten cases studied here, the LIPS provided more detailed information on different areas of cognitive functioning
than could be readily obtained from the SPM, supporting the first hypothesis. However, in those cases where it had been possible to administer most of the WAIS-R, and where interpretation was not compromised by language impairments, the LIPS profile did not contribute significantly to the information already obtained.

4.2 Comparison of qualitative information

As this was an exploratory study, qualitative data was not collected in a predetermined or structured manner, but was confined to the kinds of observations made contemporaneously by the testers as part of normal clinical practice. Such observations inevitably reflect the degree of clinical experience and, probably, personal biases of the testers. Thus, the data obtained represent only examples of what might be gathered by an observant tester. Whilst some observations were unique to particular individuals, others were common to many or all of the subjects. Across the ten cases studied, the number of items of qualitative information recorded from the LIPS was four times that recorded for the SPM, suggesting that the LIPS provides a much richer source of qualitative observations, and providing empirical support for the second hypothesis. Once categorised, sixteen categories of qualitative information were noted from the LIPS, compared with ten categories for the SPM. Seven of the categories were in common (i.e. they related to the same construct or to opposite poles of that construct). A greater proportion of SPM categories were idiosyncratic, relating to only one subject. This supports Lezak's (1983) contention that multiple-choice tests do not generally allow for detailed qualitative observations of behaviour.
It is interesting to note the consistency with which certain types of observation were recorded during the LIPS. Whilst this clearly reflects, to a large extent, the aspects of performance deemed by the current examiner to be of relevance, it does suggest the possibility of developing an observational profile which might be used systematically to supplement the quantitative information from the clinical profile.

Quantity of qualitative observations cannot, of course, be equated with usefulness, an aspect which is discussed below.

4.3 Contribution of qualitative and quantitative information to development of a rehabilitation programme

Examination of the case studies indicates that in all cases except those where a WAIS-R had been administered without complications, within the constraints outlined the quantitative and qualitative information from the LIPS affected decision making on the type and content of rehabilitation programmes. In view of the limitations described above, the quantitative information was mainly used to identify areas where further, more detailed, investigation was indicated. This is, however, consistent with the hypothesis-testing approach to assessment (Lezak, 1983; Walsh, 1978; 1985), in which hypotheses based on initial information are progressively tested and refined in the light of information obtained. This individualised approach has been described by Cohen and Mapou (1988) as being particularly appropriate in rehabilitation settings.

The qualitative data were used in a number of ways. First, they were used to inform clinical opinion on the underlying causes of difficulty with particular test items. For
example, in Case Study 4, it was noted that HD was sometimes able to complete items correctly when prompted to check, suggesting that the difficulty lay not so much in the underlying skills necessary for task completion, but in identifying and using feedback about her performance to monitor and modify that performance. In Case Study 5, it was clear from qualitative observation that GR performed well when the task drew on old, well-learned skills, but that he had difficulty in determining what was required of him in a novel situation. Second, the qualitative information was used in conjunction with quantitative data to guide clinical decisions about the type of rehabilitation approach that would be most appropriate. Finally, the case studies showed that qualitative observations were often generalisable to other aspects of behaviour and were therefore highly relevant in suggesting particular rehabilitation strategies that might be adopted.

4.4 Correlation between LIPS and SPM scores

The correlation between raw scores on the LIPS and the SPM was 0.88. However, this finding must be treated with caution in view of the very small numbers involved. Of more importance to the clinician concerned with interpretation of test data in individual cases, is the very significant individual differences found once raw scores were converted to IQ scores for the two tests. The finding that IQ scores obtained from the SPM were consistently higher than those from the LIPS is consistent with findings from other validation studies comparing the LIPS with well established measures of intellectual functioning (Ratcliffe and Ratcliffe, 1979). Ratcliffe and Ratcliffe suggest that the difference lies in a combination of standardisation weaknesses
for the LIPS, together with the all-or-nothing scoring system, which heavily penalises the subject who places only one or two blocks incorrectly. However, the results from these ten case studies suggest that other factors may also be relevant when the tests are used with subjects with acquired brain injury. Not only are the individual differences greater than those found in the studies reported by Ratcliffe and Ratcliffe, the size of the discrepancy varied considerably. In the 6 cases where IQ scores for both assessments could be calculated, the differences ranged from 8 to 33 IQ points, with three of the subjects having a difference of 20 or more points.

In several of the cases studies, the LIPS IQ score must be of doubtful validity. Where there is a very “spiky” profile, with a combination of passes and fails across test items over a wide age range, the concept of a single score indicating level of functioning becomes meaningless. Again, this is not a problem unique to the LIPS, since it applies equally to calculation of IQ scores on the WAIS-R in cases where there are wide variations in sub-test scaled scores. However, this does not appear to be a sufficient explanation. For example, in Case Study 3, where a discrepancy of 33 IQ points was noted, JK’s scores on the LIPS were remarkably consistent, with all items passed at the 7-year level and no items passed at the 9-year level. JK’s tendency to fall foul of the “all-or-nothing” LIPS scoring system is likely to be a contributory factor, but the extent of the difference between her performance on the two tests remains unexplained.

One possible explanation for the difference may lie in the fact that the SPM is generally considered to be a “pure” measure of intellectual ability. It is a widely recorded
phenomenon that some patients, following certain types of acquired brain injury, may perform well on standard intelligence tests, but seem unable to apply their abilities effectively in their everyday life. This has been related to disruption of certain higher level cognitive functions, predominantly associated with damage to the frontal lobes, and including functions such as initiation, planning and organisation, and maintaining goal-directed behaviour (Lezak, 1983). It is thought that the structure imposed in most test situations assists subjects with such deficits, such that the test performance is not a reliable indicator of performance in less structured, everyday situations. It is possible that the LIPS, with its absence of specific instructions and its reliance on the subject developing an understanding of task requirements through exposure to earlier, easier items, makes a greater demand on these higher level cognitive functions than some other tests of intellectual functioning, including Raven’s Matrices. It is not possible to draw any conclusions regarding this possibility on the basis of the limited data available from these case studies, but may well be a topic worth further investigation. The extent to which these factors might also affect performance on the SPM is not clear. Lezak (1983) suggests that initiation, planning and self-monitoring are less likely to be required for satisfactory performance on the matrices than on some other tasks, whereas Carpenter, Just and Snell (1990) found goal-management to be an important component of superior performance on the Advanced Progressive Matrices. This latter finding is likely to be of less relevance to the simpler SPM.

In the case of both tests, it is likely that specific cognitive deficits, such as apraxia and visual perceptual or constructional disorder, will affect performance. Some evidence is available in the literature of the impact of such deficits on SPM performance, as
discussed above, but there is at present no comparable empirical evidence for the LIPS.

4.5 Relative costs

In terms of both time taken to administer the test, and in cost of the test itself, there is no question that the SPM is a less costly instrument than the LIPS. In situations where a simple indication of overall level of functioning is required, the SPM would undoubtedly be the instrument of choice.

Time taken to complete the LIPS is substantial, and more similar to that required for the WAIS-R than for the shorter SPM. However, given the greater availability of the WAIS-R, and the significant body of literature regarding its use in neuropsychological assessment, most clinicians would choose this in those cases where it could be administered without being compromised by language or other impairments.

The LIPS is not readily available in most psychology departments, and is an expensive item to purchase. Decisions on its cost-effectiveness must depend on the client group concerned and the purpose to which the results are to be put. In this study, it has been shown that the LIPS can assist in assessment and treatment planning for individuals with significant impairments of language, where other methods of assessment may not be practicable.
5. CONCLUSIONS

The series of case studies described here suggest that where more conventional neuropsychological assessment is constrained by impairment of language functioning, the LIPS can make a useful contribution to assessment and to clinical decisions on the planning of individual rehabilitation programmes. The test can be readily administered to people with any degree of language impairment, and is generally found to be acceptable to the subjects. This study showed that the LIPS lends itself well to the collection of qualitative data which, together with quantitative information, could be used to assist in clinical decisions regarding the management of individual cases. However, the LIPS is expensive and time-consuming, and it is unlikely that it would be selected in preference to the WAIS-R in cases where the latter could be administered satisfactorily. The LIPS does not have the benefit of any body of literature to assist in interpretation of the performance of individuals with acquired brain injury, nor was it designed within any explicit model of cognitive functioning. Direct comparison of different cognitive skills is not possible in the way that can be achieved with scaled sub-test scores on the WAIS-R.

Comparison of the IQ scores obtained from the LIPS with those derived from the SPM, suggests that the LIPS scores must be treated with great caution as indicators of overall levels of cognitive functioning in adults with acquired brain injury. IQs were consistently lower than those obtained from the SPM and the discrepancy in many cases was extreme. This is in contrast with validation studies comparing the LIPS with other tests of intellectual functioning, where a much lower and less varied level of individual difference was found. This is an area which certainly merits further
investigation. In particular, it is important to understand whether this variability might stem from the differential impact of certain types of cognitive impairment on the LIPS compared with other, commonly used assessments.

The clinical profile devised by Levine et al. (1975), whilst providing some form of systematic organisation of the LIPS results, does not readily meet the needs of the clinical neuropsychologist. The categories used do not necessarily map directly onto recognised cognitive functions, and appear to have been derived by "armchair logic", rather than formal factor analysis or other systematic methodology. If the LIPS were to be adopted more widely as a tool for neuropsychological assessment, it would be helpful for a more appropriate and methodologically sound profile to be developed, preferably based on neuropsychological models of cognitive functioning and a more thorough investigation of component cognitive skills. This would, however, be a major undertaking.

The qualitative information reported in this study was obtained in an ad hoc manner, according to the normal clinical practice of the particular examiner. The consistency of use of certain categories of observation, coupled with the apparent benefits of such information, suggests that it might be possible to develop a profile which would assist in the collection of qualitative information, and which might be of particular benefit to the less experienced clinician. In developing such a profile, careful consideration would need to be given to issues such as inter-rater reliability. The benefits of a profile of qualitative observations would be considerably enhanced by a related study to
investigate the significance of these factors in terms of outcomes. A more systematic study of the extent to which these qualitative observations correlate with observations made in naturalistic settings would also be useful.

The findings regarding the significant but varying individual differences in overall performance on the LIPS and the SPM highlights the importance of gathering data on the effect on LIPS performance of particular categories of acquired cognitive impairment. The cases evaluated in this study suggest that one important factor to consider is the relative effect of frontal lobe impairment on LIPS performance compared with other tests of intellectual functioning which have been regarded as less sensitive to these deficits. Of particular significance, especially since the LIPS is only likely to be of benefit in cases where language impairment constrains the use of the assessment of choice, is an investigation of the effect of aphasia on performance. The LIPS has been used with children who are deaf and dumb, or who have developmental language disorders, but it would not be appropriate to draw any conclusions from these studies as to the possible effect of acquired disruption of language functioning in adults.

Overall, this study has shown that there are a number of significant limitations to the LIPS as a tool for neuropsychological assessment. However, in situations where more appropriate methods of assessment cannot be used, the LIPS can make a contribution to understanding the cognitive functioning of the individuals concerned and can help in indicating ways in which rehabilitation programmes may be tailored to individual needs. Whilst the LIPS is far from ideal as an assessment tool, until more
satisfactory methods have been developed for assessment of this client group, it offers some basis on which the clinical neuropsychologist can begin to gain a clearer understanding of cognitive functioning. However, this study has highlighted a number of areas where further work might enhance the usefulness of the information which can be obtained.
REFERENCES


APPENDIX A

LEITER INTERNATIONAL PERFORMANCE SCALE:
CLINICAL PROFILE RECORD FORM

NAME: ____________________________

DATE: ____________________________

D.O.B.: __________________________

C.A.: ____________________________

M.A.: ____________________________

I.Q. RANGE: ______________________

EXAMINER'S NOTES: ____________________________

INSTRUCTIONS: Draw a vertical line through the basal and terminal ages. Identify subtests passed by circling appropriate responses.

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By: Martin N. Levine, M.A.
Robert M. Allen, Ph.D.
Leslie N. Alker, M.S.
Walter Fitzgibbon, Ed.D.