A Portfolio of Study, Practice and Research:
Submitted for the Doctorate of Psychology (PsychD) in Clinical Psychology

University of Surrey

Volume One

Investigating spatial reasoning skills among individuals diagnosed with Asperger syndrome

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INTRODUCTION TO THE PORTFOLIO

This portfolio comprises two volumes, which each contain a selection of work completed during the Doctorate of Psychology (PsychD) clinical training course.

Volume 1 comprises an academic section, consisting of the four essays written as a requirement of the PsychD; a clinical section, containing summaries of the six placements completed over the three years of the course and summaries of five formal case reports; and a research section, comprising the service related research project completed in Year 1, the qualitative research project completed in Year 2, the major research project completed in Year 3, and a research log book.

Volume 2 of the portfolio is primarily a clinical dossier containing the five case reports, the placement contracts and logbooks, examples of clinical correspondence, and placement evaluation forms. Due to the confidential nature of the clinical material, this volume will be kept within the Clinical Psychology department of the University of Surrey.

The work presented in each portfolio reflects the range of client groups, presenting problems and psychological approaches covered during the course. Within each volume, the work is presented in the order in which it was completed to illustrate the development of clinical, academic, and research skills during the period of training.
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Compare and contrast the evidence base for two different theoretical models of eating disorders. What implications does this have for the delivery and provision of clinical services for people with eating disorders?

Year 1

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INTRODUCTION

Almost all contemporary theories of eating disorders acknowledge an influence of multidimensional factors. In fact, there is a general consensus throughout the literature that eating disorders arise from a complex interaction of biological, psychological and social factors (Vitousek, 1996). Nevertheless, different theoretical models emphasise the relative contribution of specific factors for their role in the development and maintenance of psychopathological symptoms. The focus of the present essay will be to consider those factors emphasised by the cognitive and psychodynamic models of eating disorders.

The essay will begin with an overview of the primary theoretical propositions that cognitive and psychodynamic models offer for the symptoms of anorexia nervosa and bulimia nervosa. Following this overview, there will be a comparison of current evidence for the validity of aetiological and maintaining hypotheses derived from each model. Included in this comparison will be a summary of the empirical research investigating specific cognitive and psychodynamic hypotheses, critical evaluation of the methodologies employed in this research, and consideration of the implications the evidence has for the delivery and provisions of clinical services for people with eating disorders.

OVERVIEW OF COGNITIVE MODELS OF EATING DISORDERS

Initial cognitive models of anorexia nervosa (Garner & Bemis, 1982; 1985) and bulimia nervosa (Fairburn, 1981; Fairburn, Cooper, & Cooper, 1986) were based on Beck’s cognitive theory of psychopathology (Beck, 1976; Beck, Rush, Shaw, & Emery, 1979). According to Beck and his colleagues, psychopathological conditions emanate from cognitive structures (i.e. schemas) and belief systems that are dysfunctional or maladaptive. These schemas and beliefs, which develop from earlier life experiences, systematically bias the way environmental information is processed and interpreted. Biased information processing in turn impacts on consciousness with the production of negative automatic thoughts and images that interact and drive pathological emotions and behaviours (Clark & Steer, 1996). Thus, the cognitive perspective holds that negative automatic thoughts and biased cognitive processes are symptoms of the psychopathological condition that have a mediating role in maintaining cognitive, emotional and behavioural symptoms (Beck, 1987).

1 The diagnostic criteria for each of these eating disorders are presented in Appendix A
Cognitive Models of Eating Disorders – Aetiology
In general, cognitive models of eating disorders propose that maladaptive thinking patterns concerning one’s self, body shape, and weight are central in the aetiology and maintenance of eating psychopathology (Fairburn et al., 1986; Fairburn, Shafran, & Cooper, 1999; Garner & Bemis, 1985; Vitousek & Hollon, 1990). Both anorexia and bulimia are held to evolve from general, unconditional core schema, which reflect the individual’s perception of global incompetence and negative self-evaluation. These core schemas are typically characterised by a sense of worthlessness, guilt, failure, desired perfectionism, and/or the fear of criticism (Vitousek & Hollon, 1990). Attempts to alleviate the distress caused by these maladaptive schemas are hindered by schema driven biases that function to keep them unchallenged and unchanged (Vitousek, 1996). Instead, the continued presence of maladaptive schema and compensation processing biases, along with other sociocultural influences, give rise to maladaptive solutions – dieting and weight loss.

Cognitive Models of Eating Disorders – Maintenance
Initial dieting and weight loss bring feelings of self-control and positive reinforcement from others (Cooper, 1997). For anorexics, relentless dieting is maintained by the self-reinforcement they get from the sense of mastery, self-control, and competence derived from successful dieting (Garner & Bemis, 1985; Vitousek & Hollon, 1990). This reinforcement gives rise to dysfunctional assumptions and beliefs that tend to be specifically concerned with weight and shape, such as the need to be thin, the fear of weight gain, the use of weight and shape as the primary measure of self worth, and the desire for complete self control (Garner & Bemis, 1985).

According to Garner and Bemis (1985), the rigid and extreme nature of these weight and shape related beliefs promote dysfunctional styles of reasoning (e.g., overgeneralization, perfectionism, all-or-nothing thinking) and information processing biases (e.g., selective attention and memory), which are reflected in negative automatic thoughts that mediate psychopathological behaviour. For example, automatic thoughts that small increments in weight will inevitably progress to obesity and ingested food will be instantly converted to fat may motivate anorexic patients’ frequent weighing and avoidance of food intake. Similarly, thoughts that vomiting or laxative abuse help rid the body of unwanted calories may support purging behaviour. Once behaviour becomes dominated by negative automatic thoughts, even
the punishing consequences of these behaviours (e.g., starvation) fail to prompt change in beliefs, and the cycle of mediated behaviours and negative automatic thoughts continues.

Fairburn et al., (1986) offer a similar account for the maintenance of bulimic symptoms. Like anorexic patients, bulimics tend to develop dysfunctional assumptions and beliefs concerning their weight and shape. Many of these beliefs correspond with those of anorexics, for example self worth is believed to come almost entirely from weight and shape, and although weight gain and food are not feared to the same extent as with anorexics, fatness is viewed negatively and thinness and self-control positively. These dysfunctional beliefs justify the overgeneralised and extreme connotations individuals attach to events concerning weight gain or loss and to states of fatness or thinness. The negative automatic thoughts that ensue drive much of the bulimics strict dieting and weight related behaviour. However, because food is not feared to the same extent as with anorexic patients (especially restricting type) these dysfunctional thought processes also subserve episodes of overeating. Cooper (1997) describes how the intense concern with shape and weight is deemed to be the force behind patients adopting extreme dieting rules that are impossible to maintain. When they inevitably deviate from their diet, even slightly, bulimics see it as a reflection of their lack of self-control and evidence of weakness. These patients subsequently may abandon all dieting controls and engage in binge eating.

OVERVIEW OF PSYCHODYNAMIC MODELS OF EATING DISORDERS
Current psychodynamic conceptualisations of psychopathology come from drive-conflict (id, ego, superego), object relations, and self-psychology orientations. According to Johnson (1991), these models share a common focus on how interactions with the environment shape the way one thinks and acts, and that with the progress of time one's developed sense of self-identity helps regulate these interactions. If the sense of self is adaptive to the environment and the individual is sufficiently satisfied with these adaptations they are less likely to develop psychopathological symptoms (Johnson, 1991). However, if self-identity is maladaptive or the individual is not content with the self then symptoms are likely to emerge. Conceptualised in this way, symptoms are generally thought to be symbolic efforts to communicate the nature and extent of the individuals struggle. Moreover, symptoms are thought to persist until patients come to realise and understand the underlying deficit they represent, and attempts are made to satisfy unmet needs.
Psychodynamic Models of Eating Disorders – Aetiology

The psychodynamic perspective on eating disorders has been particularly influenced by the theory of self-psychology (Goodsitt, 1983; 1985; Kohut, 1971), which will be the primary psychodynamic approach considered for the remainder of the essay. The basic premise of the self-psychology approach is that eating disorders are symptomatic expressions of undeveloped or incomplete mental structures, and reflect a disorder of the self (Geist, 1989; Goodsitt, 1985). More specifically, an individual’s capacity to maintain self-esteem, cohesion, and various other self-regulating functions provides the foundation from which they adapt to environmental and internal changes. However, if self needs are not affirmed throughout early developmental experiences then these capacities may be absent, impaired, or unstable. These deficits leave the individual with limited access to their emotional lives and dependent on their physical appearance as a source of gratification (Sands, 1989). Consequently, when the need to adapt to changes arises, the deficits in self-regulating structures are revealed through bodily symptoms such as eating disorders (Sands, 1989). In short, the self-psychology perspective, like the cognitive models of eating disorders, implicate maladaptive core schemas concerning one’s self as a central aetiological factor in eating psychopathology.

Psychodynamic Models of Eating Disorders – Maintenance

In contrast to the cognitive models, the self-psychology model holds that maladaptive core schemas alone are sufficient to elicit and maintain psychopathological behaviours. For example, when the integrity or cohesion of the self is threatened the anorexic’s incapacity for self-regulation leaves them feeling inadequate, ineffective, and out of control. Starvation and constant activity in the form of physical exercise help divert attention from these painful internal states, while the focus on food, weight and ritualistic behaviours provides a sense of control. For bulimics, who are poorly equipped to regulate mood, self-esteem, and cohesion, a threat to self-integrity leads them to body manipulation in the form of binging, purging, and weight control. By adopting these behaviours they temporarily restore a sense of effectiveness. Thus, the self-psychology model views the symptoms of anorexia and bulimia as serving a restorative purpose. Moreover, once these symptoms develop into a chronic condition they provide patients with a compensatory identity, which in itself provides the patient with the sense meaningfulness in the world (Goodsitt, 1985).
EVIDENCE BASE FOR COGNITIVE AND SELF-PSYCHOLOGY MODELS OF EATING DISORDERS

Initial adaptations of Beck's (1976) cognitive theory and Kohut's (1971) analysis of self into models of eating disorders stem from clinical observations, case reports, and possibly some degree of introspection. Unfortunately, these sources of evidence are limited insofar as uncontrolled observations and clinical interview are subjective. Furthermore, the lack of comparative control groups prevents identification of features that are unique to eating disorders as opposed to features shared with concurrent psychological disorders (Cooper, 1997). Recent developments in National Health Service policies, particularly the emphasis on clinical effectiveness and accountability, have highlighted the need for evidence based clinical practice (see, Division of Clinical Psychology, 1998). The remainder of this paper will evaluate and compare empirical evidence for the validity of the aetiological and maintaining hypotheses outlined by cognitive and self-psychology models of eating disorders.²

AETIOLOGICAL FACTORS

Core Self-Cognitions

Empirical Evidence Base. Both the cognitive and self-psychology model of eating disorders hypothesise that maladaptive core cognitive structures are at the root of eating disorders, and that these core cognitions reflect a global deficit of the self and the world. Recently, controlled empirical studies have begun to examine the contribution maladaptive core self-beliefs make to eating psychopathology. For example, Marshall, Palmer, and Stretch (1993) compared core beliefs of female anorexic, bulimic, and control group patients and found that women with anorexia held beliefs reflecting negative self-esteem and self-evaluation much more frequently than women in the control group, for whom such beliefs were largely absent. Bulimic women were also found to hold these negative beliefs with the same conviction as anorexic women, although they tended to do so less consistently. Similarly, Cooper, Todd & Cohen-Tovée (1996) found that both anorexic and bulimic women recorded significantly more negative core self-beliefs than control group women using a sentence completion task.

² A notable exclusion from this evaluation is a review of outcome studies of treatments based on each of these models. Outcome studies offer a rich source of information often used to reflect the validity of theoretical propositions. A thorough review of such information is beyond the scope of this paper, which instead has focused primarily on the theoretical propositions derived directly from the models and not how these hypotheses are adapted into therapeutic procedures.
These studies serve to support the basic premise that maladaptive core beliefs are involved in eating psychopathology. However, these studies do not address which self-related beliefs are more prominent than others in the development of different eating symptomatologies. In other words, there is no empirical evidence concerned with the specific contents of those core beliefs associated with anorexia and those associated with bulimia. This lack of evidence may in part be because neither the cognitive nor self-psychology models themselves are particularly clear about the specific contents of the core beliefs involved. The cognitive model simply holds that core self-beliefs involved are characterized by a range of negative evaluations (e.g., worthlessness, guilt, failure and so on). The self-psychology model implicates an absence or deficits in core beliefs that reflect self-identify (e.g., self-esteem, cohesion, self-regulation). What is missing from these models, and subsequently the evidence is a clear understanding of the core idiosyncratic cognitive profile associated with anorexia and bulimia.

One attempt to address this problem has been initiated by Leung, Waller & Thomas (1999). In their study, they evaluated the specific content of core self-schemas among individuals with anorexia, bulimic-anorexia, bulimia, and normal controls using a measure of 16 core beliefs relating to one's evaluation of self and evaluation of their role in the world. Leung et al (1999) found that there were different patterns of association of core beliefs with eating psychopathology between anorexia and bulimia patients. Unfortunately these findings are limited in their generalization because of the relatively small sample size and because several important confounding variables (e.g., mood state) were not controlled.

Clinical Implications. The evidence concerning the role of core self-schema in the aetiology of eating disorders is disappointing. Studies to this point (with the exception of Leung et al., 1999) have tended to focus on the extent to which anorexics and bulimics have maladaptive self-schemas compared with healthy controls. One of the major concerns about this approach is that maladaptive self-beliefs generally accompany a variety of psychological disorders. Without knowledge of the pattern of core beliefs associated with anorexia and bulimia it is

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3 Young’s Schema Questionnaire (YSQ; Young, 1994) assesses core beliefs such as: functional incompetence (belief that one is not competent and cannot be independent); defectiveness/shame (belief that one is internally flawed); enmeshment (the lack of individual identity due to emotional over involvement with others); insufficient self-control (the belief that one cannot control their impulses or feelings); social undesirability (the belief that one is unattractive to and disliked by others); unrelenting standards (the belief that one should strive for unrealistic standards)
more difficult to isolate the specific eating disordered core beliefs from those beliefs that
underlie anyone of a number of concurrent psychological conditions. In practical terms, this
leaves the clinician to tackle all core self-schemas that reflect negative content. The result is
more therapy time spent addressing general psychopathology than time necessarily focused on
specific core beliefs that attach meaning to anorexic or bulimic symptoms. Thus, it would be
helpful to continue to establish links between specific core belief profiles associated with
different eating disorders. As well as informing cognitive and psychodynamic models of
eating disorders, this would help optimise clinical interventions for specific
psychopathologies.

**Underlying Assumptions - Weight and Food Related Beliefs**

*Empirical Evidence Base.* Both the cognitive and self-psychology models implicate
maladaptive core cognitions concerning one sense of self in the aetiology of eating disorders.
In addition, the cognitive model also strongly endorses the presence of dysfunctional
underlying assumptions specifically concerned with weight, shape, and food. These are held
to be rigid and extreme beliefs (and rules) that govern one’s perception of various situations
(Beck, 1996). The self-psychology model makes no specific endorsement of weight and food
related beliefs, but instead implies a more direct relationship between core self-cognitions and
eating disorder symptoms.

In accordance with cognitive models of bulimia (Fairburn et al., 1986), several studies have
attempted to assess cognitions concerned with weight, shape and food (e.g., Mizes, 1988;
Schlesier, Hamilton, O'Neil, and Lydiard, 1989; Schulman, Kinder, Powers, Prange and
controls, and found among bulimics, but not controls, that restrictive eating standards were
associated with low self-efficacy for dieting, self-control deficits, distorted body image
beliefs, and distorted eating related attitudes such as self-esteem derived from weight and
striving for perfect self-control. Schlesier et al., (1989) found that bulimics showed a higher
level of agreement with various assumptions concerned with weight, body shape, and food
and eating, regardless of depression (and thus beyond general psychopathological beliefs).

Fewer studies have attempted to assess the weight, shape and food related beliefs relevant to
anorexia. Mizes (1992) compared anorexics with bulimics and psychiatric controls and found
that both anorexics and bulimics scored more highly than psychiatric controls on agreement with weight and food related beliefs concerned with strict weight regulation, desired approval, and excessive self-control. There were no difference found between anorexics and bulimics. Unfortunately, despite evidence of internal consistency and concurrent validity for the assessment scale employed, the generalisation of Mizes’ (1992) findings is limited because of an extremely small sample size.

Clinical Implications. Overall, evidence supports the existence of weight and food related cognitive disturbances among bulimics (and to a lesser extent anorexics). In terms of clinical implications, the recognition of dysfunctional weight and food related beliefs requires that a relative proportion of therapy be devoted to assessing the content and environmental contingencies that reinforce a patient’s dysfunctional beliefs. Based on this assessment, therapists will be better equipped to devise structural interventions aimed at establishing more adaptive underlying beliefs. The assessment of dysfunctional weight and food related beliefs are likely to involve clinical interviewing and the use of standardised self-report inventories. One concern undermining this approach at present is that many of the inventories do not adequately separate content areas, particularly weight and shape from food and eating (Cooper, 1997). Without sufficiently distinguishing between belief content areas the combination of clinical interview and self report may be susceptible to being reactive, that is, simply confirming the therapists formulations and missing cognitions that they may have overlooked. Moreover, without further studies to distinguish between specific content areas it is difficult to assess (a) whether food and eating beliefs are secondary to weight and shape beliefs, or vice versa (Fairburn & Cooper, 1989), and (b) whether these beliefs change as individuals swap between a diagnosis of anorexia and bulimia.

MAINTAINING FACTORS
Review of empirical evidence to this point has focused on the aetiological hypotheses set out by the cognitive and self-psychology models of eating disorders. The evidence for disturbance in core beliefs has been encouraging in validating aspects of both cognition and self-psychological models (with some limitations), whereas evidence for disturbances in weight and food related beliefs has been generally supportive of the cognitive orientation. What remains to be addressed is how these aetiological features (i.e. core beliefs and in the
case of cognitive models underlying assumptions) serve to influence and maintain eating disordered behaviour.

Self-Psychology Direct Relationship

*Empirical Based Evidence.* As stated above the self-psychology model implies that disturbances in core self-cognitions impact directly to influence and maintain eating disorder symptoms. Early developmental experiences in which the child’s subjective experiences are largely ignored are thought to contribute to disturbances of mental structures. These disturbances include impairment of the sense of self-effectiveness, the capacity to access or tolerate emotions, and impairment of cohesion and regulation of self-experiences. Self-imposed starvation, binge-purge episodes, and excessive exercise are manifestations of the disturbances that are thought to provide a desperately needed sense of organization and identify to an otherwise sense of self (Geist, 1989; Sands, 1989). This theoretical formulation lacks a clear specification of the mechanisms or processes by which cognitive disturbances elicit problematic eating disorder symptoms. Rather, the model assumes the symptoms to be a symbolic communication of the individual’s internal conflict. Moreover, the link between disturbances, symbolism and symptoms is deemed to be accessible only through the individual’s subjective experiences. This conceptualisation does not lend itself to quantitative empirical investigation but instead is reliant upon clinical observation and vignettes for indirect support.

*Clinical Implications.* Despite a lack of empirical based evidence linking core cognitive disturbances to symbolic symptoms, dynamic psychotherapy approaches incorporating aspects of the self-psychology model remain active. One reason for this may be that there is no evidence to demonstrate conclusive superiority of any one therapeutic approach (Department of Health, 2001). In fact, treatment outcome trials have found psychodynamic approaches to be particularly helpful in sustaining long term functioning (e.g., Garner, Rochert, Davis, Garner, Olmsted & Eagle, 1993; Treasure, Todd, Brolly, Tillo, Nehmed & Denman, 1995).

The nature of self-psychology based psychotherapy requires ‘sustained interest in the patient’s authentic subjective experience [so that it] promotes the identification, organisation and integration of emotional experience and the consolidation of a more differentiated sense of self’ (de Groot & Rodin, 1998, p.359). There are several implications for the delivery of this
type of therapy. First, this approach requires a reasonable amount of time and training in order to establish an effective therapeutic alliance and address the persistent vulnerabilities associated with the patient's disturbed eating habits. For these reasons, it is not a suitable approach until any immediate dangers associated with low body weight and/or excessive purging have been controlled, the patient has been stabilized, and disordered eating behaviours have subsided. Thus, it should be considered a complementary approach that follows other interventions that focus on more immediate symptom reduction. Second, this psychotherapeutic approach emphasizes (possibly more so than a CBT approach) that therapists maintain a line of empathetic, non-judgmental enquiry in order for the client to feel understood and assisted in organizing their subjective experiences. Only with this trust is the client likely to feel safe in exploring their own subject world and allowing their own sense of self to unfold. Third, there is the suggestion that certain personality factors influence suitability for dynamic therapy, and indeed CBT (de Groot & Rodkin, 1998). These factors might include psychological mindedness, reflectiveness, and motivation for insight and patience.

Information Processing and Automatic Thoughts
In contrast to the self-psychology model of eating disorders, the cognitive model is more explicit in outlining the mechanisms by which core self-schema and underlying assumptions operate to influence eating disorder symptoms. Schema-driven biases that emanate from core self-schema and dysfunctional styles of reasoning and information processing biases that ensue from underlying assumptions are expressed in situation specific automatic thoughts about weight, shape, and food. These negative automatic thoughts are deemed to mediate eating disordered behaviour. Thus, the cognitive model holds that schema-driven processes will be evident in the areas of core self-concerns; dysfunctional styles of reasoning and information processing biases will be found in weight and shape and in food and eating concerns; and that automatic thoughts will reflect concern with weight, shape, food, and eating (Cooper, 1997).

Schema Driven Processes
At present there appears to be no empirical investigation of schema-driven processes associated with core self-beliefs in eating disorders.
Dysfunctional Styles of Reasoning and Information Processing Biases.

Empirical Based Evidence. Dysfunctional styles of reasoning have been investigated using self-report questionnaires designed to assess characteristic cognitive distortions in relation to weight, shape, and food concerns (e.g., Franko and Zuroff, 1992; Hsu, 1990; Lingsweiler, Crowther, and Stevens, 1989). In general, these self-report studies have found that patients with eating disorders, particularly bulimics, report greater frequency and stronger levels of distortion than healthy controls, binge-eaters, and depressed women. Common distortions include overgeneralizations, all-or-nothing thoughts that precede binge episodes, magnification of negative weight related situations, and resolutions to adopt 'stricter' control in the future.

Although self-report studies have supported the existence of dysfunctional reasoning styles outlined by cognitive models of eating disorders, the validity of these findings have been called into question. Vitousek, Daly, and Heiser (1991) argue that self-report assessment of patients with eating disorders may be particularly vulnerable to deliberate falsification as a result of a patients' need to sustain consistency between different aspects of their belief system. Conversely, the tendency for overcompliance among some patients, especially anorexics, may lead them to conform to subtle administration biases (Vitousek, 1996). Also, the capacity to give an accurate account of internal processes may be hampered by the effects of physiological and general cognitive functioning deficiencies associated with eating disorders.

Empirical studies using experimental paradigms to investigate information processing biases have offered an alternative to the methodological constraints of self-report. These paradigms have been particularly useful in the study of eating disorders because they employ tasks in which the underlying purpose is not overtly apparent and the dependant variable is difficult to falsify (Vitousek, 1996). One paradigm, an adaptation of the Stroop test, has been used extensively to investigate selective attention biases. Subjects are asked to name the colour of print used for target words (i.e., feared stimuli such as weight, shape, and food related words) and matched, neutral control words (see Cooper and Fairburn, 1992a for detailed review). Almost all empirical studies have found that both anorexics and bulimics display attention processing biases (i.e. delayed response time) in connection to weight and food related words relative to control subjects, and to their response time to neutral control words (Ben-Tovim,
Walker, Fok, and Yap, 1989; Channon, Hemsley, and deSilva, 1988; Cooper, Anastasiades, and Fairburn, 1992; Cooper and Fairburn, 1992a). Additional comparisons between eating disorder subtypes have revealed that anorexics and bulimics both display profound delayed response times for food related word stimuli, with the response time among anorexics equally delayed for weight related stimuli (Ben-Tovim, et al., 1989; Channon et al., 1988). This finding suggests that attentional bias for anorexics is influenced by both weight related and food related stimuli, whereas for bulimics the bias stems mostly from food related stimuli.

In addition to investigating selective attention biases, experimental paradigms have been used in empirical studies to investigate selective memory biases in patients with eating disorders (e.g., King, Polivy, and Herman, 1991; Sebastian, Williamson, and Blouin, 1996). These studies have used a story recall paradigm and found that anorexic and bulimic patients tend to recall significantly more weight and food related information than healthy controls, and significantly more weight and food related information than any other category of information. Further work needs to be done in this area to determine if these trends are indeed the result of selective bias at the time of recall or rather a consequence of a selective attention bias at the point of input.

Automatic Thoughts

Empirical Evidence Base. The content of situation specific automatic thoughts has been investigated in studies using self-report questionnaires and experimental paradigms. Several questionnaire studies have employed self-statement inventories devised to capture the dysfunctional and erroneous processing of weight and food related information as expressed in automatic thoughts (Clark, Feldman, and Channon, 1989; Phelan, 1987). These studies have found that both anorexic and bulimic patients have higher frequency and intensity of negative, irrational thoughts relating to weight, shape, food and eating, and that these thoughts decrease over the course of treatment and correlate with other eating psychopathology (Phelan, 1987). An important point to keep in mind, however, is that these inventories are susceptible to similar reliability and validity concerns as the self-report measures used to assess dysfunctional styles of reasoning and information processing errors.

A prominent experimental study investigating automatic thoughts of patients with eating disorders was carried out by Cooper and Fairburn (1992b). In this study, subjects (anorexics,
bulimics, symptomatic dieters, and normal controls) were asked to 'think aloud' during and after exposure to three behavioural situations; self weighing, standing in front of a mirror, and eating a chocolate bar. The results indicated that all groups expressed a similar number of weight, shape and food related thoughts in total, but that the thoughts of anorexic and bulimic patients were significantly more negative than those of the other groups. Interestingly, between groups comparisons of separate thought content areas (weight and shape versus food and eating) revealed that anorexics expressed significantly more negative thoughts about eating than control group, while bulimics expressed more negative thoughts about weight and appearance than control groups. Cooper and Fairburn (1992b) suggested that these findings can be used as evidence of a qualitative difference in automatic thought content for anorexics, whose concerns centre on eating, and bulimics who are predominately concerned with weight and shape.

Clinical Implications. The studies reviewed in this section have shown encouraging support for the existence of cognitive processing disturbances (i.e., dysfunctional reasoning style and information processing errors) and negative automatic thoughts concerning weight, shape and food among anorexics and bulimics. This is consistent with the eating disorder models developed by Garner and Bemis (1985) and Fairburn et al., (1986). Much of the current evidence, however, derives from correlation studies investigating associations between cognitive components and symptoms, and therefore no inference of causality can be made between dysfunctional cognitive processing, negative automatic thoughts, and the persistence of psychopathological symptoms. Cooper (1997) argues that to establish an understanding of how and which beliefs, assumptions, processing errors, thought concerns and symptoms are causally related there needs to be a separating out of different areas of concern (both between and within self belief schemas, weight and food related beliefs, and automatic thoughts concerning weight and shape, and food and eating). The current evidence base would be useful in ensuring that any separation of factors would be theoretically motivated.

Despite the need for further investigation, the current evidence still carries implications for clinical services. Evidence that automatic thoughts and cognitive processes have an immediate link to symptomatic behaviour suggests they are a great deal more open to exposure than core or underlying assumptions. On one level, this suggests that therapeutic interventions targeting negative automatic thoughts and dysfunctional cognitive processes
make it a more suitable approach (compared with self-psychology based interventions) in tackling early symptom reduction. In accordance with Cooper and Fairburn's (1992b) findings, cognitive derived therapies for bulimics will demonstrate greater efficacy if they focus on weight and shape concerns, whereas cognitive therapies for anorexics should redirect the emphasis toward eating concerns. On another level, exposure of negative automatic thoughts and dysfunctional processing permits insight to a patient's internal values. This more immediate access to a patient's internal values suggests that CBT may be (a) more applicable in a resource limited National Health Service where time limits are placed on the number of therapeutic sessions, and (b) therapist training is not as extensive as with self-psychology based psychotherapy. Still, resistance to engage in treatment typically displayed by eating disorder patients (particularly anorexics), means it is important that therapists do not use this insight to refute the patient's irrational values. Rather, therapists are required to employ principles of Socratic questioning and guided discovery in getting patients to take a closer look at how their values are supported and the various consequences that result.

CONCLUSION

This essay has reviewed the theoretical propositions of cognitive and self-psychology eating disorder models, and in particular evidence for the hypotheses that stem from each model. Also considered were the implications this evidence could have for clinical services. There is an emerging body of empirical support for various aspects of each model. However, most of the evidence appears to centre on cognitive features that are easily operationalised. Subsequently, empirical support for various cognitive model hypotheses is emerging at a much faster rate than self-psychology derived hypotheses, which remain reliant on clinical observation and case reports for indirect support. Thus, future research needs to focus not only on further validating existing aspects of each model, but also developing current theoretical propositions into more fine grained, operational hypotheses. In the current climate of clinical effectiveness the development and validation of detailed theoretical models will serve to further inform the application of theory derived therapeutic approaches.
REFERENCES


Appendix A

Diagnostic and Statistical Manual of Mental Disorders criteria for anorexia nervosa (DSM-IV 307.1; American Psychiatric Association, 1994)

A. Refusal to maintain body weight at or above a minimally normal weight for age and height (e.g., weight loss leading to maintenance of body weight less than 85% of that expected; or failure to make expected weight gain during period of growth, leading to body weight less than 85% of that expected).

B. Intense fear of weight gain or becoming fat, even though under weight.

C. Disturbance in the way in which one’s body weight or shape is experienced, undue influence on body weight or shape on self-evaluation, or denial of the seriousness of the current low body weight.

D. In post-menarcheal females, amenorrhoea, i.e., the absence of at least three consecutive menstrual cycles (A woman is considered to have an amenorrhoea if her periods occur only following hormone, e.g., oestrogen, administration.

Specify Type:
Restricting type: during the current episode of anorexia nervosa, the person has not regularly engaged in binge eating or purging behaviour (i.e., self-induce vomiting or the misuse of laxatives, diuretics, or enemas.

Binge/purging type: during the current episode of anorexia nervosa, the person has regularly engaged in binge eating or purging behaviour (i.e., self-induce vomiting or the misuse of laxatives, diuretics, or enemas.

Diagnostic and Statistical Manual of Mental Disorders criteria for bulimia nervosa (DSM-IV 307.51; American Psychiatric Association, 1994)

A. Recurrent episodes of binge eating. An episode of binge eating is characterised by both of the following:
(1) eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than most people would eat during a similar period of time and under normal circumstances;
(2) a sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop or control what or how much one is eating).

B. Recurrent inappropriate compensatory behaviour in order to prevent weight gain, such as self-induced vomiting; misuse of laxatives, diuretics, enemas, or other medication; fasting; or excessive exercise.

C. The binge eating and inappropriate compensatory behaviour both occur, on average, at least twice a week for six months.

D. Self-evaluation is unduly influenced by body shape and weight.

E. The disturbance does not occur exclusively during episodes of anorexia nervosa.

Specify Type:
Purging type: during a current episode of bulimia nervosa the person has regularly engaged in self-induced vomiting or the misuse of laxatives.

Non-purging type: during a current episode of bulimia nervosa, the person has used other inappropriate compensatory behaviours, but has not regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas.
Critically review the current status of the assessment and treatment of dementia in adults with learning disabilities.

Year 1

July 2002
INTRODUCTION

The purpose of this paper is to critically review the current status of the assessment and care management of people with learning disabilities (LD) affected by dementia. In terms of assessment, the focus will be to review current diagnostic criteria of dementia and evaluate the adaptations needed for applying these criteria to people with LD. Included in this discussion will be an evaluation of the inherent limitations of using various assessment methods with this population and the presence of co-existing factors that complicate differential diagnosis. In terms of care management, the primary focus will be to critically evaluate the clinical psychologist's role in helping maintain the quality of life of individuals with LD after a diagnosis of dementia has been made.

ASSESSMENT

General Diagnostic Considerations

The term dementia is descriptive and does not in itself imply a specific aetiology. The most common cause of dementia in the general population is Alzheimer's disease (AD), which is characterised by distinct neuropathological features, and whose clinical manifestations are reflected in the progressive decline in functioning (Cummins & Benson, 1992). The insidious onset of this decline may include mild short-term memory and language disturbances, fluctuations in mental status, and unpredictable mood changes. In the later stages of the disease cognitive impairments become more profound, there is a gradual loss of the self-care skills needed for independent living, and personality changes are likely to ensue. Eventually, there is global deterioration of mental and physical functions and death results, usually from immune deficiency (e.g. pneumonia).

Other causes of dementia such as vascular disease, Huntington's disease and HIV have their own unique underlying neuropathology but may produce a similar progressive and irreversible pattern of decline as with AD (see Boller & Muggia, 1999 for review). However, progressive decline of functioning is not necessarily defining of dementia and some dementias with other aetiologies may not result in any further decline beyond the initial loss of functioning. Moreover, dementias due to depression, sensory impairments, or biomedical/chemical imbalances may be reversible insofar that a return to premorbid levels of functioning is possible if successfully treated.
The various aetiologies of dementia carry serious implications for diagnosis, in particular, the need for accurate methods to differentiate individuals who have progressive, irreversible dementia (e.g. AD) from those whose symptoms are due to treatable conditions. At present there are two main criterion systems used for the diagnosis of dementia – Diagnostic and Statistical Manual-Fourth Edition (DSM-IV; American Psychiatric Association, 1994) and International Classification of Disease-Tenth Edition (ICD-10; World Health Organisation, 1992). DSM-IV provides a separate list of diagnostic criteria for the major types of dementia (i.e. those with different aetiologies). In contrast, ICD-10 provides one set of criteria that are designed to first establish a diagnosis of dementia irrespective of aetiology and only once this diagnosis is established does it aim to further define the type of dementia. Both DSM-IV and ICD-10 criteria acknowledge the importance of cognitive decline as a symptom of dementia, although ICD-10 places additional emphasis on “non-cognitive” symptoms (e.g. emotional lability, irritability, apathy, coarsening of social behaviour).

**Current Status of the Diagnosis of Dementia for People with LD**

In the past clinicians and researchers have used a variety of specified and unspecified criteria for the diagnosis of dementia among people with LD. This inconsistency has led to large differences throughout the literature concerning what constitutes dementia for this population and basic empirical findings such as prevalence rates. In response to these problems, Aylward and her colleagues (e.g. Aylward, Burt, Thorpe, Lai, & Dalton, 1997; Burt & Aylward, 1998) have begun to promote the need for wider acceptance of recognised diagnostic criteria for people with LD. Specifically, they have highlighted the advantages of using ICD-10 criteria over DSM-IV on the grounds that the two-step process (i.e. diagnosing psychopathology of dementia and then differentiating the type of dementia) is more likely to encourage clinicians to consider various causes of dementia rather than focus on AD as the likely cause of cognitive decline (Aylward et al., 1997). Furthermore, the greater emphasis placed on “non-cognitive” aspects of dementia within ICD-10 criteria is congruent with empirical evidence that these are the more likely signs of dementia to be manifested and recognised in people with LD (Duggan, Lewis, & Morgan, 1996; Prasher & Chung, 1996). ICD-10 diagnostic criteria for dementia are presented in Appendix A.
Critical Evaluation of Diagnostic Criteria for People with LD

General Decline

One of the most fundamental adaptations in applying ICD-10 criteria for dementia to individuals with LD is that decline of any ability or functioning needs to be documented relative to each individual’s ‘baseline’ level of functioning (Aylward et al., 1997). In the general population a decline is evaluated by comparing a person’s current level of functioning to a ‘normative’ level. However, baseline functioning between individuals with LD is more heterogeneous than the general population and there are considerable variations in the quantity and quality of acquired skills and impairments (Holland, Karlinsky, & Berg, 1993). Consequently, documenting deficits in current functioning for someone with a learning disability may not actually reflect a decline but rather a pre-existing impairment or behavioural problem. Thus, to establish the clinical significance of current functioning requires comparison with what is typical (i.e. baseline) functioning for that person.

To facilitate a comparison between current and baseline functioning in establishing a diagnosis of dementia a growing number of professionals are advocating the need for longitudinal assessment (e.g. Holland et al., 1993; Janicki, Heller, Seltzer, & Hogg, 1996). The rationale behind longitudinal assessment is that an initial evaluation of cognitive, health, and functional abilities would serve as a baseline and would ideally be carried out prior to when the person is likely to be at risk of developing dementia (i.e. beginning at age 40 for individuals with Down’s syndrome and age 50 for those with other types of learning disabilities; Janicki et al., 1996). Subsequent periodic follow-ups would then permit clinicians to quantitatively observe changes in functioning, and thereby differentiate newly developed symptoms of dementia from long-standing impairments.

One advantage of the longitudinal approach is that it is proactive and brings a dimension of objectivity to documenting any decline in functioning. For many individuals with LD the early symptoms of dementia may not be exposed because their lives are based around routine in which they are not required to engage in cognitive or behaviourally challenging tasks (Burt, Loveland, Primeaux-Hart, Chen, Phillips, Cleveland, et al., 1998). Alternatively, if new deficits are exposed overtime they may simply be absorbed by carers in the same way that deficits associated with their learning disability are managed (Oliver, 1998). According to Burt et al., (1998) if the masked symptoms of dementia are only recognised in the later stages
of the disorder then (depending on the degree of learning disability) the individual may no longer be testable and will never have documented changes sufficient to make a diagnosis. Longitudinal assessment will overcome this pitfall of reactive assessment, which in turn will reduce the need to rely solely on retrospective, informant-based reporting.

Despite the advantages of longitudinal assessment, there are several difficulties obtaining a baseline level of functioning and maintaining periodic follow-up. On a clinical level, if there is a progressive decline in functioning due to dementia then the individual’s skills and abilities will change over time, and as a result the type and method of assessment employed may need to change. For example, certain assessment tools may no longer be sensitive enough for evaluating an individual’s current level of functioning and so they are scored below test error level (known as floor effect; Thompson, 1999). Alternatively, there may need to be a shift away from direct assessment methods involving the individual towards informant-based strategies as the demand of direct testing become too distressing for the individual. Some of these problems may be accommodated by employing assessments with a lower floor threshold. However, in doing so there is a corresponding low ceiling which will prevent adequate evaluation of higher functioning across sequential testing (Dalton, 1992). On a more general level, the difficulties concerning longitudinal assessment relate to the increase in workload for professionals as more people with LD live and survive into older age (Zigman, Schupf, Haveman, & Silverman, 1995). Repeated assessments are time-consuming and require cooperation within a multi-disciplinary team. Thus, government health authorities need to be committed to ensuring that the resources are available to develop and sustain the structure needed for longitudinal assessment.

Decline in Memory and Other Cognitive Functions
ICD-10 criteria prescribe that a decline in memory and other cognitive functions are essential for a diagnosis of dementia. In accordance with the previous discussion it follows that documenting a decline of these functions requires a comparison between the individual’s current and baseline level of functioning. Further to comparing current and baseline functioning clinicians also need to consider differences in normal ageing patterns and the effect the person’s pre-existing impairments have on the presentation of symptoms indicative of dementia.
Normal Ageing Patterns: It is important to consider whether memory or other cognitive decline over time is greater than those associated with normal ageing in adults with LD. Just like the general population, a gradual slowing of cognition might be expected among individuals with LD as the result of normal ageing (Cooper, 1998). However, unlike the general population, current evidence suggests that the profile of age-related decline among people with LD may not simulate the profile of normal ageing among people without LD (Burt, Loveland, Chen, Chuang, Lewis, & Cherry, 1995; Devenny, Silverman, Hill, Jenkins, Sersen, & Wisniewski, 1996). There is also evidence that the pattern of normal age decline differs between people with different types of LD (Devenny, et al., 1996). When considering any patterns of normal ageing in adults with LD one needs to be mindful of the impact of cohort effects. Age-related differences between people with Down’s syndrome, other LD, and the general population may stem from differences in education, occupation, healthcare, and living arrangements (Oliver, 1998). Furthermore, previous age-related findings may become dated due to substantial improvements in these areas for people with LD (e.g. Turk, Dodd, & Christmas, 2001). Nevertheless, the current evidence-base would suggest that changes in cognition should be greater than those associated with normal ageing in others with LD (not just the general population) in order to indicate dementia.

Degree of Learning Disability and Adaptive Behaviours: To establish if a decline in cognitive functioning is symptomatic of dementia it is also important to consider the impact the individual’s learning disability might have on the manifestation of memory loss and/or other cognitive impairments. For many higher functioning adults with learning disabilities memory loss and cognitive impairment may be similar to those observed in the general population (Aylward et al., 1997). For adults with more severe LD the loss of cognitive functions could be manifested quite differently. Aylward et al., (1997) listed a number of characteristic symptoms that might be indicative of various degrees of memory loss and cognitive impairment for individuals with mild to moderate LD and individuals with more severe LD. These symptoms are summarised in Table 1.

Knowledge of changes in cognition is usually brought to the attention of the clinician by the care-giver who is concerned by changes in the individual’s adaptive behaviour (McKenzie, Harte, Patrick, Matheson, Murray, 2002). Carers may report that the individual no longer
Table 1. Symptoms of Decline in Memory and Other Cognitive Functions for Adults with Mild-Moderate and Severe Learning Disabilities.

<table>
<thead>
<tr>
<th></th>
<th>Mild-Moderate Learning Disability</th>
<th>Severe Learning Disability</th>
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<tr>
<td><strong>Memory</strong></td>
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<tr>
<td>Mild Memory Loss</td>
<td>- Forgetting social arrangements</td>
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<td></td>
<td>- Locating recently-placed objects</td>
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<td></td>
<td>- Remembering information given by care-givers</td>
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<tr>
<td>Moderate Memory Loss</td>
<td>- Reporting events that happened throughout the day</td>
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<td></td>
<td>- Remembering names of family members</td>
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<td></td>
<td>- Finding their way around their own house or neighbourhood</td>
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<tr>
<td>Severe Memory Loss</td>
<td>- Increased need for prompting to complete previously learned tasks</td>
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<td></td>
<td>- Increased failure to recognise friends and family</td>
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<td><strong>Other Cognitive Functions</strong></td>
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<tr>
<td>Abstract Reasoning</td>
<td>- reduced ability to choose correct clothing for the weather</td>
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<tr>
<td>Planning/Organisation</td>
<td>- reduced ability to carry out non-routine tasks (e.g. shopping)</td>
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<tr>
<td>Apraxia:</td>
<td>- reduced ability to carry out routine tasks (e.g. grooming)</td>
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<tr>
<td>Agnosia:</td>
<td>- inappropriate use of objects</td>
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<tr>
<td>Aphasia:</td>
<td>- only noticed in those with good language skills</td>
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<tr>
<td><strong>Severe Learning Disability</strong></td>
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<tr>
<td><strong>Memory and Other Cognitive Functions</strong></td>
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<tr>
<td>Often manifest via a reduction in previously acquired skills</td>
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<td>Not necessarily documented with standardised neuropsychological testing but instead maybe based on indirect informant report.</td>
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<tr>
<td><strong>Changes in Emotional, Motivational and Social Behaviour</strong></td>
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<tr>
<td>Need to determine if behaviour is a function of the learning disability or whether it is overshadowing underlying clinical change</td>
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travels outside their home unless accompanied by another person or that the individual requires additional support with self-care tasks such as grooming or preparing meals. In recent years, the association between a decline in adaptive behaviour skills, ageing, and dementia has been extremely well established among people with LD (see Prasher, 1998 for review), to the point that it is now considered good practice to incorporate an evaluation of these behaviours as part of the assessment protocol for dementia (Janicki et al, 1996).
Typically, this assessment will be based on a semi-structured interview schedule or rating scale involving one or more persons familiar with the individual, and will aim to document changes in emotional control, motivation, and social activities that reflect changes in underlying cognitive function (Cooper & Prasher, 1998).

There are a number of interview schedules and rating scales currently available whose psychometric properties have been confirmed for assessing adaptive behaviours for people with LD (e.g. Deb & Braganza, 1999; Evenhuis, 1996; McKenzie et al., 2002; Prasher, 1997). These informant-based assessments are popular because they are usually easy to administer, do not require the expertise of a highly trained professional, and do not require participation of the individual. Despite these advantages, there are several issues that may draw the reliability and validity of informant-based assessment methods into question. First, staff and care-givers vary in the amount of time they spend with the person being rated and the context in which they spend their time with the individual, and therefore may have different perceptions of the individual's behavioural skills (Oliver, 1998). Second, employed staff may be subject to high rates of turnover and it may be that they are yet to have the opportunity to fully observe the various domains of adaptive behaviour. Third, the training and occupational experience of carers may inadvertently influence their ratings, for example, if they are required to make subtle medical and psychological distinctions between observed deficits (Oliver, 1998).

In view of the inherent problems associated with informant-based reporting it is essential that the diagnostic process of dementia for people with LD is supplemented with direct cognitive assessment. Direct assessment strategies involve standardised procedures for rating specific cognitive functions based on the individual's actual performance across different neuropsychological tests and/or controlled behavioural tasks. These tests yield clear numerical data that represent the level of functioning for specific cognitive domains, which providing they are sufficiently sensitive and specific, will enable examiners to detect subtle changes in cognitive skills over time even in the presence of pre-existing intellectual impairment (Crayton, Bradbury, Oliver, Hall, & Holland, 1998). Moreover, direct cognitive assessments provide the additional evidence examiners may need for isolating specific cognitive impairments that may be contributing to changes in adaptive behaviour (Crayton & Oliver, 1993).
A degree of caution needs to be employed with the use of direct neuropsychological assessment and behavioural observation for people with LD. In order to assess a specific cognitive skill independent of other skills one needs to be wary that performance may vary according to the modality in which instructions are presented and responses required. For example, an individual's performance on a language-laden memory task may be compromised by pre-existing comprehension and expressive language deficits to the point that short-term memory is not necessarily the cognitive domain that is being assessed. Similarly, idiosyncratic responses that have been acquired as part of the learning disability may not be recognised within specified scoring procedures, which can lead to a misrepresentation of the skill being assessed. Other concerns associated with direct performance-based strategies stem from problems with floor effects (discussed above) and the possible disintegration of cognitive processing and organised thinking due to the pressures imposed by the intrusiveness of direct evaluation (Sovner, 1986). Examiners also need to keep in mind the ethical implications of their findings, whether they are obliged to inform the client, what impact it may have on the individual's life, and the consequences of failing to detect or incorrectly detecting changes in cognitive functioning.

**Differential Diagnosis**

Once the symptomatic pathology of dementia has been established ICD-10 criteria require that further consideration be given to the underlying aetiology of the dementia. In effect, this implies that AD must be differentially diagnosed from normal ageing, depression, hypothyroidism, sensory deficits, and other neuropathological causes.

**Depression:** Prevalence rates of depression in people with LD have been estimated to range between 5-67%, and the impairments associated with the onset of depression have been found to be severe enough to be indicative of a dementia (Burt, Loveland, & Lewis, 1992). The challenge for clinicians in distinguishing this 'pseudodementia' from a primary dementia rest primarily with the ability to evaluate the onset of symptoms and negotiate inconsistencies in test performances. Among the general population, onset of 'pseudodementia' is often sudden and accompanied by complaints of memory problems and distress. Also, throughout assessment there is often an unusual discrepancy between the reported cognitive or behavioural decline and actual test performance, with tests showing higher scores than expected from verbal report. Unfortunately, for people with LD the period of onset of
impairment is more difficult to gauge and may not have been reported when they first appeared, either because the person is less aware of changes or is unable to verbally express them. At the same time detection based on inconsistencies in test performance is also less clear than for the general population because of the necessary provisions needed when employing direct assessment strategies for people with LD (see above).

**Biological Mechanisms:** Hypothyroidism has been found to be associated with ageing in people with LD, particularly those with Down’s syndrome at increased rates compared to the general population (Percy, 1998). The primary symptoms of this condition (i.e. mental slowing and a lack of motivation) can quite easily be confused with the onset of dementia. Fortunately, hypothyroidism has distinct biological markers that can be tested and treated effectively, and therefore clinicians need to be aware of the potential to rule out these biological mechanisms with appropriate medical investigations. This may require the clinician to negotiate with the individual in order to gain their cooperation to undertake the necessary medical examinations. Other medical conditions whose symptoms may also resemble dementia and which medical/biochemical investigation can be used to rule out include infections, HIV, and general vitamin and metabolic deficiencies.

**Sensory Deficits:** Another major cause of cognitive and behavioural impairments that is often overlooked, but whose profile of decline can also resemble the onset of dementia, are loss of hearing and visual acuity. Haveman, Maaskant, & Sturman, (1989) found that people with LD are twice as likely to suffer visual problems and three times more likely to suffer auditory problems than the general population. Need for concern over sensory deficits is highlighted further when one considers that a significant proportion of intellectual decline tends to be reported among people with LD as a result of sensory problems, but in the absence of any other evidence of dementia (Hewitt, Carter, & Jancar, 1985).

**CARE MANAGEMENT**

In the previous section the role the clinical psychologist in making a diagnosis of dementia was outline. This role primarily involved carrying out initial baseline assessments of

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1 There are presently no treatment regimes that will permanently arrest the death of neuronal cells associated with diseases such as dementia of the Alzheimer type. For this reason, the therapeutic approach for dealing with progressive dementia is one of 'management' more so than treatment. This paper is focusing on psychological interventions involved in this management, although one should be aware that medical and social interventions are also available but are beyond the scope of this paper.
cognitive and behavioural functioning and sustaining longitudinal follow-up at regular intervals to monitor for changes. In practice psychologists are also likely to be involved in liaising with psychiatrists, community nurses, and caregivers to discuss mental health issues and to arrange medical investigations in order to rule out differential aetiological factors. However, in terms of ongoing management once a diagnosis has been established the psychologist's role tends to be less defined. According to Kitwood (1997) this problem arises because there is currently no coherent theory of the processes of care for those affected by dementia. Instead, there exists a substantial portfolio of practical approaches that tend to be used unsystematically to address problems as and when they arise. The following discussion will focus on how psychologists might employ a range of these strategies in three main areas of care management for people with LD affected by dementia. These three areas include skill maintenance, carer support, and treatment of concurrent risk factors.

**Skill Maintenance**

According to Burt (1998), care programs for individuals with dementia should be developed with the aim of preserving residual skills that will enable them to continue to access various aspects of their life. To develop such programs one will invariable require input from those who work closely with the individual. However, it will be the psychologist's knowledge of age-related changes and the specific functional losses identified throughout the assessment that will enable them to make a unique contribution in adapting environmental routines for others to follow. In general, these adaptations will involve teaching staff and carers how to enhance sensory cues that invoke the use of a number of senses to convey the same information when sensitivity in other senses is diminished (Christenson, 1990). For example, an individual whose temporal organisation skills have gradual diminished, seeing signs for the dining room, plates and cutlery on the table, hearing sounds from the kitchen and smelling aromas of familiar meals being cooked will increase the likelihood that the person will continue to go to the dining area at appropriate times (example cited in Burt, 1998). Although such environmental modifications would be implemented gradually, the psychologist needs to be mindful of the levels of stimulation and socialisation the individual is receiving. Without sufficient personal contact and engaging activities many residual skills will be at risk of premature decline. With excess stimulation the individual may become distressed and confused. To help minimise any distress that might arise psychologists should aim to
incorporate as many objects that are familiar and reassuring to the individual as possible (Burt, 1998).

The basic principle of sensory cueing in adapting an individual’s routine transcend to strategies that focus specifically on the maintenance of communication and memory skills. In terms of communication, for example, staff and carers need to be made aware of the various components that are likely to enhance a successful conversation. These include use of appropriate vocabulary; providing a structure in which key points are clear and extraneous details are minimised; using appropriate gestures, facial expressions, pointing to objects to support verbal content; being vigilant of non-verbal behaviours; allowing the person time to process information; assuming responsibility for maintaining the conversation; repeating information where necessary; and listening attentively (McCallion & Toseland, 1996; cited in McCallion, 1998). Only once the carer is aware of these components can they begin to make the necessary adjustments for simplifying interactions and providing sufficient cues that will enhance the affected individual’s chances of following the conversation. Unfortunately, difficulties the psychologists might face in determining how carers might better adapt various components of their communication may arise because of the limited time they spend with the individual. Also, the time psychologists spent with the individual tends to be well structured and controlled. Consequently, the appropriateness and logistics of adaptations that are put suggested may not easily generalise to other contexts.

Many interventions aimed at maintaining procedural and long-term memory skills also utilise cueing strategies that invoke alternate sensory channels to substitute for the information from diminished senses. For procedural memory, strategy labelling is recommended particularly in the early stages of AD. Strategy labelling begins with breaking the individual’s routine tasks into their constituent parts and making sure the individual is still capable of completing each of these components. Different modalities are then used to coordinate each of these components. This may include providing a list of simple written instructions using a familiar vocabulary, use of reinforcing verbal instructions, and labelling each of the objects involved in the task. Depending on the individual’s learning disabilities it may be necessary to adjust the format of the information presented. For example, in the case where hearing is impaired or reading skills have not been developed the use of pictures can be substituted for words and verbal instructions. Alternatively, if sequencing is problematic then clearly distinguishing the
various steps involved in the task with numbers or offering them an ordered booklet format may be more appropriate.

A different cueing strategy aimed at long-term memory is the use of a personal photo album that aims to support the recognition of people, places, and objects familiar to the individual. A key element in the success of any memory strategy is the need for continued use. Strategies need to be incorporated into everyday life and should not be called upon only at times when the individual is seen to be struggling (Bourgeois, 1994). Also, the sooner these strategies are implemented the greater the opportunity for the individual to build comfort and familiarity using them.

**Carer Support**

In addition to the advice and direction psychologists offer for skill maintenance they also have an ongoing role in the education of family members and professional care-givers. Family-carers need to be made aware of the extent and nature of their affected relative's disability, the fluctuations that might be expected from day-to-day, and what long-term decline is likely. This information is important as it helps reduce negative and damaging interpretations of difficult behaviour. In particular, family members need to be made aware that their interactions with the individual may change and that there may be several reasons for this. For example, a person may seem to less compliant to engage in certain activities, which may arise either because they no longer understand what they are being asked to do or they lack the motivation to perform tasks. By helping family-carers understand the underlying reasons for changes in behaviour and offering suggestions to overcome difficulties (e.g. task modelling) psychologists can help reduce frustrations for both parties and prevent the relationship from deteriorating.

Psychologists play an equally important role in the support they offer to professional caregivers. Residents affected by progressive dementia require considerably more staff attention and as a result the staff's perceptions and feelings toward the client may change. A recent investigation by Whitehouse and Chamberlain (2000) found that when staff working with adults with LD attributed behavioural changes to dementia it was viewed as 'uncontrollable and stable', which in turn left staff feeling more pessimistic about being able to help the individual. Staff have also been found to experience feelings of rejection when
they perceive that they are no longer valued, needed or even recognised by the affected individual (Holland, et al., 1993). The impact of these perceptions and feeling on staff burnout should not be underestimated. In helping staff cope better psychology needs to provide education sessions that will enable staff to build up their knowledge base of the impact dementia has on a person life. These sessions should focus on identifying changes that are expected to occur overtime as a result of the dementia progress and how to differentiate these changes from normal ageing processes and other treatable causes of cognitive and behavioural decline. Staff training should also aim to support staff in recognising and reflecting upon the personal feelings they may experience at different times.

Treatment of Concurrent Risk Factors

Once a diagnosis of primary progressive dementia is established it is essential that psychologists remain vigilant for the presence of concurrent risk factors such as depression, sensory impairments, or biological imbalances. The coexistence of any of these conditions is likely to contribute to the already disabling consequences of dementia. The ongoing role of the psychologists may be particularly prominent with the concurrence of depression (and/or other psychiatric disorders) that can be successfully treated. Current findings indicate that treatments of depression in adults with LD tend to be time-consuming and vary from person to person (Myers & Pueschel, 1995). Although non-drug therapies are preferred in order to minimise adverse side-effects that may compound cognitive and behavioural decline associated with the dementia, the effective use of such interventions (e.g. social skills training or psychotherapy) depend heavily on the premorbid and subsequent decline in level of functioning. Even simplified psychological interventions can be difficult for people with dementia (let alone a learning disability) to understand, assuming they are motivated to comply. Consequently, the treatment of depression and other psychiatric disorders in people with LD (with or without dementia) tends to involve a series of attempts incorporating social skills training, psychotherapy, and medication (Burt, 1998). Moreover, the detection and effective treatment of depression will be made more difficult by individuals and/or carers who are resistant to additional assessment and intervention they deem less pressing than that for the primary dementia.
SUMMARY

Recent years has seen the emergence of a considerable body of work concerned with the assessment and care management of patients with LD affected by dementia. A review of this literature in the present paper has revealed that positive progress has been made toward developing a clearer pathway by which health professionals (including psychologists) are guided in their assessment and diagnosis of dementia for this population. This pathway has highlighted the processes and adaptations needed for the longitudinal assessment of cognitive and behavioural decline for people with LD in accordance with specified diagnostic criteria. Unfortunately, a similar model on which to structure the development and implementation of care management programs is yet to emerge. Thus, psychologists have been left to rely solely on their own experience in deploying a multitude of practical strategies in the maintenance of residual skills, support for carers, and treatment of concurrent risk factors. Future work will need to focus on providing a coherent framework that will allow psychologists to systematically draw together their assessment findings, the client’s current needs, and their likely requirements for the future.
REFERENCES


Appendix A

ICD-10 Diagnostic Criteria for Dementia

Decline in memory:
Most evident in the learning of new information, although in more severe cases the recall of previously learned information may also be affected. The impairment applies to both verbal and nonverbal material.

Decline in other cognitive abilities:
Characterised by deterioration in judgement and thinking, such as planning and organising, and in the general processing of information. Deterioration from a previously higher level of performance should be established.

Awareness of the environment:
Absence of clouding of consciousness for a period of time sufficiently long to allow the unequivocal demonstration of decline in memory and other cognitive functions.

Decline in emotional control or motivation, or change in social behaviour:
Changes are manifested in at least one of the following: (1) emotional lability, (2) irritability, (3) apathy, or (4) coarsening of social behaviour.

Duration:
Decline in memory and other cognitive functions must be present for at least six months.

ICD-10 Criteria for Alzheimer Disease

All criteria for dementia are met.

Exclusionary Criteria:
No evidence from the history, physical examination, or special investigations for any other possible cause of dementia, a systematic disorder, or alcohol or drug abuse.

Onset and progression:
For a diagnosis of Alzheimer’s disease, there must be evidence of gradual onset and continuing cognitive decline.
Child, Adolescent and Family Essay

Critically discuss any two psychoanalytic concepts that a clinical psychologist might use to enhance their understanding and practice in working with children.

Year 2

December 2002
INTRODUCTION
Throughout the eighteen hundreds human behaviour was assumed to be controlled externally and conscious thought was deemed the defining characteristic of the human experience (Lemma-Wright, 1995). However, toward the end of this century Sigmund Freud challenged these established beliefs by introducing the idea that there were areas of one's experience beyond conscious awareness, but which nonetheless affected behaviour. Based on his observations, Freud (1915) proposed a set of theoretical statements that explained how the workings of the inner self created instinctual drives that were instrumental in determining human behaviour. Although much of Freud's (1915) work has subsequently developed and diversified into different schools of psychoanalytic thought there remains at least one fundamental principal upon which psychoanalytic models and practice continue to converge: Humans beings are social creatures whose self development and behaviours are mediated by instinctual drives and interactions with others and reality (Tyson and Tyson, 1995).

The aim of the present paper is to critically discuss how attachment and containment have been conceptualised within this psychoanalytic framework, and furthermore how these conceptualisations might be used by a Clinical Psychologist to enhance their understanding and practice in working with children.¹

ATTACHMENT
Overview of Attachment Behaviour
Attachment is a term used broadly in the psychological literature to describe the emotional ties we feel towards other people (Berk, 1994). In the child and social development literature the term is used almost synonymously with reference to the evolving relationship between an infant and primary caregiver, who is usually the infant’s mother. Emotional ties between an infant and caregiver are thought to emerge in the first weeks of life with the infant using a set of innate signals to draw adults into close contact and keep them within close proximity. Within months the infant begins to respond more intimately to their primary caregiver when compared to a stranger, and will generally show a preference for contact with this familiar person and quieten more quickly when comforted by them. Across the first year of life this connection continues to narrow and before long the baby will come to expect that their

¹ Note: In addressing the aim of this paper attachment and containment are being discussed as separate concepts even though they are both imminently enmeshed in psychoanalytic theory and practice.
caregiver will respond when signalled, they will display a marked preoccupation with the
caregiver’s presence or absence, and they will become very upset and anxious when separated
from them (Kagan, Kearsley, and Zelazo, 1978).

Although the vast majority of infants raised within a family context have become attached to a
familiar caregiver by the time they are two-years-old, the quality of this relationship can differ
immensely (Ainsworth, Blehar, Waters, and Wall, 1978). Some infants appear relaxed and
secure in the presence of their caregiver, while others appear anxious and uncertain.
Empirically, several landmark investigations have identified specific patterns of secure and
insecure attachment by observing the different responses displayed by children when they are
repeatedly separated and reunited with their caregiver in unfamiliar surroundings (Ainsworth
et al., 1978; Main and Solomon, 1990). The qualities that characterise these different
attachment patterns are presented in Table 1.

The Concept of Attachment
Within the wider psychological literature, Bowlby’s (1969) theory of attachment has become
the dominant paradigm for understanding the mental processes associated with the social and
emotional behaviour observed between an infant and caregiver. According to Bowlby (1969),
infants are born with an attachment behaviour system made up of an innate collection of

Table 1. Qualities Characterising Different Attachment Patterns

<table>
<thead>
<tr>
<th>Secure Attachment</th>
<th>Infants who are distressed by parental separation but who are easily comforted and happy to see parent upon reunion. Often return to joyful play.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insecure-Avoidant Attachment</td>
<td>Infants who are not distressed by parental separation and who physically avoid or turn away from the parent upon reunion. Subsequent play is usually flat and unanimated.</td>
</tr>
<tr>
<td>Insecure-Resistant Attachment</td>
<td>Infants who remain close to parent before departure and who seek contact upon reunion, but angrily/passively resist the contact once offered. Play is ineffectual and shows signs of anger.</td>
</tr>
<tr>
<td>Disorganised/Disorientated Attachment</td>
<td>Infants who show a marked and pervasive fear in the presence of the caregiver and who often display a variety of confused/contradictory behaviours at reunion, including turning away while being held and flat or depressed affect.</td>
</tr>
</tbody>
</table>
automatic behaviours that promote survival when the infant perceives they are vulnerable. This set of behaviours, which include crying, clinging and grasping, are assumed to motivate the initial urge to relate to others and moreover, these behaviours are deemed to evolve throughout infancy in conjunction with the emergence of new emotional and cognitive capacities. Based on the actual experiences shared with caregivers across this time the infant constructs an affectionate bond that is encoded into a set of expectations about the availability of social interactions, the likelihood that interactions will provide support at times of need, and the appropriateness of behaviours expressed in social exchanges (Bretherton, 1992). These expectations are assumed to endure overtime and influence the individual's interpersonal relationships in later life.

Although Bowlby's (1969) theory comprises many assumptions derived from various scientific disciplines (including evolution, ethology, and cognition), there are clear conceptual links between the basic principles of attachment theory as described above and various psychoanalytic views of development and social relations (Steele and Steele, 1998). For example, there is a shared belief that the meaning infants derive from early interactions with caregivers are represented in an internal working model that serves as the backdrop from which individuals evaluate their own self-worth and their interpersonal relationships (Kernberg, 1995). Moreover, there is a shared belief that anxiety provoking experiences that arise from contact (or lack of it) with a caregiver are fundamental in shaping internal working models. Arguably, the most controversial psychoanalytic views to elaborate these beliefs stem from object-relations theorists who have built upon early instinctual-drive theory to highlight (a) the role intrapsychic conflicts have in motivating attachment related behaviours/disturbances and (b) the effect these conflicts have on transforming actual experiences in the internalised representation (e.g., Bion, 1962; Klein, 1946; Winnicott, 1971, as cited in Gomez, 1997).2

Early Instinctual-Drive Based Views of Attachment

Instinctual-drive theory holds that human beings function not only in response to the demands and conditions of the external environment, but also in response to the demands and conflicts

2 Other object-relations theorists such as Ronald Fairbairn and Harry Sullivan have also adopted the concept of internalization of social interactions as central to attachment, but have considered alternate motivational systems to that of Freud's instinctual drive theory. The views of these psychoanalysts are not the focus of this paper, although an introduction to their ideas can be found in Kernberg (1995).
of the inner environment. Freud (1915) described these inner psychic energies as instinctual drives that are regulated via three forces: the id, ego, and superego. The id comprises those instinctual energies geared toward survival and the pursuit of self interests (i.e. life instincts/libido) and those that aim for a state in which all inner tensions are dispelled (i.e. death instinct). The instinctual attraction toward death gives rise to self-destructive aggressive tendencies which, because they contradict the desires of the life instinct, are redirected outward to 'objects' in the environment (Freud, 1917). Thus, the id pursues self-gratification by not only satisfying the pleasures of life but also by competing with others to reduce the tensions arising from any perceived threat to one's own safety. To curb the forces of the id, the ego is concerned with the consequences of action, and will mediate the id by evaluating the outcome for actions in reality. In other words, the ego operates to select a means for gratifying pleasure and reducing tension that is safe, even if that means delaying the id's desires. The superego oversees the ego and represents the inner energies we have bound up in the ideal self, that is, the moral and ethical standards we aspire to conform to.

In terms of attachment, early psychoanalysts hypothesised that an infant's innate desire to satisfy their instinctual drives are largely mediated via the maternal relationship. During the first year of life the infant's own ego and self-preservation capacities have not yet formed and so the infant is motivated to rely on their caregiver to provide an auxiliary ego (A Freud, 1936). Through this auxiliary ego the infant finds expression for their inherent libidinal and aggressive instincts, and is alerted to take defence to the threat of danger in the absence of this ego. From a psychoanalytic perspective these dangers may not necessarily be situations in which there is an objective fear of loss of a loved one, but they may also arise out of the subjective fear the infant perceives to their own omnipotence. When the mother consistently satisfies the infants drive for pleasure and aggression (which in the first year is based on oral gratification such as feeding) and her manner reflects sensitive and loving care, the infant builds a sense of trust that their needs will be met (Erikson, 1950). Consequently, the infant begins to internalise a positive self image of the mother, which is absorbed as the identity of their own ego that will satisfy drives and provide confidence to explore the environment (i.e. secure attachment). When this internalised image is based on hostile or critical interactions with caregivers and the infant's needs are not regularly met, there is no trust or perhaps mistrust in relying on others for comfort and reassurance (i.e. insecure attachment).
The instinctual-drive approach provides an explicit outline for the motivation and development of the attachment bond, regarding it as critical for exploration of the environment and building one’s own self-esteem. Drive theory also outlines the processes by which early infant relations are carried forward to have an enduring effect on later social interactions. In terms of empirical evidence, several studies have shown that infants whose needs are regularly met with sensitive, caring parental practices are significantly more likely to have positive attitudes to peer relations and social adaptation in later life when compared with infants who experience critical and abrupt caregivers (e.g. Egeland, Carlson, and Sroufe, 1993; Sroufe, Egeland, & Kreutzer, 1990). This evidence supports the idea that early contact with caregivers provides a learning experience, which may be internalised and exert an influence on later social interactions. Despite the evidence for this psychoanalytic perspective on attachment, it has been criticised on the grounds that it overemphasises the importance of feeding in the development of emotional ties (Bretherton, 1992). More specifically, Freud’s emphasis on the oral zone as the locus of instinctual gratification has been deemed to underline the importance of the caregiver’s contribution to the attachment relationship but focus less on the importance of the infant’s contributions and experiences.

Object-Relations View of Attachment: Kleinian Perspective
Unlike the early psychoanalytic views of attachment described above, later analysts such as Eagle (1995) and Fonagy (2001) have focused more toward the ideas of object-relations theorists who stress the importance of the infant’s unconscious pre-adaptedness in influencing early social exchanges (e.g. Klein, 1948) and the mutuality between infant and caregiver for social development (e.g. Bion, 1962; Winnicott, 1971).

Melanie Klein
Klein’s (1948) view of social relationships and development incorporate much of Freud’s (1915) drive theory, in particular the idea that the infant is, from birth, constantly threatened by destructive impulse from the aggressive drive. To dispose of these aggressive urges the infant is compelled to invest in an outside object (i.e. the caregiver). However, the dominance of the aggressive drive provides that the infant’s experiences in the first three months of life are heavily tinged by anger and anxieties of being persecuted whenever their desires are not immediately and completely satisfied. In order to cope with these anxieties (which for the most are assumed to be fantasised on the infant’s behalf) the infant will order their
experiences by splitting them into what he/she feels are good and bad experiences. In other words, the infant perceives the caregiver as part-objects. By splitting good from bad the infant has the chance of experiencing a good relationship and can take in (introject) this good object as a base for their sense of self (i.e. the ego). At the same time, the infant can project impulses and anxieties they can no longer hold inside into the bad object. These processes at play in early infant-caregiver relationships (which Klein referred to as the paranoid-schizoid position) are the means by which the infant initially copes with the persecutory anxiety of being unprotected in the external environment, and which enables the infant to get started with trusting an external object who inevitably cannot satisfy all of one's instinctual needs.

Over time the splitting processes are assumed to diminish and the infant is thought to become increasingly aware that good and bad external objects are really one, for example, the caregiver is a whole object with good and bad parts. Once in this position, which Klein (1948) referred to as the depressive position, the integration of good and bad aspects gives rise to new fears and guilt related anxieties, and the infant becomes less concerned with being persecuted by external objects and is more worried with protecting the good internal and external objects. Consequently, the infant is less inclined to project internal bad objects and will instead take them onboard, along with good objects, as part of their superego. This integrated representation of a caregiver made up of good and bad parts and the desire to protect their relationship with this object is deemed to be the basis from which the infant will be accepting of other relationships in later life. However, if this mental integration does not develop the infant continues to project entire unwanted and feared aspects of their emerging self into the representation of the mother (and other people in later life) resulting in angry/passively aggressive relationship patterns (projective identification; Klein, 1948).

Contemporary Kleinian Views of Attachment
Klein's (1948) work provides an extensive commentary on the inner experiences of the infant in their early social interactions and places a particular emphasis on the overwhelming nature of anxieties experienced by the infant in the paranoid-schizoid position and the depressive position. However, it is Klein's insistence that individuals continue to alternate between the painful urges of these two positions, rather than develop a state of stable well-being that has limited the application of her ideas to theories of attachment (Eagle, 1995). Nevertheless, psychoanalytic views have continued to be influenced by Kleinian ideas. For example,
Fonagy (2001) argued that the internalised state of mind of the infant in the depressive position, in which there is integration and acceptance of imperfection in the caregiver, may be analogous to a secure attachment. When these individuals feel that their caregiver is not attuned to them they will sense that this does not reflect the whole caregiver. While they may feel disappointed or frustrated by not having their needs met, they will persist with seeking proximity and maintaining contact, and their feelings will dissipate quickly.

In contrast to secure attachments, insecure attachments may reflect the lability of the mental representations of caregivers that is characteristic of the paranoid-schizoid position. For these infants the caregivers inability to satisfy their needs is felt as a more permanent characteristic of the bad object, and so instead of persisting with their primary means for gaining proximity and control they will resort to other strategies such as pretending not to be distressed (avoidant attachment quality) or resisting contact in protest of their distress (resistant attachment quality). Subsequent collapse of these attachment strategies might be expected when the child perceives very little good part to the caregiver and they are confused and frightened about how to respond in their presence (disorganised attachment quality; Hesse & Main, 2000). It is perhaps this latter form of insecure attachment that fits best with Klein's (1948) views insofar that she assumed that the paranoid-schizoid position will dominate over the depressive position in stressful situations. Moreover, there is empirical evidence indicating that splitting (one of the primary processes of the paranoid-schizoid position) is an important marker of insecurity among people categorised with disorganised attachment patterns (e.g. Main and Goldwyn, 1995).

**Practical Implications of Freudian and Kleinian Ideas**

The deduction of psychoanalytic based practice from the logic of theory is beset with complications owing to the richness of theoretical ideas, the presence of complex contextual factors, and the limited application of experimental strategies for verifying the efficacy of theory-practice links (Fonagy, 1999). These difficulties are reflected in the lack of empirical evidence supporting the effectiveness of psychoanalytic based treatments for various psychological problems encountered in clinical work with children (Wolpert, Fuggle, Cottrell, Fonagy, Phillips, Pilling et al., 2002). Nevertheless, an understanding of the mental processes encapsulated in Freudian and Kleinian ideas can provide valuable insights into working with children whose early attachment relationships are heavily implicated in the manifestation of
social and emotional disturbances. These disturbances include impaired peer relationships, affect regulation, frustration tolerance, impulse control, self-esteem and cognitive functioning (see Jacobitz and Hazen, 1999 and Moss, Rousseau, St-Laurent, and Saintong, 1998 for details).

According to Fonagy and Target (1996) the roots of such developmental disturbances may be linked with an impoverished sense of self and others, which has been internalised in the superego. For example, a child whose internalised representation of self and others comprises the integration of strict disciplinary parental standards that have come to dominate over their good internal objects, may feel impelled to live up to the unattainable demands of perfection.

In a similar way, a child whose good internal objects have been contaminated by the internalisation of unrestrained parenting may not aspire to any standards, and so will feel no guilt when breaking the rules or behaving immorally. In extreme cases, such as children who have experienced particularly frightening and unpredictable parent, there may be little integration of internal representations. From the Kleinian perspective these children are assumed to split their early experiences into quite separate good and bad objects, which in their later life continue to serve as a framework for interactions with parents, peers and authority figures. Typically for these children, people in their social network will be identified as falling into either good or bad categories, leading them to behave morally toward those whom they have a positive transference with and immorally toward those with whom they have a negative transference (Carr, 1999).

Fonagy and Target (1996) argue that to tackle the psychoanalytically inferred mental processes in children with developmental disturbances one needs to consider not only the presence of impoverished mental representations but also the representations and mental experiences that are absent as a result of the impaired processing. To this end, treatment therapies need to provide children with alternate cognitive experiences that directly address the limitations of the child’s self representations, and that help the child to develop an awareness of the mental states of other people, as well as themselves. One treatment program that has adapted these ideas into the limited confines of NHS resources, and for which there is a growing body of clinical effectiveness data (Chamberlain, 1994), is the idea of prosocial training groups. Within these groups, children can be exposed to (a) a social environment in which there is a set of societal rules that are consistently reinforced and (b) ecologically valid
strategies to strengthen their capacity to monitor their own internal states (i.e. thoughts, feeling, and physiological sensations) and empathise with that of others. Moreover, therapists attuned to intrapsychic processes can use their training to interpret and work through issues of splitting and projecting good and bad qualities into various group members/facilitators should it arise. A child might then be expected to develop a balanced integration of good and bad objects, and internalise morally acceptable standards into the superego. Carr (1999) speculates that the effectiveness of such programs may be enhanced by corresponding parental training on the principles of shaping and positive reinforcement of acceptable behaviour.

CONTAINMENT

To this point in the paper the ideas of Freud and Klein have been explicated to reflect the polarity of different conceptualisations of attachment. On the one hand, Freud's (1915) drive theory has been used to emphasise the role the caregiver plays in the development of emotional ties and the internal working model of social interactions. On the other hand, Klein’s (1948) ideas of splitting and projective identification have been used to emphasise the infant's state of mind in early interactions and the impact this may have on social exchanges in later life. From this point the focus is changing to explore the mutuality of mental processes between an infant and caregiver in social development.

The Concept of the Container/Contained Relationship

One of the principle psychoanalytic concepts focusing on the mutuality of mental processing between an infant and caregiver is 'containment', which has been derived primarily from the work of Wilfred Bion (1959; 1962). In its broadest form containment refers to an active process in which the exchange and transformation of experiences shift within a container/contained relationship. This relationship is based on the model of the mother as the container and the infants projected needs, feelings, and unwanted parts as the contained (Bion, 1962). Typically the defining feature of what the infant wants contained is that it is something intolerable from within which they do not have the capacity to express in a coherent verbal manner and so experience it at a near sensory psychosomatic level. The containing mother, if she is receptive to the infant's state of mind receives this preconscious material and will allow it to be evoked in her. In doing so she is able to identify with the true meaning of the projected object(s) and can attend to it in the infant. In this way, Bion's (1962) concept of the containment parallels Winnicott's (1971) concept of 'holding' in which the personal self in
thought to emerge through the protective care of the 'good-enough' mother who provides an illusion of being at one with her infant and making him/her feel safe.

Despite the overlap between containment and holding, Bion (1962) further elaborated the active nature of the container/contained process (Lanman, 1998). Relying heavily on the earlier Kleinian concepts of projective and introjective identification, Bion (1962) proposed that the unwanted or damaging part of the self that the infant projected into another (projective identification) was contained within the inner space of the containing other (introjective identification), who themselves experienced a preconscious psychosomatic change to their own psyche (Miller-Pietroni, 1999). Through observation, reflection, and discriminatory thought the container cognitively and emotionally processes the infant's fears and separates what is psychologically useful from less productive fears. This transformation enables the container to reintroject the object back into the infant in a way that is tolerable to their psyche (Bion, 1962).

Through these processes of projective/introjective identification and reintrojection the container/contained relationship provides the infant with a sanctuary in which they feel their fears are being held within a safe place. At the same time, the model provided by the container can itself be introjected and bring a lasting sense of meaning and internal coherence to the infant's experiences (Britton, 1992). When the mother acknowledges the infant's state of mind as more than just a cry for help and allows herself to experience the infant's fear she is in a position to attend to the infant's communication in an identifiable, yet balanced, manner. In this way the infant's preconscious psychosomatic sensations can be transformed into something more rational at a conscious level by the mother, and can be stored and used for thought (Britton, 1992). The subsequent introjection by the infant of an object capable of containing and dealing with anxiety in this way provides the infant with an object for thinking and informing for one self. In other words, the infant who internalises a model of empathetic containment begins to develop the resources of self-knowledge, which enables them to experience their anxiety and think about themselves with a degree of coherence and mental stability, even at times of distress.

Bion (1962) and Segal (1975, as cited in Hinshelwood, 1991) have suggested that the mental stability derived from the container/contained relationship may be disrupted from two sources.
It may be disrupted by an excessive destructive omnipotence of the infant's fantasy, which Bion (1959) believed was always present in the case of psychosis. Mental stability may also be disrupted when the mother is unable to acknowledge and absorb the infant's projected anxiety, leaving the infant to introject an experience of greater intolerance than he/she first projected. One might speculate that these disruptions may be proportionally related to one another. In any event the infant is likely to perceive the containing object as inhospitable and be left with a sense of insecurity and incoherence (Britton, 1992). This in turn may lead the infant to project their fears and anxieties with increased vigour and frustration, which depending on the context may be construed as primary aggression. Bion (1962) described this breakdown in containment as an 'ego-destructive superego'. He suggested that the integrative processes of the depressive position provide for the internalisation of a whole object that functions as the ego (i.e. the conscience). However, when containment goes wrong it produces a part of the self that is opposed to the self. This ego-destructive superego will oppose integration making it difficult for the infant move from the paranoid-schizoid position.

**Practical Implications of the Container/Contained Relationship**

The concept of containment derived from the infant-mother relationship has, by extension, been used to illustrate the mental processes operating in other social interactions. In particular, containment has been considered in the context of the therapeutic relationship between the healthcare therapist (e.g. psychologist) and a client. Typically, people are referred to or seek help from a therapist when a particular aspect(s) of their life have reached a point where they feel overwhelmed and/or they can no longer think coherently about the problem, leaving them with a sense of being disconnected and fragmented. The client’s presentation of this problem(s) will usually come amidst a barrage of information some of which is communicated verbally while many other aspects are unconsciously reflected in sensory-somatic qualities such as bodily symptoms, perceptual distortions, and dysfunctional behaviour. For the therapist to arrive at some understanding of the issues presented and formulate an interpretation that allows the client to feel understood they must observe not only the client’s responses and overt actions but also reflect upon self-observations and the overall atmosphere of the sessions (Steiner, 1993). When this is convincing and extends beyond thoughtfully reiterating the client’s words the client feels the therapist can contain and understand those elements he/she has projected, and as a result the projected objects can be reintrojected in a more tolerable form (Steiner, 1993). Only once the client senses this relief
are they able to introject the therapist's capacity to think and experience as a model for their own self-thought.

From a clinical perspective the container/contained processes create a great deal of pressure within the client-therapist relationship. On one level the client is being exposed to new fears of the projected object in the therapeutic context such as a sense of helplessness should the object not be contained by a professional or the fear that certain aspects of the projected self will be devoured, stripped of identity, and destroyed (Britton, 1992). On a corresponding level, the therapist is pressured by the need to gather all information brought to the session, hold it alongside whatever aspect the client chooses to dwell on, notice what is not being looked at, and allow certain aspects to resonate as important, whether they are presented that way or not.

Allowing the client's projections and other information deemed salient to resonate within themselves, the therapist is being exposed to the pain and frustration experienced by the client. This exposure raises issues in relation to the therapist's well-being and the need to maintain a professional distance when dealing with numerous client experiences. Professional boundaries are emphasised throughout healthcare training in order that the therapist, and by extension the client, understand the role behaviours needed to protect themselves and manage the intimate nature of their contact. Although professional distance from a client's problems is necessary, Miller-Pietroni (1999) argue that if the protective habit is overdone the therapist is at risk of developing a 'defensive thick skin' that inhibits the capacity to think independently and connect with the client. The overly defensive therapist will ensure that the client's projections are rebounded without being taken in, thought about, and responded to appropriately. In other words, the sense of partnership essential within the container/contained relationship is inhibited.

The emotional labour required in processing the container/contained relationship and adapting professional boundaries are highly subjective functions which inevitably the therapist cannot expect to achieve perfectly, if indeed there exists a perfect way. Nevertheless, the importance of these processes to therapeutic alliance suggests that the therapist needs to address personal awareness issues in relation to the pressures experienced in clinical sessions. For some this might come easily. For others it may grow out of reflection within supervision sessions where
they are given the guidance and space to acknowledge the seriousness of various pieces of information, identify previously undetected material, and retain a non-judgemental capacity to think about issues from different perspectives.

CONCLUSION

This paper has reviewed the concepts of attachment and containment from a psychoanalytic perspective and has focused particularly on the role intrapsychic processes have in motivating and influencing a child’s social development and behaviour. The richness and complexity of the psychoanalytic theories from which both concepts have emerged has meant that large and potentially important aspects related of these concepts have overlooked. Indeed, much of what has been extrapolated has been simplified back to the basics in order to fulfil the aim of this paper. Nevertheless, the psychoanalytic ideas discussed here provide valuable insight into understanding some of the unconscious processes and subjective experiences that need to be considered when interpreting and formulating a client’s behaviour/disturbances.

Moreover, this paper has highlighted how it is not necessary to be working strictly within a psychoanalytic model in order to make use of the concepts and ideas discussed. In fact, one might expect that the gap between clinical psychology and psychoanalysis can continue to merge to the benefit of both disciplines if there are continued efforts to use one to inform the other.
REFERENCES


Older People Essay

What factors in older people (a) cause “depression” and (b) are addressed in treating depression psychologically?

Year 2

July 2003
INTRODUCTION
The National Service Framework (NSF) for Older People aims to promote provisions of care for social and health-related issues faced by people over the age of 64 years (Department of Health, 2001a). Highlighted within this document is the need to improve access to integrated mental health services for older people, particularly in relation to the diagnosis, treatment and support offered to those suffering from depression. More specifically, the NSF stipulates that the diagnosis of depression in older people should involve a thorough assessment of psychiatric factors along with the psychological and social processes implicated in the onset and maintenance of symptoms. Detailed guidelines are also outlined to promote the use of psychological therapies alongside antidepressant medication in treating older people with depression within multidisciplinary services specialising in mental health. The aim of the present paper is to review the multidimensional factors that have been linked with the aetiology of depression in older people and consider how psychological approaches address these factors in the treatment of depression.

DEPRESSION, DIAGNOSIS AND PHENOMENOLOGY
Before discussing the aetiology and treatment of depression in later life, it is important to establish what is inferred by the term depression and whether the experience of depression is in some ways different for older people than for other age groups. The general assumption is that depression is the most common psychiatric disorder affecting older people and is more prevalent than in younger people (Stroke, 1992). This assumption stems, at least in part, from population studies in which various symptoms that characterise depression (as listed in Table 1) have been found to increase with advancing age (Blazer, Burchett, Service, & George, 1991). However, despite this increase in symptomatology with age, the overall prevalence of major depression diagnosed in people over the age of 65 is reported to be equivalent to that of other age groups (Palsson & Skoog, 1997).

Attempts to explain the paradoxical contrast between the prevalence of depressive symptoms and the diagnosis of depressive disorders have focused on the pragmatic challenges faced by clinicians when diagnosing depression among older people. For example, Unützer (2002) argued that the lack of knowledge and stigma older people have about depression may prevent them endorsing symptoms related to mental health disorders, and consequently they are less
Table 1. Characteristic Symptoms of Depression.

- Depressed mood for most of the day – persistent feelings of sadness and emptiness
- Loss of interest or pleasure derived from all, or almost all activities
- Significant changes in body weight, either as a result of decreased appetite or overeating
- Sleeping difficulties, either insomnia or hypersomnia
- Psychomotor agitation (fidgety) or retardation (slowed movement or speech)
- Loss of energy – general feeling of tiredness and/or fatigue
- Feelings of worthlessness, excessive/inappropriate guilt, or pessimism (i.e. hopelessness)
- Difficulties with concentration, memory, or decision making
- Recurrent thoughts of death, suicidal ideation, or plans to attempt suicide
- Recurring aches and pains with no known aetiology.

Note:
According to the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) a formal diagnosis of major depression requires at least five of the above symptoms to be present during the same two week period and represent a source of significant distress or impairment in functioning (American Psychiatric Association, 1994). Moreover, at least one symptom needs to be depressed mood or loss of interest or pleasure (American Psychiatric Association, 1994)

likely to actively seek help for depression from primary care services such as their GP. Difficulties diagnosing depression among older people may also rest with the experience and training of the GP, the person with whom an individual is most likely to have an initial consultation with about their symptoms (Laidlaw, Davidson, & Arbuthnott, 1998). GPs may attribute signs of depression to other factors including normal ageing, grief and loss, physical illness, dementia, medication, and other medical conditions (Unützer 2002). Each of these factors is more salient among the elderly and can serve to mask an underlying depressive disorder within the GP’s limited consultation time.

In addition to the pragmatic difficulties diagnosing depression amidst the confounding factors outlined above, several studies have suggested that the diagnosis of depression may be underrated because depressive symptoms represent a different phenomenological experience for older people. In general, comparisons between older and younger depressed people have revealed that older people tend to present with more somatic symptoms than their younger counterparts (Brodaty, Peters, Boyce, Hickie, Parker, Mitchell, & Wilhelm, 1991; Brown, Sweeney, Loutsch, Kocsis, & Frances, 1984). These symptoms include greater insomnia,
agitation, and hypochondrias. Furthermore, older depressed people as a whole tend to report fewer affective symptoms and instead report a general lack of apathy toward various aspects of their life (Alexopoulos, Borson, Cuthbert, Devanand, Mulsant, Olin, Oslin, 2002).

Differences in the experience of depression have also been found by comparing older people with early and late life onset, that is, older people who experience depression throughout their lives versus those who experience their first episode in later life. Those with first onset in later life have been found to experience less guilt (Brown, et al., 1984), but more anxiety, hypochondrias, apathy, and delusions than older people with a long history of depression (Alexopoulos et al., 2002; Brodaty et al., 1991; Krishnan, Hays, Tuptler, George, & Blazer, 1995).

Although the above findings have not always been replicated, they nevertheless indicate the heterogeneous nature of depressive disorders in older people. In many case this diversity in presenting symptoms means that older people will not meet the formal diagnostic criteria for major depression (Blazer, 1991). They either experience too few symptoms with less continuity or present a pattern of symptoms that is qualitatively different from younger depressed people, that is, more somatic symptoms and atypical affective concerns. These depressive ‘subsyndromes’, while not necessarily as severe as major depression, have been associated with increased morbidity, limited social functioning, poorer overall health, and increased health-care costs (Schwenk, 2002). Thus, when considering depressive disorders in later life it is important not only to include major depression but other atypical syndromes that cause significant impairment and negatively impact on quality of life.

**CAUSAL FACTORS OF DEPRESSION IN OLDER PEOPLE**

Knowledge of the aetiological factors underlying depression is essential for carrying out a thorough diagnostic assessment and planning appropriate intervention and prevention strategies. However, as with many other psychiatric disorders a definitive cause of depression has not been established. Instead, the literature is compiled with studies reporting correlational associations between the presence of depressive symptomatology and demographic, biological, and psychosocial factors. The aim of this section is to review the multidimensional factors implicated as contributing influences to late-life depression.
DEMOGRAPHIC FACTORS

Age
The prevalence of depression among older people has been found to range between 1% and 20% (Katona, 1994). Interestingly, the studies that have employed formal diagnostic criteria, such as DSM-IV, generally report rates of major depression at the lower end of this range (3-5%), which is comparable with prevalence rates of depression for other age groups (Palsson & Skoog, 1997). However, several criticisms can be levelled at the prevalence studies that employ formal diagnostic criteria of depression as their outcome measure. First, the use of strict criteria does not recognise the change in symptom pattern found in over 65’s and excludes individual’s who experience clinically relevant subsyndromes of depression. Second, the studies in question have not consistently included individuals over the age of 80 in their sample. In studies that have employed broader outcome measures of depressive symptoms and which have included a representative sample of the very old, prevalence rates have been found to increase across the older age span (e.g. Beekman, Deeg, van Tilburg, Smit, Hooijer, van Tilberg, Kriegsman, 1995; Blazer et al, 1991). For example, Blazer, et al, (1991) found 8.1% of individuals aged 65-75 had significant depressive symptomatology, which increased to 10.3% for those aged 75-84, and 12.3% for those aged 85 and over. However, further statistical analysis on this data when controlling for potential confounding factors salient in older age (e.g. physical disability, social support and functional impairment) revealed a reversal of this trend. Together, this evidence does not sufficiently implicate age as an independent risk factor for depression in later life.

Gender
Several epidemiological studies have reported greater prevalence of depressive symptomatology in elderly females than older males (Katona, 1994). In some studies the prevalence of symptoms among women (46%) is reported to be double that for men (19.6%) aged over 65 years (Zunzunegui, Beland, Llacer, & Leon, 1998). This finding may in part be influenced by the unlikelihood that older men will present to their GP with emotional difficulties (Crawford, Prince, Menezes, & Mann, 1998). Nevertheless, both epidemiological and longitudinal studies have found that the strength of association between female gender and depression, although it decreases, remains significant when commonly known risk factors are controlled. These findings suggest that the influence of gender on depression in old age may be twofold. First, gender may serve to moderate the extent to which the vulnerability of
other risk factors is manifest as depressive symptoms, and second, that gender serves as an independent risk factor for depression among older women, possibly as a result of cultural definition of gender roles.

**Ethnicity**

Significant differences in the prevalence of depressive symptoms have consistently been found when comparing ethnically distinct older communities. In general, white communities report higher levels of symptomatology than ethnic minorities groups (Harwood, Barker, Ownby, Mullan, & Duara, 1999). However, before ethnicity is implicated as an independent causal factor of depression for older people, one may want to consider that culture is likely to have a major impact in the development of beliefs that shape attitudes and behaviours related to the aging process. Thus, differences in the prevalence of depression between ethnic communities may be more a reflection of cultural or contextual bias in current assessment methods among older people rather than differences arising from ethnicity per se. Preliminary support for this proposition comes from Mills & Henretta (2001), where it was found that levels of depressive symptoms increased among members of ethnic minorities who spoke more fluent English and had more years of formal education.

**BIOLOGICAL FACTORS**

Biology represents a dimension of organic factors that may also play a causal role in late-life depression. A review of this literature reveals there is evidence to suggest that a positive family history of mood disorders is a significant predisposing factor for depression in old people. Comparisons between older people with early-onset and late-onset depression have revealed higher rates of family psychiatric history in those with early-onset depression and considerably lower rates of familial mood disorder in those with late-onset depression (Brodarty, Luscombe, Parker, Wilhelm, Hickie, Austin, & Mitchell, 2002). These findings suggest that a genetic predisposition to depression may exist, but that it is primarily restricted to those individuals who develop the disorder earlier in life and carry it through to old age.

In addition to the increased genetic risk associated with early-onset depression, recent research has investigated the association between neurological risk factors and depression. One hypothesis that has received particular attention is that late-onset depression may be
related to underlying vascular disease in the brain (Baldwin and O'Brien, 2002). Indirect evidence for this hypothesis is gleamed from studies which show that vascular dementia carries a higher prevalence of depression than other forms of dementia (Newman, 1999), and that up to 50% of stroke patients experience depression in the first year after the CVA (House, 1996). More direct evidence, however, has been found in brain imaging studies of elderly depressed samples. Several Magnetic Resonance Imaging studies have shown a positive association between abnormal hyperintensities consistent with vascular disease in the frontal lobes and basal ganglia and late-onset depression (Salloway, Malloy, Kohn, & Gillard, 1996). Consistent with damage to these regions of the brain, older people with late-onset depression (when compared with early-onset depression) typically display greater cognitive impairment of executive functions, increased psychomotor retardation, and poorer response to antidepressant medication (Sallowey, et al, 1996; Simpson, Baldwin, Johnson, & Burns, 1998). Together, these various lines of evidence support the proposition that vascular brain disease may be linked with the onset of late-life depression. However, caution needs to be taken when interpreting these studies as they reflect associative data rather than causal hypothesis testing, and it is possible that unrecognised confounding factors could explain the association between late-onset depression, neurovascular abnormalities and cognitive dysfunction (Baldwin & O'Brien, 2002).

PSYCHOSOCIAL FACTORS
A considerable body of research has emerged over time concerning the contribution of psychosocial factors in the aetiology of late-life depression. Psychosocial factors are broadly defined as the psychological and social processes that exist within the individual and the environment that they inhabit (Bruce, 2002). Not surprisingly, many of the psychosocial factors implicated as risk factors for depression fall under the general category of life stressors, that is, events that cause a great deal of disruption in one's life and evoke negative emotional and behavioural reactions. The stress associated with such events may vary depending on the perceived threat the individual attributes to the magnitude, duration and controllability of possible outcomes.

1 Other neuroendocrine and nutritional hypotheses has also been implicated in the cause of depression in older people, but discussion of these areas of research extend beyond the scope of this paper (see Katona, 1994, for review).
Overall, life stressors are consistently found to be associated with the onset of depressive episodes among older people, with more severe stressful life events producing a relatively greater risk for depressive episodes (Beekman, et al., 1995; Orrel & Davies, 1994). Comparisons between older people with early and late onset depression have shown that severe events are more strongly associated with the onset of both first and recurrent episodes in later life, whereas milder events tend to be associated with recurrent episodes only (Brilman & Ormel, 2001). In other words, older people with early onset depression can experience recurrent episodes in the presence of mild forms of life stress, but stressful events need to be relatively more severe to induce onset of symptoms for the first time in later life.

According to Bruce (2002), there are several inherent difficulties in drawing sweeping conclusions about the nature of the relationship between life stressors and late-life depression from this data. First, a person’s perception of life stresses tend to be measured retrospectively, which is problematic insofar that retrospective assessment of life events is subject to recall bias. With the passage of time most individuals develop a formulation of events that led to their depression and within this framework the severity and precise timing of events in relation to the onset of symptoms may become distorted. A second difficulty in evaluating the relation between life stressors and depression is that life stressors tend to be measured as an aggregate of stress caused by life events (Bruce, 2002). However, since the degree of severity attributed to life events is a function of one’s own perceptions about the outcome, the spectrum of stressful life events represented in an aggregate measure of stress is potentially very large. Consequently, when aggregate measures of life stressors are employed in the study of late-life depression there is the potential that individual stressful life events specific to the older population are being overlooked. Thus, it is important to consider specific stressful life events salient among older people and evaluate their relationship with the onset of late life depression as independent risk factors.

Health-Related Events: Medical Illness and Disability

There is a high prevalence of medical illness and disability among older people compared with other age groups and as a result, health-related events have received a good deal of attention as potential risk factor for late-life depression. The role of health-related events as a psychosocial risk factor arises because medical illnesses or disabilities carry implications for the individual and their usual way of life. For some older people, health-related events may
represent a realisation of the aging process and one’s own mortality. For others, the degree of cognitive or physical impairment that accompanies the illness or disability may precipitate other events and lifestyle changes. For example, a stroke may bring about a loss of independence and periods of restricted movement, which in turn impact on social relationships and the organisation of premorbid living arrangements.

Several prospective and longitudinal studies have found that the presence of health-related events is strongly associated with the subsequent onset of depressive episodes among older people (e.g. Prince, Harwood, Thomas, & Mann, 1998; Schoevers, Beekman, Deeg, Geerlings, Jonker, & van Tilberg, 2000). Baseline and follow-up measures of medical illness and disability (such as limitations in activities of daily living, functional impairment, and homebound status) have consistently been found to increase the onset and degree of depressive symptoms by two-to-fivefold (Bruce, 2002). This level of risk for new onset depression appears to be independent of whether individuals have experienced the illness or disability across their life time or whether the event has only come on in later life. Moreover, the association between health events and subsequent development of depression has been found to remain significant when controlling for demographic factors and other psychosocial risk factors. Thus, both medical illness and disability appear to be independent risk factors for late-life depression.

These longitudinal studies are particularly prominent in terms of the evidence they provide for investigating the role of health-related events (and other psychosocial risk factors) in the aetiology of depression. Since measures of illness and disability are taken at baseline from depression-free individuals, the participant is rating health-related events independent of the outcome of depression and there is an inbuilt temporal demarcation between the risk factors measured and the onset of depressive symptoms. This minimises the effect of recall bias on outcome measures and permits a more valid argument of causal reasoning to be made for the significant associations between health-related events and the subsequent onset of depression.

**Bereavement**

Bereavement over the death of a spouse or loved one has been clearly identified as a major factor related to the onset and increase of depressive symptoms among older people. There is a substantial body of evidence to support this relationship. For example, Pahkala, Kivela, &
Laippala (1991, as cited in Katona, 1994) compared a community sample of older depressed and non-depressed individuals, and found that 31% of the older depressed population but only 2% of the non-depressed sample had recently experienced the death of someone close to them. Other findings in the literature show that depressive symptoms are more common and severe in the period immediately following bereavement and that these symptoms gradually decrease over time (Bruce, 2002).

However, before bereavement is implicated as an independent risk factor for late-life depression there are several issues that need to be considered. First, many expressions of the normal grieving process mirror symptoms of depression, and so one might expect there to be an increase in feelings and cognitions that resemble depressive symptomatology in the period that follows the death of a loved one (Bruce, 2002). Thus, the difficulty in interpreting findings becomes one of separating expressions of grief from symptoms of depression, a division which will vary according to sociocultural and clinical notions of grieving and depression. A second difficulty when implicating bereavement as a risk factor is that death is a multidimensional factor influenced by a variety of religious and personal beliefs, as well as the different circumstances and consequences that surround an individual's death (e.g. sudden versus expected, social isolation versus social freedom). Several studies have found that the relationship between various dimensions of bereavement and the onset of depression will be subject to moderation by other risk factors, in particular social support and gender (e.g. Prince et al., 1998). Thus, it would appear that when considering the role of bereavement in the onset of depression careful analysis of sociocultural and clinical parameters is required, as well consideration of the various circumstances surrounding the death and how other risk factors may be implicated in the bereavement process.

Social Support

Social support is another psychosocial factor for which there is evidence of a strong relationship with depression in later life. In particular, significant associations have been found between depressive symptomatology and older people who either live alone or have reduced contact with their relatives and friends (Pahkula et al., 1991). However, the extent to which a lack of social contact is directly and independently linked with increased risk of depressive onset remains unclear because of inconsistent findings among several major longitudinal studies. Bruce (2002) argued that these inconsistencies reflect (at least in part)
different conceptualisations of social support, which by its nature is a multifactorial construct that involves dimensions of perception, quality and quantity of social support. At present, research into the impact that these various dimensions have on depression in older people is limited. In fact, Prince, Harwood, Blizard, Thomas, & Mann, (1997) found that different dimensions of social support cluster with other life events such as disability and bereavement to reflect the overall poorer quality of life for older people with or without depression. This finding suggests that social support may act in the specific context of other psychosocial risk factors to buffer or increase the risk of depression.

PSYCHOLOGICAL TREATMENT OF LATE-LIFE DEPRESSION
The empirical debate surrounding the aetiology of depression in older people is undertaken with the aim of improving treatment approaches for mood disorders in later life.
Traditionally, treatments for the elderly have focused primarily on antidepressant medication and electric-convulsive-therapy, both of which have demonstrated a strong efficacy for the management of severe depression (Katona, 1994). In contrast, psychological approaches for treating depression in older people has only recently established itself as an effective therapeutic intervention to be used alongside, and in some cases as an alternative, to physiological-based therapies. For many authors, the initial reluctance to adopt psychological treatment approaches for older people stems from ageism inherent in early psychological theory, in particular the ideas that older people lack the mental plasticity to engage with the challenges of psychotherapy and that many of their difficulties were an expected part of the ageing process (Laidlaw, 2001). However, with the gradual movement away from this ageist perspective, psychological therapies for older people have evolved and have become widely appreciated for the awareness and flexibility they bring to the idiosyncratic nature of an individual's problems. The aim of this section is to review the factors that are evaluated in determining the appropriateness of using psychological therapy for treating depression in older people. There is also an overview of how specific evidence-based therapy would address the multidimensional factors highlighted as risk factors.

Evaluating the Appropriateness of Psychological Therapy
Before making the decision to undertake psychological interventions with older people, the therapist needs to consider several factors in determining the appropriateness of psychological therapy for treating depression. First, an evaluation of the risk of self-harm is needed.
Although suicide attempts decrease with age, the resultant death from suicide is almost twice as frequent among older people (especially men) when compared with the general population (Alexopoulos et al., 2002). It is, therefore, essential to examine an individual's suicidal ideation and any means of suicide they may have available to them, including the availability of medication. Alexopoulos, et al., (2002) suggests that in cases where it is suspected that a person has not revealed a legitimate suicidal intent, the severity of depressive symptoms are a good predictor of suicidal ideation and can be used to assess the potential risk of suicide.

A second issue to consider when evaluating the appropriateness of psychological treatment for late-life depression is the possible confounding factors that may mirror depressive symptomatology. In particular, careful consideration should be given to the potential co-existence of chronic medical illness and/or dementia. Older people typically have one or more medical illnesses, which may increase the number of somatic complaints that mimic or mask depression. For others the presence of an underlying organic dementia may reduce functional ability to the point that behavioural manifestations resemble symptoms of late-life depression, in particular apathy and loss of initiative (Chemerinski, Petracca, Sabe, Kremer, & Startstein, 2001). In both these situations the clinician may be required to draw on broader sources of information (e.g. family members, cognitive assessments, and medical history) in order to evaluate the range of symptoms that will differentiate the extent to which any co-morbid syndromes confound depressive symptoms.

A third issue to consider in determining the use of psychological therapies is the individual's own psychological mindedness. In order to engage in a collaborative therapeutic alliance, the client is required to bring several qualities to the relationship. These qualities are outlined in Table 2. Invariably, the extent to which some of these qualities are accessible to the individual will depend on the presence of chronic medical illness or impaired cognitive processing (Gallagher-Thompson & Thompson, 1996), as well as the individual's acceptance of their symptoms as a psychological disorder. In some cases, adaptations to the treatment protocol may be sufficient to accommodate for the individual's cognitive abilities and state of mind. In other cases, it may be beneficial to undertake psycho-educational work prior to engaging in therapy. Educational components of therapy have been shown to help normalise the client's experiences and beliefs, and enhance their sense of control over symptoms (Cooper & Murphy, 1986). There is also promising evidence to suggest that bibliotherapy
Table 2. Qualities Indicative of Psychological Mindedness.

- Accessibility of automatic thoughts.
- Awareness and differentiation of emotions.
- Capacity to provide a history with some sense of emotional relatedness to the events of his/her own life and their meaning.
- Acceptance of personal responsibility for change.
- Willingness to develop a therapeutic relationship with the therapist.
- Some signs of hope and realistic self-esteem (which may be quite faint for individuals with depression).

Adapted from Safran and Segal (1990)

(i.e. reading educational material) is an effective adjunct in helping older people with mild-to-moderate depression understand the various psychological and social processes underlying their symptoms (Floyd, 2003).

Psychotherapy for Late-Life Depression

Over the past 15 years there has been a growing body of controlled intervention studies investigating the efficacy of psychotherapy for treating late-life depression. These studies have largely focused on therapeutic approaches developed for use with the general population, although some consideration has been given to therapies aimed primarily at later adult life (e.g. reminiscence therapy). Of the current empirical data, cognitive-behavioural therapy (CBT), brief psychodynamic therapy, and interpersonal therapy (combined with antidepressant medication) have the largest evidence base in support of their effectiveness in treating late-life depression. There is also evidence that behavioural therapy, life reminiscence, and interpersonal therapy alone will yield greater benefits than no treatment. A detailed review of the efficacy and selection of psychotherapy for treatment of depression in older people is provided by Areán and Cook (2002) and Department of Health (2001b).

Among the various psychotherapies for late-life depression, CBT has received the most research attention. The CBT approach is based on the theoretical assumption that an individual's underlying beliefs influence the way that they think and process information
about events, and that these thought processes are interactively linked with how the person feels and behaves (Beck, 1996). To this end, disturbances in mood and behaviour are attributed to dysfunctional information processing and thinking errors. Based on this premise, CBT intervention strategies employ the use of 'collaborative empiricism' to enable the individual to discover links between thinking errors and abnormal mood, and to challenge the validity of this connection (Beck, 1996). This guided discovery and hypothesis testing is achieved through explicit use of cognitive and behavioural strategies that enable the person to evaluate their cognitions and mood more objectively (e.g. activity and thought monitoring) and develop new skills (e.g. cognitive restructuring, problem-solving strategies).

One of the major advantages of using CBT with older people is that it is problem-orientated and focuses upon the symptoms of depression in relation to the context that they occur (Morris & Morris, 1991). The concept of depression is not unique to older people, but it is influenced by risk factors that are not necessarily as prevalent in other depressed populations. As discussed earlier, many of these individual risk factors (such as bereavement and social support) are multifactorial, which means they evoke different thoughts, beliefs and attitudes for different people. By allowing the individual to explore the historical, medical, and current social milieu in which they experience symptoms, CBT helps disentangle the direct and indirect influence the various risk factors exert over mood.

CBT can also be considered a particularly relevant intervention for older people because the evolving formulation of the person and their perceived problems is sufficiently flexible in its application that age-related changes can be adapted for (Thompson, 1996). Many of the cognitive and behavioural techniques employed with younger people may need to be adjusted in order to accommodate the increased restrictions older people face as a result of physical disability and slowed/impaired cognitive processing. For example, it may be necessary to search for less physically strenuous intervention strategies and make the rationale for prescribed intervention strategies more explicit. By the same token, however, there is 'no empirical evidence or therapeutic necessity to adapt cognitive therapy in order to make it more suitable for older adults without cognitive impairment or in the absence of frailty (Laidlaw, 2001, p.11). Laidlaw (2001) argues that the structural elements of CBT, such as collaborative empiricism, socratic questioning, and guided discovery, are as accessible and equally important in their application for treating depression in older people as they are for younger
people. Indeed, the application of CBT in which major modifications are made to these essential therapeutic components may mean that the empirical body of evidence supporting this therapy for treating late-life depression may not be applicable.

**SUMMARY**

Diagnosis and treatment of late-life depression is an area where the demand for specialised mental health services continues to grow. In terms of diagnosis, the heterogeneous and atypical presentation of depressive symptoms makes it difficult for GPs to identify mood disorders amidst differential diagnoses in a limited space of time. Specialist mental health services, on the other hand, are able to devote more time to assessing the presenting symptoms. There is also more opportunity to explore the various risk factors that have been implicated in the onset of late-life depression. Although some of these factors pose a risk across the lifespan, others have been identified as salient risk factors for older people. These factors have broadly categorised into the separate domains of demographic, biological and psychosocial risk factors. Despite this separation it is difficult to ascertain on the basis of the current empirical evidence alone, whether individual factors serve an independent causal role or whether they function to modify vulnerability to other risk factors. Moreover, the multifactorial nature of these risk factors increases the potential that they have an idiosyncratic influence for each individual. Thus, thorough diagnostic assessments are needed to disentangle the role various risk factors play in the onset of depression.

In terms of treatment, the mounting evidence-base for the efficacy of psychological therapies for treating late-life depression means that older people should expect some therapeutic input beyond antidepressant medication. Once again, these demands may extend beyond the capacity of a primary care service and require specialist input. However, before deciding to undertake psychological therapy, clinicians should endeavour to evaluate the suitability of the individual for psychological intervention. This may involve the clinician undertaking some preliminary work to prepare the individual for therapy and it may also involve making adaptations to the planned treatment protocol to accommodate the context in which the symptoms are experienced.
REFERENCES


Journal of Clinical Psychology/In Session, 59, 187-195


American Journal of Geriatric Psychiatry, 4(Supplement), 7-13

International Journal of Geriatric Psychiatry, 14, 331-337.


Chichester, UK: John Wiley & Sons.


Laidlaw, K. (2001). An empirical review of cognitive therapy for late life depression: Does research evidence suggest adaptations are necessary for cognitive therapy with older adults?  
Clinical Psychology and Psychotherapy, 8, 1-14

PSIGE Newsletter, 67, 6-8.

Research on Aging, 23(2), 131-152

International Journal of Geriatric Psychiatry, 6, 407-413.

Journal of Affective Disorders, 52, 169-176.

Zeitschrift für Gerontologie, 24, 17-23.


Summary of Clinical Experience
Adult Mental Health Placement Summary

Adult Mental Health Placement

Setting
- Community Mental Health Team

Client Demographics
- Individual and indirect work with 10 clients (4 Male and 6 Female) ranging in age from 20-61.

Presenting Problems
- Depression
- Anxiety (Generalised and Social Phobia)
- Obsessive-Compulsive Disorder
- Posttraumatic Stress Disorder
- Somatoform/Pain Disorder
- Psychosis
- Forensic
- Memory Decline Related to Neurological Disorder

Assessments
- Questionnaires and Behavioural Assessments used: Beck Depression Inventory II, Beck Anxiety Inventory, State-Trait Anxiety Inventory, Dysfunctional Attitude Scale, Posttraumatic Stress Diagnosis Scale, Internal-External Scale, General Health Questionnaire, ABC Record Diary and Daily Mood Monitoring.
- Neuropsychological Assessment: National Adult Reading Test (NART), Wechsler Adult Intelligence Scale (WAIS-III), Adult Memory and Information Processing Battery (AMIPB), Visual Object and Space Perception Battery (VOSP), Graded Naming Test (GNT), FAS Verbal Fluency

Intervention
- Cognitive-Behavioural Therapy
- Social-Learning Model
- Psychosocial Theory
Teaching / Presentations
• None

Meetings / Visits / Observations
• Regular multidisciplinary team meetings.
• Attended multidisciplinary Clinical Review meetings involving reviews of Care Planning Assessment.
• Meeting with Head of Psychology within the Trust to discuss issues relevant to the Trust.
• Shadowing Senior CPN and Social Worker on-call as part of Assertive Outreach Program.
• Observation of assessments conducted by Consultant Psychiatrist and Senior Occupational Therapist.
People with Learning Disabilities Placement Summary

People with Learning Disabilities Placement

Setting

- Community Team for People with Learning Disabilities

Client Demographics

- Individual work with 3 clients (2 male and 1 female) ranging in age from 24-69.
- Indirect work with 2 clients (1 male and 1 female) aged 24 and 21, respectively.
- Group work with 5 clients (all female) aged 21-42.

Presenting Problems

- Challenging behaviour
- Asperger syndrome
- Dementia
- Downs syndrome
- Tourette’s syndrome
- Physical Abuse

Assessments

- Structured Interviews and Self-Report Questionnaires: The Life Experiences Checklist, Beck Depression Inventory, Beck Anxiety Inventory, ABC Functional Assessment, Pre- and Post-group measure for keeping safe in the community.
- Neuropsychological Assessment: Wechsler Adult Intelligence Scale (WAIS-III), HALO, LEITER, Dementia Rating Scale.

Intervention

- Behavioural
- Cognitive-Behavioural
- Systemic
- Exposure to some psychodynamic thinking through joint supervision.
- Co-facilitated a keeping safe in the community group with another Trainee Clinical Psychologist and Assistant Psychologist.
Teaching / Presentations

- Co-presented an "Introduction to Legal Issues and Sexuality in relation to People with Learning Disabilities" as part of an away day arranged for the Clinical Psychology and Challenging Needs Service.
- Presentation on "Bullying within Residential and Day Care Facilities" to staff and students at the Psychology/Challenging Needs Departmental meeting.

Organisational Work

- Involved in the early stages of developing and planning a "Teaching/Reflective Practice group for members of staff at a large residential home.

Meetings / Visits / Observations

- Attended fortnightly Psychology team meetings and case discussions.
- Chaired two network/professionals meeting that were convened in order to discuss the needs and professional input for a client with challenging behaviours. The meeting involved personnel from Clinical Psychology, Psychiatry, Social Services, Challenging Needs Service, Speech and Language, the Community Nursing Team, and Day Services.
- Visited several day placement centres and residential homes to tour the facilities and observe the various activities available for clients - Included a whole day working alongside staff in a day unit and participating in scheduled group/individual activities.
- Meetings and observation of multidisciplinary professional working in services for People with Learning Disabilities including: Speech and Language Therapist, Occupational Therapist, Nursing/Day Unit Managers, Social Services Manager.
Child, Adolescent and Family Placement Summary

Child, Adolescent and Family Placement

Setting
- Child and Adolescent Mental Health Team

Client Demographics
- Individual and indirect work with 9 clients (7 Male and 2 Female) ranging in age from 3-16.
- Group work with 12 children (8 male and 4 female) aged 11-14.
- Group work with 10 parents (3 male and 7 female).

Presenting Problems
- Anxiety
- Conduct Disorder / Anger Management
- OCD
- Learning Difficulties
- ADHD
- Autistic Spectrum Disorder
- Attachment difficulties

Assessments
- Neuropsychological Assessment: Wechsler Intelligence Scale for Children (WISC-III), Wechsler Objective Reading Dimensions (WORD), Wechsler Wide Range Achievement Test (WRAT-3).

Intervention
- Cognitive-Behavioural / Behavioural
- Systemic
- Narrative
- Psycho-Social Skills group for children with ADHD and Social Communication Disorders.
Teaching / Presentations

• Co-presented talk entitled ‘Distinct Concepts or Differences in Language Use: A Narrative Perspective’ as part a series of Academic lectures given by members of the clinical team.
• Presented findings of Service-Related Research Project to Clinical Service.
• Co-facilitated two parent information evenings for those parents whose children were attending the Psychosocial skills training group.

Meetings / Visits / Observations

• CAMHS Tier 3 Away Day to discuss strategies for reducing waiting list and clinical audit research.
• Attended weekly Tier 3 multi-disciplinary department meeting and weekly Tier 3 case discussions.
• Attended meeting involving client, parents and the school Senco Officer for the purpose of discussing the prospect of a statement of special education.
• Represented Clinical Psychology at a network meeting convened to discuss the needs and professional input for a client with Autistic Spectrum Disorder
• Meetings and observation of multidisciplinary child development services including Alcohol/Substance Abuse Therapist, Social Services Clinical Psychologist, Tier 4/In-patient Clinical Psychologist, Sleep and Behaviour Unit for under 5s, Family Therapy Service,
• Psychotherapist, Nurse Specialist, Music Therapist, Educational Psychologist
• Observations of ADHD Clinic – Family and Medical Assessment conducted by psychiatric and psychological staff for the purposes of diagnosis and recommendations.

Courses and Training Events

• Attended meeting organised by the South Thames Neuropsychology Special Interest Group. Focus of the meeting was a presentation of new research concerned with the diagnosis of Asperger syndrome and the role of neuropsychological assessment.
• Attended conference organised by the Brain Injury Trust/BPS Division of Neuropsychology: ‘Assessment and Rehabilitation following Traumatic Head Injury’.
Older People Placement Summary

Older People Placement

Setting
- Community Mental Health Team
- Inpatient Rehabilitation Hospital

Client Demographics
- Individual and indirect work with 6 clients (3 Male and 3 Female) ranging in age from 60-93.
- Couple work with a male and female client aged 76 and 65, respectively.
- Group work with 8 clients (all female) aged 67-85.

Presenting Problems
- Health-related anxiety
- Fear of Falling
- Depression
- Lewy Body Dementia
- Parkinson’s disease
- Martial difficulties
- Aggressive behaviour

Assessments
- Questionnaires and Behavioural Assessments used: Geriatric Depression Scale, Beck Depression Inventory II, Beck Anxiety Inventory, Life Satisfaction Index, Beck Hopelessness Scale.
- Neuropsychological Assessment: National Adult Reading Test (NART), Middlesex Assessment of Mental State (MEAMS), Wechsler Adult Intelligence Scale (WAIS-III), Wechsler Memory Scale (WMS-III), Graded Naming Test (GNT), FAS Verbal Fluency, Rey Complex Figure Test, Behavioural Assessment of Dysexecutive Syndrome (BADS).

Intervention
- Cognitive-behavioural therapy
- Narrative therapy
- Interpersonal Therapy
• Incorporated aspects of solution-focused therapy and psychoanalytical thinking.
• Group work involved co-facilitating a 'Learning to manage anxiety group' for eight women who were experiencing social anxiety and life adjustment difficulties.

Teaching / Presentations
• Co-facilitated a four week teaching course entitled “Psychological Approaches to Assessment” with another Trainee Clinical Psychologist and Consultant Clinical Psychologist. The aim of the course is to provide individuals working with older people in a health-related role with a broader perspective to the assessment process by investigating how different psychological models (CBT, Narrative Therapy, and Interpersonal Therapy) inform and influence the assessment process.
• Clinical case presentation at a multidisciplinary team meeting of how Narrative therapy was used with an 83-year-old lady with a fear of falling.

Meetings / Visits / Observations
• Attended weekly Multidisciplinary team meeting.
• National Service Framework Implementation meeting. Monthly meeting focusing on issues involved with the implementation of NSF policies in the Trust.
• Attended inpatient ward rounds and case conference/care planning meetings.
• Observation of assessments conducted by Occupational Therapist
• Visited various residential homes and day centres in the trust

Courses and Training Events
• Attended a Special Interest Group conference/workshop organised by PSIGE focusing on Narrative Approaches to working with Older People. Details of the conference presentations were fed back to the psychology team at a weekly psychology meeting.
• Attended presentation on Dementia and the role of psychiatry and psychology have in the treatment of dementia.
• Informal Autogenic Training provided as part of supervision with the Consultant Clinical Psychologist.
Specialist Placement Summary

Specialist Placement in Paediatric Neuropsychology

Setting

- Hospital Setting

Client Demographics

- Neuropsychological assessment of five children (3 male and 2 female) ranging in age from 1½ to 14-years-old.
- Indirect neuropsychological assessment and rehabilitation consultation with 2 patients – a 17-year-old boy and a 13-year-old girl.
- Individual work with one male paediatric psychology patient aged 10.

Presenting Problems

- Traumatic head injury (road traffic accident)
- Epilepsy
- Stroke (Moyamoya disease)
- Encephalitis
- Developmental delay
- Migraine

Assessments

- Wechsler Abbreviated Scale of Intelligence (WASI), Wechsler Intelligence Scale for Children (WISC-III), Wechsler Objective Reading Dimensions (WORD), Children’s Memory Scale (CMS), Working Memory Test Battery for Children, Delis Kaplan Executive Function System (D-KEFS), NEPSY, Bayley Scale of Infant Development, Token Test for Children, Rey Complex Figure Design,
- Structured Interviews and Self-report Questionnaires: Children’s Headache Assessment Scale (CHAS), Children Depression Inventory, Culture-Free Self Esteem Inventory, Conner’s Rating Scales.

Teaching / Presentations

- Presentation on Moyamoya disease was made to the paediatric psychology team.
- Regular case presentations during joint meetings with the Paediatric Neurology department and during joint supervision.
• Presentation of neuropsychological readings reviewed as part of joint supervision.

Meetings / Visits / Observations
• Regular team meetings with paediatric psychology.
• Joint meetings with Paediatric Neurology.
• Attendance at neurology and psychosocial ward rounds.
• Observation of MRI and EEG.
• Observation of bedside neuropsychological assessment.

Research
• Collected data for publication of a twin study comparing neuropsychological recovery following surgery for Moyamoya disease.
Specialist Placement in Acute Adult Neuropsychology

Setting
- Hospital setting

Client Demographics
- Neuropsychological assessment of nine adults (7 male and 2 female) ranging in age from 22 to 61-years-old.
- Brief neuropsychological rehabilitation/consultation with 2 patients – a 23-year-old and a 38-year-old gentleman.

Presenting Problems
- Traumatic head injury
- Epilepsy (including Encephalitis-related Epilepsy)
- Early on-set dementia
- Parkinson’s disease
- Cardiovascular-related Illnesses (Stroke, Hypertension)
- Multiple Sclerosis
- Cerebral Lupus

Assessments
- Wechsler Adult Intelligence Scale (WAIS-III), Wechsler Memory Scale (WMS-III), Delis Kaplan Executive Function System (D.KEFS), WTAR, Rey Complex Figure Design, Ruff Figural Fluency Test, Rey Auditory Verbal List Learning, Benton Visual Retention Test, Graded Naming Test, Brief Test of Attention, Verbal Series Attention Test, Adult Memory and Information Processing Battery, Wisconsin Card Sorting Test, Grooved Pegboard, Symptom Check List-90 (SCL-90), Depression, Anxiety and Stress Scale (DASS), Fatigue Impact Scale.

Meetings / Visits / Observations
- Attended weekly Neurology rounds to discuss clinical cases, which involved the presentation of neuroimaging data (MRI, CT), EEG, and angiography.
• Attending the Regional Neurosciences Centre SENA Meeting. Range of lectures and case studies were presented, which included movement disorders, epilepsy (pseudoseizures), and stroke.
Clinical Case Report Summaries
Summary of Adult Mental Health Case Report

Cognitive behaviour therapy with a 50-year-old woman presenting with long term anxiety disorder with obsessive-compulsive features.

Reason for Referral
A 50-year-old white female was referred to the community mental health team psychology service by her psychiatrist with long-standing Obsessive Compulsive Disorder (OCD) and depression.

Presenting Problem
She reported experiencing intrusive thoughts about death and illness of her family over a period of six months. She described how she always feared the worst happening to members of her family and that even though she knew she was being ‘silly’ she felt compelled to repeatedly check with family members for signs of ill health. She also presented with signs of comorbidity such as feeling depressed and irritability.

Assessment
During the assessment interview, information was obtained regarding her personal and family history, education and occupation, psychiatric history, and her current support network. She had a long history of anxiety and depression associated with illnesses and disruptions that occurred within her family, which began at the age of 15 when her grandmother died after a prolong illness. She believed that her strict family upbringing had prevented her from expressing emotions openly at such times throughout her life and that she often kept her emotions to herself in order not to burden others. In addition, she believed that she currently battling to ensure that ‘everything’ ran smoothly for her family to prevent them from being upset with her. She displayed evidence of a negative internal attributional style throughout the assessment in that she would often focused the blame for negative events on herself.

The Beck Anxiety Inventory (BAI) and Beck Depression Inventory (BDI) were used as outcome measures. Initial BAI and BDI scores placed her in the moderate/severe level of emotional disturbance.

There was no evidence to indicate a risk of suicide at the time of assessment.
Formulation

A collaborative formulation of the presenting problems was developed based on Salkovskis’ (1996) cognitive model of anxiety. It was hypothesised that her early experiences growing up in a strict and demanding family environment had led to the development of dysfunctional beliefs about being inadequate and the need to do more for others. Family illnesses and disturbances were deemed to activate negative assumptions and automatic thoughts about what will happen if she did not do everything she could for others. The negative automatic thoughts were seen to maintain her anxiety and depression insofar that they impacted on the level of perceived threat of the worst happening and her expectations of being able to cope. Her behavioural responses to the perceived threat (i.e. hypervigilance toward signs of illness and avoidance though maintaining order) further helped maintain the anxiety and depression by preventing the discovering that her intrusive thoughts and perceived threat were unsubstantiated.

Intervention

A collaborative CBT approach was adopted over ten sessions. In that time a process of Socratic questioning, mood/activity/behaviour monitoring, and guided discovery were used to:

- Socialise the client to the cognitive model of anxiety.
- Identify and re-evaluate the negative automatic thoughts associated with the overestimation of threat appraisal and underestimation of coping ability.
- Identify and challenge negative assumptions the client made about herself.

Outcome

Improvements were observed in several forms. First, the client reported a subjective improvement in her ability to tolerate uncomfortable situations. She said that she felt less compelled to blame herself when things went wrong and would not always put herself out trying to establish order in these situations. Second, the post intervention BDI rating showed a marked reduction to a mild level of depression. The BAI also showed a marked decline in the number of anxiety symptoms experienced post intervention, although it still indicated a moderate/severe level of anxiety. Third, the client was observed to generalise the conceptualisation of her difficulties and select appropriate strategies to deal with difficult situations for herself. This was particularly seen to be the case following a latter session when the prospect of current and future setback was discussed.
Extended assessment and management of challenging behaviour for 31-year-old man with a learning disability.

Reason for Referral
A 31-year-old white man living in a community home for people with learning disabilities was referred to the community team clinical psychology service for people with learning disabilities by the team psychiatrist, due to his self-injurious behaviour and verbal aggression toward staff.

Presenting Problem
He presented with incidents of self-injurious behaviour that had become increasingly severe and required hospital treatment.

Assessment
During initial interviews with staff and parents, information was obtained about the history of the presenting problem, his personal and family history, and others issues relating to his behaviour, mood and social context. He had a long history of self-injurious behaviour that tended to re-emerge whenever events occurred that frightened him. It was noted that he had recently been teased by a group of youths when he visited his parent’s home and that he had recently been told that his grandfather was not well. Other issues identified throughout the assessment included increased lability, low mood and loss of interest in hobbies, increased binge eating and excessive spending on goods for himself and staff. Contributing to these difficulties staff indicated that there had been numerous staff changes at the residential home that had caused disruption to daily routines. A review of the his case notes indicated that he previously received intermittent input from professionals at times of crises after which time the input dissipated. There was no evidence of an intellectual assessment, which raised questions about his level of cognitive functioning.

Formulation
A social learning model of self-injurious behaviour was used for the initial conceptualisation of his difficulties. According to this model, his self-injurious behaviours were hypothesised to
be functional responses that were maintained by a schedule of positive and negative reinforcement. More specifically, it was hypothesised that his self-injuring was positively reinforced because it resulted in the contingent occurrence of positive environmental events (e.g. one-to-one staff attention). His self-injuring was also thought to be negatively reinforced because it resulted in the contingent withdrawal or prevention a negative environmental event (e.g. expression of pent up negative emotions and avoiding involvement in daily activities and chores he was asked to do).

It was further hypothesised that his desire to receive staff attention, express pent up emotions, and avoid activities using self-injuring behaviour stemmed from a combination of contextual factors, including: low self-esteem, disturbances in his current living environment, and unknown level of verbal/cognitive functioning that limited effective communication.

Action Plan
Although a number of hypotheses had been generated from the formulation, it was possible that a number of equally viable hypotheses could be generated to account for his behaviour. Additional information was required in order to better understand the processes underlying his difficulties and so an extended assessment was proposed.

The assessment plan included:
- Functional analysis (including risk assessment) using a functional assessment interview, ABC charts, local risk assessment procedures.
- Assessment of cognitive functioning and communication skills using standardised assessment tools.
- Evaluate depression and quality of life using daily diaries and questionnaires.

Outcome and Recommendations
The additional information obtained throughout the extended assessment provided substantiating evidence for several of the earlier hypotheses and also highlight several new hypotheses about his difficulties.

It was found that he had quite limited cognitive and communicating abilities, despite the impression he gave by his talkative nature. While he was proficient at tasks that he had rote
learned he was considerably less able at adapting skills to tasks that were unfamiliar to him. His current living and social environment was seen to be unstructured and under-stimulating. He had few established relationships and was unable to communicate effectively with staff (and visa versa), which probably contributed to him feeling anxious and insecure as to who was going to help him.

His self-injuring behaviour thus appeared to be used a means of engaging staff for support at times when he was anxious and was unsure what to do, and was less likely to be a means for avoiding tasks he was requested to do altogether.

A number of recommendations were made based on the findings of the assessment. These recommendations related to the development of a structured daily timetable, staff training and parental support, and ongoing psychosocial input to help with effective emotional expression and low self-esteem.
Summary of Child Adolescent and Family Case Report

Individual and family based cognitive-behavioural problem-solving training with a 12-year-old boy presenting with defiant behaviour and attention deficit hyperactivity disorder.

Reason for Referral
A 12-year-old white boy was referred to the Child and Adolescent Mental Health Service by a private psychologist, who requested psychological input to help the family manage aggressive and impulsive behaviours associated with Attention Deficit Hyperactivity Disorder (ADHD).

Presenting Problem
He presented with difficulty controlling his temper and acting out in verbally aggressive ways toward his grandmother, teachers and other pupils at school.

Assessment
During the assessment interview with the client, his mother and his grandmother information was gathered in relation to the history of the problem, his developmental and educational history, and the family background. Both his mother and grandmother reported impulsive and oppositional behaviour from a young age. They described how this behaviour typically occurred when his grandmother or school teachers asked him to do things such as his chores or homework, although he believed that his grandmother or teachers treated him like a baby.

John was the only child from his mother’s violent relationship with his father, whom he has no contact with. His mother lived with her new husband and step-children, while he lived with his maternal grandparents because his mother found it too stressful to cope with his problematic behaviour. His mother reported that he behaved very well when he spent weekends with her.

The Conners Parent Rating Scale (completed by mother and grandmother), Conners-Wells Self-Report Scale, and Culture-Free Self-Esteem Inventory were used to elicit further information about perceptions of the problem and as outcome measures. The client’s responses indicated his perception of relative difficulties with anger-control and academic self-esteem.
Formulation
The presenting problem of anger control and aggressive behaviour were formulated using a multi-systemic approach in which problem behaviours were seen to exist and be maintained by the interactive processes within multiple systems. It was hypothesised that his disrupted early family environment and early difficulties regulating attention/impulsiveness had limited primary attachments and development of internal working models, which predisposed him to confrontational interactions. The enduring nature of his disruptive behaviour was hypothesised to be maintained by his by dysfunctional interactive patterns that arose within the home and at school, in particular inconsistent living arrangements, disciplinary patterns and expectations placed on him. Interactions with the school were thought to lack adequate consideration of his ADHD and associated learning difficulties.

Intervention
The intervention consisted of 10 weekly meetings that included one-to-one sessions and joint family sessions. The aim of these sessions was to improve his ability to control his anger and aggression at times of stress by:

- Using psychoeducation and age-adapted CBT model to draw attention to the cognitive and emotional processes that influence his behaviour.
- Using age-based social problem-solving skills strategies (including story telling and guided imagery) to help identify problem situations and deal more effectively with emotional responses to these situations.
- Adopting family-orientated communication strategies to facilitate family communication to deal with difficult situations and reach mutually agreed compromises.
- Meeting with the family and the School Special Needs Coordinator to consider prospect of a Statement of Education Needs and to find a suitable school mentor.

Outcome
Although the number of sessions was limited to ten due to a number of missed appointments, there were several observed improvements. The client and his family reported increased ability not to ‘jump to conclusions’, more motivation to seek resolutions to interpersonal conflicts, and that he had been put on school report less often. There was, however, some concern that emotions were being bottles up at times. Post-intervention outcome measures were completed by his grandmother and the client. His grandmother’s Conner’s ratings
indicated continuing oppositional and hyperactivity, but improvement in sustaining attention, impulse control and social relationships. The client's self-esteem rating indicated that his self worth remained high and that he was now feeling more confident about his school work.
Summary of Older People Case Report

Use of narrative theory in working with an 83-year-old lady with a fear of falling.

Reason for Referral
This 83-year-old white lady was referred to the community psychology service for older people by her psychiatrist with continuing symptoms of anxiety and depression associated with a fear of falling.

Presenting Problem
She described a range of anxiety symptoms and negative thoughts in relation to a fear of falling. She said that these symptoms were particularly severe when she was walking around and had to negotiate tight spaces or obstacles. She also described anticipatory symptoms of anxiety whenever she knew she would have to leave the house.

Assessment
During the assessment interview, information was gained from her in relation to the history of the problem, her previous involvement with health services, and her personal and family background. Information was also derived for a home visit and questionnaires.

She had a six year history of fear of falling that began following a diagnosis of arthritis in her knees. She acknowledged that since the diagnosis she had become increasingly reliant on a primary carer to help her with all aspects of daily living. She also said that she now felt unable to move around for herself without the use of a wheelchair or walking frame. Although she said she disliked being so reliant on others and feeling helpless, there was some suggestion of secondary gain from the support she received.

She had been involved with numerous health services over the past six years. She said that she now believed that ‘nothing’ could be done to help her and that she was a failure. This story contrasted with accounts of her earlier life where she was described as active and independent.
The home visit highlighted her ability to walk independently when given sufficient space and limited obstacles. However, a number of practical arrangements were identified that restricted her movements around the house and may contribute to a fear of falling whilst she was inside.

The Life Satisfaction Index (LSI) and Beck Hopelessness Scale (BHS) were used as outcome measures. Initial scores on both of these rating scales indicated a severe level of dissatisfaction and hopelessness. The BHS highlighted her difficulties with envisaging a future life and what she wanted to accomplish in the future.

Despite high levels of hopelessness, there was no evidence of suicidal ideation at the time of assessment.

**Formulation**

A narrative approach to therapy was adapted to guide formulation of her difficulties. Within this framework it was hypothesised that she had dealt with previous experience of anxiety and avoided failure in her life by being self-critical and remaining active. This was seen to lead to the development of her preferred narrative that she needed to be confident, independent, and active to be successful. The diagnosis of arthritis and inability of healthcare professionals to 'fix' her was deemed to have led to the development of a new narrative of failure, which incorporated aspects of low self-efficacy and hopelessness. The automatic thoughts and behavioural responses (i.e. avoidance, hypervigilance, and physiological changes) that stemmed from this new narrative whenever she stood up or anticipated a social outing further increased her risk of falling, which in turn reinforced the story of failure.

**Intervention**

A collaborative narrative and solution-focused approach to therapy was planned. Over nine sessions, reflective listening, guided discovery, metaphors, and landscaping questions were used to:

- Gain additional understanding of how the problem narratives had been manufactured in social, cultural, and psychological contexts throughout her life.
- Externalise fear of falling and its characteristics as a distinct problem from the client’s identity.
• Discover unique outcomes and create an alternate narrative more reflective of her true identity.
• Orientate her toward the future.

A narrative approach was adopted on the grounds that the more evidence-based intervention for anxiety disorders with older people had been used with limited success on two previous occasions with the client. Moreover, narrative therapeutic approaches had been deemed to be an effective strategy for creating the opportunity for change in clients with a perception of hopelessness.

Outcome

Improvement was observed in the form of increased positiveness toward the future and confidence in confronting the fear of falling. She reported that she no longer accepted fear as the only option for her future and that she now saw herself as having a purpose, which would motivate her to remain active against the wishes of the fear of falling. She was also able to identify solution focused behaviours that she and others had begun to use and would continue to use as part of her ongoing battle with the fear of falling. The post-intervention BHS rating of hopelessness indicted a reduction to a moderate level of hopelessness, with many of her responses to items regarding the future reflecting a more positive outlook.
Summary of Specialist Case Report (Paediatric Neuropsychology)

Neuropsychological assessment of an 8-year-old boy with a history of intractable partial seizures and increasingly aggressive behaviour.

Reason for Referral
This eight-year-old boy was referred by a Paediatric Neurologist with a long history of ‘intractable complex partial seizures’ and increasingly aggressive behaviour. The referral requested a neuropsychological evaluation of the contribution his underlying seizure disorder and any environmental factors were having on the current behavioural situation.

Presenting Problem
Aggressive outbursts were reported to occur on a daily basis. They usually involved punching, kicking and throwing objects, and were described as being increasingly unpredictable in terms of when and how long they lasted. He reported that he was aware that he lost his temper and usually remembered what he had done, but that he could not stop himself at the time. His mother reported that he had no regard for the consequences of his actions at the time of the outbursts.

He had a long history of intractable complex partial seizure disorder dating back to infancy. At the time of assessment he experienced three-four seizures a week with a consistent symptomatic pattern that included some aggressive actions similar to those seen in the aggressive outbursts.

The increase in aggressive outbursts coincided with the birth of his half-sister 18-months ago and a marked deterioration in his ability to concentrate at school. He had been excluded from school and there was concern that the severity of the aggressive outbursts were placing family members in danger and restricting his educational opportunities.

Neuropsychological Hypotheses
His history of complex partial seizures and aggressive behaviours is consistent with temporal lobe epilepsy with an epileptiogenic focus in the mesiobasal temporal lobe extending to frontal lobe discharges.
It was hypothesised that his neuropsychological performance would be consistent with hippocampal (mesiobasal) temporal lobe seizures with frontal lobe involvement: average level intellectual functioning, deficits in the acquisition of new information, difficulties sustaining memory (particularly for nonverbal material), and difficulties with response inhibition, motor programming and regulation, and working memory.

Neuropsychological Assessment
Standardised measures and clinical observations were utilised as part of a process-oriented approach to neuropsychological assessment. Measures included Wechsler Intelligence Scale for Children (WISC-III), Children's Memory Scale (CMS), Working Memory Test Battery for Children, NEPSY, and Rey Complex Figure Test.

Although these measures reflected an average level of general intellectual ability and above average ability to utilise strategies for organising information, they showed that his cognitive functioning was adversely influenced in at least three ways:

• First, his ability for short-term retention and retrieval of complex information was impaired, which was consistent with damage to the mesiotemporal and sub-cortical brain regions such as the hippocampus and limbic system.
• Second, visuo-spatial and perceptual coordination functions related to the right parietal lobe were impaired, possibly as a result of on-going (and past) epileptic discharge in the right hemisphere.
• Third, his desire for positive reinforcement as observed throughout the assessment impacted on his motivation to persist with tasks according to how well he thought he was performing.

Opinion and Recommendations
Evidence from the neuropsychological assessment supports the opinion that his current behavioural difficulties are likely to have a neurogenic basis (i.e. are related to the epilepsy). Results indicated impairment of the mesiotemporal regions of the brain consistent with temporal lobe epilepsy. This area of the brain is also implicated in the regulation of emotions, which may explain (in part) the difficulties he has controlling and monitoring his emotions in relation to day-to-day life events. It was also indicated that low self-esteem may be driving
his desire for positive interactions/reinforcement from others and may be linked with a functional increase in the number of aggressive outbursts.

The recommendations based on the findings of the neuropsychological assessment related future formal educational needs of the client, as well as the psychosocial support and intervention for the family and client in dealing with emotional outbursts.
Research Section
Comparing the length and content of neuropsychological reports with other neurological reports

Year 1

June 2002
ABSTRACT

Objectives: To investigate differences and similarities between neuropsychology and neurology reports, and to determine if variations in the length and content of neuropsychology reports differ with variable such as patient age, diagnosis, and status.

Design: Mixed within-measure and between-measure design was used.

Setting: reports surveyed in this investigation were taken from a neuropsychology and neurology service operating together within a Neurosciences department of a local NHS Trust.

Data Collection: Data was collected from 29 neuropsychology reports and the 29 corresponding neurology referral reports. The main outcome measures for which data was obtained and subsequently analyses included overall report length, number of categories contained with the reports, the length of specified categories, patient age, diagnosis and their service status.

Results and Discussion: The results show that neuropsychology reports were consistently longer and contained considerably more categories than the corresponding neurology reports, particularly with regards to information concerning behavioural observations, test results, and conclusions drawn from the assessment. There was also evidence to suggest that the variations in the length and content of neuropsychology reports may be influenced by the nature of the assessment and the type of patient diagnosis.

These key themes are discussed in relation to potential changes in report writing practices and the ethical implications of any changes.
**Introduction**

Report writing is an important part of clinical neuropsychological assessment, not least because it documents one's findings and recommendations in response to a referral question. In order to determine the type of information that should be contained within a neuropsychological report several texts have proposed standard report writing guidelines (e.g. Axelrod, 2000). Despite these guidelines reports tend to be prepared in a variety of ways depending on the purpose of the assessment, the intended target audience, and the specific parameters set out by the clinician’s supervisor and service (Spreen & Struss, 1998). The purpose of the present investigation was to audit the format (i.e. length and content) of report writing in a NHS neuropsychological service, and evaluate if across discipline report comparisons could elicit information that the service would find useful in devising a report format specifically tailored to their clinical setting.

**Factors Affecting Neuropsychological Report Writing**

The limited amount of research on neuropsychological report writing has so far focused on aspects of the clinical setting that might influence the amount and type of information contained within reports.

Donders (2001a) surveyed 414 members of the Division of Neuropsychology of the American Psychology Association, and found that the mean length of reports was 7.38 pages, with document length ranging from one page to 30 or more pages. Several factors were found to impact on report length. Investigation of employment setting revealed that neuropsychologists working in private practice wrote significantly longer reports than those in medical settings, but not those in a rehabilitation centre. Patient age group also impacted on report length with clinicians writing more succinct reports for ‘geriatric’ patients compared with paediatric and general adult patients. Primary diagnostic category also influenced report length with clinicians in a forensic practice writing significantly longer reports than their colleagues writing reports for neurological or psychiatric patients.

In terms of content, Donders (2001b) found that neuropsychology reports remained similar across various employment settings, and that there was widespread agreement regarding the inclusion of specific information (i.e. patient age, education, referral question, and psychometric test data). However, major age groups and diagnostic categories were found to
be associated with variations in the frequency and utilisation of age-equivalent scores, the inclusion of diagnostic labels, and the provision of narrative recommendations.

Overall, Donders (2001a; 2001a) concluded that, despite many similarities among clinical documentations from different settings, the length and content of neuropsychology reports tend to vary between major age groups and between different diagnoses. The recommendation was that neuropsychology reports need to be shaped on the basis of clinical presentation of the patient as well as the needs and knowledge base of the target audience.

Rationale for Study
At present there is a lack of information about neuropsychological report writing practices in the United Kingdom. Consequently, not only is it difficult to evaluate the generalisation of Donders’ (2001a, 2001b) findings, but it is also difficult to establish how neuropsychological services within the NHS might improve report format to better suit specific clinical settings. One suggestion is that comparisons of report length and content can be drawn with reports of other professions that make referrals to neuropsychological services. By adopting this approach it may be possible to identify areas of overlap between reports, as well as identify those unique aspects of neuropsychology reports. Following discussions with two Consultant Neuropsychologists working in a local NHS neurosciences service it was decided to compare the length and content of neuropsychology reports with reports from their most common source of referral (i.e. neurology), and to investigate the influence patient age, diagnostic category, and patient status has on report length and content.

Audit Questions
- Is there a difference between neuropsychology and neurology reports with regard to the length of reports, the number of categories included in reports, and the length of these categories?
- Does age, type of diagnosis, or patient status influence neuropsychology report length or the number and length of categories contained within neuropsychology reports?
Method

Design
A mixed within-measure and between-measure design was used. The within-measure factor was type of report (neuropsychology or neurology) and the between-measure factors were age, patient diagnosis, and patient status.

Procedures
A list was obtained of all patients who had been seen by the adult neuropsychology service in the past three years and for whom a report had been completed. A copy of each report was screened and those who had been referred from the neurology department were deemed eligible for selection. The medical notes for each of these patients were then reviewed and those with a neurology report corresponding to the neuropsychological referral were selected for data collection.

In the three years prior to data collection a total of 102 patients were seen and reported on by the adult neuropsychological service. Sixty two of these patients had been referred from neurology and were eligible for selection. A review of the medical notes produced a total of 29 patients with corresponding neuropsychology and neurology reports suitable for data collection. The remaining 33 patient reports were not included in data collection for one of the following reasons; their medical notes were not available at the time of data collection, a copy of the neurology report was not on file, or the type face within the report was not 12-font.

Data Collection
Data was collected from the neuropsychology and neurology reports contained within the selected medical notes.

(i) Data Collected from Neuropsychology Reports
Information collected from the neuropsychology reports included age, diagnosis, patient status, report length, number of categories, and length of categories.

Patient diagnosis was classified into one of several categories; Cerebral Vascular Accident, Acquired Head Injury, Epilepsy, and Brain Disease (e.g. encephalitis, degenerative disorders,
or brain tumour). In the case where more than one diagnosis was identified the patient’s diagnosis was classified as *Multiple*. Alternatively, where no diagnosis was specified the diagnosis was classified as *Unspecified*.

Classification of Patient Status was based on which division within the neuropsychology service the patient was assessed; *Rehabilitation Service* or *Acute Diagnostic Service*.

Report Length was recorded as the number of pages rounded up to the nearest half page. Number of Categories was recorded as the number of headings contained within the report that indicated to the reader the type of information the writer would be focusing on in that section. Certain categories were selected on the grounds that they had been identified by Axelrod (2000) as standard neuropsychology report categories. These categories included *reason for referral, background/patient history, behavioural observations, presenting problem, test results/interpretation, summary/conclusions,* and *recommendations*. The length of each of these categories was recorded as the number of lines under the headings, rounded up to the nearest whole line.

(ii) Data Collected from Neurology Reports
Information collected from the neurology reports included report length, number of categories, and length of categories.

Report Length was recorded as the number of pages rounded up to the nearest half page. Recording the number and length of categories within neurology reports was less objective than for neuropsychology reports because the neurology reports tended not to be structured with the use of headings. For this reason, neurology reports were read more thoroughly and details contained within the report allocated to one of the selected categories listed above. The number of categories recorded was the sum of those categories for which details contained within the report were allocated, and the length of each of these categories was recorded as the number of lines of detail allocated, rounded up to the nearest whole line.
Results

Data Screening
A review of the distribution and variance of the primary variables revealed serious violations of the assumptions for parametric tests. In view of the small sample size, the transformation of variable values was not viable and the decision was made to employ non-parametric tests for analysis.

Within-Measure Factors
To provide a general description of the within-measure factors in the current sample the mean and standard deviations were calculated for report length, total number of categories present, and average category length. These statistics are presented in Table 1.

Table 1. Mean and Standard Deviations for the Within-Measure Factors.

<table>
<thead>
<tr>
<th>Within-Measure Factors</th>
<th>Neuropsychology Reports</th>
<th>Neurology Reports</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Range</td>
<td>Mean</td>
</tr>
<tr>
<td>Report Length (pages)</td>
<td>(1-4)</td>
<td>2.66</td>
</tr>
<tr>
<td>Number of Categories</td>
<td>(2-13)</td>
<td>10.07</td>
</tr>
<tr>
<td>Average Category Length</td>
<td></td>
<td>7.58</td>
</tr>
</tbody>
</table>

Further investigation of the differences between neuropsychology and neurology reports for each of these within-measure factors was carried out using Wilcoxon signed rank test for matched pairs. In the current context, the Wilcoxon tests were used to determine if the differences between neuropsychology and neurology reports with regard to report length, number of categories present, and category length were significant. 1

1 In accordance with the principles of for evaluating differences between matched pairs the analysis only included cases for which there was a difference between the matched pairs and disregarded those cases where there was no difference between two levels on the independent variable (Clark-Carter, 1997). Note, without any directional hypotheses, all significance levels for these analyses were based on two-tail probabilities.
Report Length
Wilcoxon sign test revealed that the number of pages for neuropsychology reports (M=2.66) was significantly greater than that for neurology reports (M=1.38, T=0, p<0.01, N=27). Of the 27 neuropsychology reports included in this analysis, all were longer than their corresponding neurology report. Two matched neuropsychology-neurology reports were excluded from the analysis because they were the same length. Thus, in the current sample no neurology reports were longer than their corresponding neuropsychology report.

Number of Categories
The mean number of categories contained within neuropsychology reports (M=10.07) was significantly more than the number of categories contained within neurology reports (M=5.52, T=5, p<0.01, N=29). All 29 neuropsychology and neurology reports were included in this analysis, with 24 of the neuropsychology reports containing more categories compared to their neurology report, and five neurology reports containing more categories than their neuropsychology counterparts.

Category Length
A summary of the distribution statistics and inferential statistics for each of the identified categories contained within reports is presented in Table 2. As can be seen from the summary of analysis in this table the number of lines taken up with information pertaining to reason for referral, behavioural observation, test results/interpretation, and conclusion/summary was significantly greater in neuropsychology reports than in the neurology reports. In contrast, the number of lines of information related to recommendations was significantly greater for neurology than neuropsychology reports. No significant difference between reports was found with regard to the number of lines devoted to background/patient information and presenting problem.
Table 2. Descriptive and Inferential Analyses for each of the Identified Categories contained within Neuropsychological and Neurology Reports.

<table>
<thead>
<tr>
<th>Category Length (number of lines)</th>
<th>Mean (SD) Neuropsychology Reports</th>
<th>Mean (SD) Neurology Reports</th>
<th>N</th>
<th>T</th>
<th>Z-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason for Referral</td>
<td>3.14 (2.97)</td>
<td>1.21 (2.13)</td>
<td>24</td>
<td>3</td>
<td>-3.14**</td>
</tr>
<tr>
<td>Background/Patient Information</td>
<td>12.34 (9.67)</td>
<td>13.83 (8.01)</td>
<td>29</td>
<td>(12)</td>
<td>-0.83</td>
</tr>
<tr>
<td>Behavioural Observations</td>
<td>3.10 (2.13)</td>
<td>2.24 (5.33)</td>
<td>25</td>
<td>7</td>
<td>-2.31*</td>
</tr>
<tr>
<td>Presenting Problem</td>
<td>4.55 (4.63)</td>
<td>4.03 (3.69)</td>
<td>23</td>
<td>11</td>
<td>-0.35</td>
</tr>
<tr>
<td>Test Results/Interpretation</td>
<td>25.07 (13.58)</td>
<td>1.10 (2.21)</td>
<td>27</td>
<td>0</td>
<td>-4.50**</td>
</tr>
<tr>
<td>Conclusion/Summary</td>
<td>8.31 (4.47)</td>
<td>5.28 (3.50)</td>
<td>27</td>
<td>5</td>
<td>-2.95*</td>
</tr>
<tr>
<td>Recommendations</td>
<td>0.17 (0.66)</td>
<td>2.41 (3.18)</td>
<td>18</td>
<td>(1)</td>
<td>-3.59**</td>
</tr>
</tbody>
</table>

N = Number of cases included in the analyses.
T = Sum of ranks for the sign that occurs least.
* p<0.05, **p<0.01 (significance levels based on two-tail probabilities).

Between-Measure Factors

A general description of the between-measure factors in the current sample is presented in Table 3. The mean and standard deviation for age suggest that the majority of reports surveyed in this investigation were written for patients between the ages of 28 and 57-years-olds. Closer investigation of the distribution frequencies revealed no reports written for patients younger than 20-years-old and only two reports written for patients older than 65-years-old. The distribution percentages further indicated that the majority of reports were written for patients with a diagnosis of acquired head injury (31%) and that slightly more reports were surveyed for people seen by the acute diagnostic service (58.6%).
Table 3. Descriptive Statistics for Between-Measure Factors.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
<th>Range</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>29</td>
<td>20-73</td>
<td>42.83</td>
<td>14.66</td>
<td></td>
</tr>
<tr>
<td>Patient Diagnosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CVA</td>
<td>6</td>
<td>20.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AHI</td>
<td>9</td>
<td>31.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epilepsy</td>
<td>2</td>
<td>6.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brain Disease</td>
<td>4</td>
<td>13.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple</td>
<td>1</td>
<td>3.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unspecified</td>
<td>7</td>
<td>24.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rehab Service</td>
<td>12</td>
<td>41.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute Diagnostic Service</td>
<td>17</td>
<td>58.6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: CVA = Cerebral Vascular Accident; AHI = Acquired Head Injury

Following this initial review of the between-measure factors it was decided that, in order to guard against Type II errors that would obscure the influence these variables had on report format, the minimum number of responses for each variable subgroup should exceed 20% of the sample. In effect, this meant that there was insufficient age diversity in the current sample to categorise age into child/adolescent (<18-years-old), adult (18-64-years-old), and older adult (>65-years-old) groups, and so analysis involving the influence of age on report format would be based on age measured as a continuous variable. Furthermore, the apriori criterion meant that comparisons carried out to determine whether the neuropsychology report format differed for people with different diagnoses and status would be limited to subgroups for which there were six or more reports surveyed.

Age

Investigation of the association between age and the length and content of neuropsychology reports was carried out using Spearman rank-order correlations. These results are presented in Table 4. The results indicate that there was no significant correlation between the age of the patient for whom the report was written and any of the factors measuring neuropsychology report length or content.  

2 These same results were also found when the correlations were corrected for ‘ties’ between ranked scores in a given variable.
Table 4. Spearman Rank-Order Correlation for Age and the Within-Measure Factors for Neuropsychology Reports.

<table>
<thead>
<tr>
<th>Within-Measure Factor</th>
<th>Spearman’s Rho</th>
<th>Within-Measure Factor</th>
<th>Spearman’s Rho</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report Length</td>
<td>0.02</td>
<td>Presenting Problems</td>
<td>0.18</td>
</tr>
<tr>
<td>Number of Categories</td>
<td>-0.15</td>
<td>Test Results/Interpretation</td>
<td>-0.06</td>
</tr>
<tr>
<td>Reason for Referral</td>
<td>0.01</td>
<td>Conclusion/Summary</td>
<td>0.08</td>
</tr>
<tr>
<td>Background/Patient History</td>
<td>-0.06</td>
<td>Recommendations</td>
<td>-0.03</td>
</tr>
<tr>
<td>Behavioural Observations</td>
<td>0.10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: *p < 0.05.

Patient Diagnosis

According to the apriori criterion, the only diagnostic groups large enough to be considered separately in the analysis were acquired head injury (AHI), cerebral vascular accident (CVA), and unspecified diagnosis. Table 5 presents the distribution scores of each these diagnostic categories for measures of neuropsychology report length and content. Kruskal-Wallis analyses of variance were performed to evaluate the relationship between the diagnostic categories and variations in the length and content of neuropsychology reports. This analysis revealed that for patients with different diagnosis there was no significant difference in the length of neuropsychology reports ($H=5.95$, df=2, $p>0.05$, N=22) or in the total number of categories contained within these reports ($H=5.85$, df=2, $p>0.05$, N=22). Moreover, there were no significant differences in the length of the presenting problems category ($H=0.26$, df=2, $p>0.05$, N=22), the conclusion/summary category ($H=3.54$, df=2, $p>0.05$, N=22), and the recommendations category ($H=1.17$, df=2, $p>0.05$, N=22). However, patients with different diagnoses were found to have significant differences in the length of the reasons for referral category ($H=9.79$, df=2, $p<0.01$, N=22), the background/patient history category ($H=7.39$, df=2, $p<0.05$, N=22), the behavioural observation category ($H=6.60$, df=2, $p<0.05$, N=22), and the test results/interpretation category ($H=7.62$, df=2, $p<0.05$, N=22).
Table 5. Mean and Standard Deviation Scores of each Diagnostic Categories for Measures of Neuropsychology Report Length and Content.

<table>
<thead>
<tr>
<th>Measures of Report Length and Content</th>
<th>Cerabral Vascular Accident (N=6)</th>
<th>Acquired Head Injury (N=9)</th>
<th>Unspecified (N=7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report Length</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td></td>
<td>3.25 (0.69)</td>
<td>3.00 (1.03)</td>
<td>2.07 (0.67)</td>
</tr>
<tr>
<td>Number of Categories</td>
<td>11.67 (1.37)</td>
<td>11.33 (2.78)</td>
<td>7.57 (3.82)</td>
</tr>
<tr>
<td>Length of Categories</td>
<td>5.17 (2.64)</td>
<td>4.67 (3.67)</td>
<td>1.00 (0.82)</td>
</tr>
<tr>
<td>Reason for Referral</td>
<td>20.67 (7.79)</td>
<td>15.89 (9.79)</td>
<td>5.00 (3.61)</td>
</tr>
<tr>
<td>Background/Patient Information</td>
<td>4.83 (1.17)</td>
<td>3.33 (1.50)</td>
<td>2.43 (1.90)</td>
</tr>
<tr>
<td>Behavioural Observations</td>
<td>3.83 (2.14)</td>
<td>5.33 (4.21)</td>
<td>6.71 (7.20)</td>
</tr>
<tr>
<td>Presenting Problem</td>
<td>36.00 (11.33)</td>
<td>30.67 (14.10)</td>
<td>15.00 (8.06)</td>
</tr>
<tr>
<td>Test Results/Interpretation</td>
<td>10.67 (3.45)</td>
<td>7.33 (2.92)</td>
<td>8.43 (7.25)</td>
</tr>
<tr>
<td>Conclusion/Summary</td>
<td>0.50 (1.23)</td>
<td>0.22 (0.67)</td>
<td>0.00 (0.00)</td>
</tr>
</tbody>
</table>

N = Number of cases included in the analyses.

Post-hoc Mann-Whitney U tests were used to determine for what type of diagnosis there were significant differences in the length of the referral category, the background/patient history category, the behavioural observation category, and the test results/interpretation category. They indicated that the length of each of these categories was significantly longer for patients with a diagnosis of CVA compared with those with an unspecified diagnosis. The length of the reason for referral category and test result/interpretation category were also significantly longer for patients with a diagnosis of AHI than those with an unspecified diagnosis.

In accordance with current recommendations the sample size for Mann-Whitney U analyses was not large enough to warrant z-test and probabilities were calculated from distribution tables (Clark-Carter, 1997, p.571)
Patient Status
A sufficient number of reports were surveyed from the rehabilitation and the acute diagnostic service to satisfy apriori criterion for inclusion in the analysis. Table 6 presents the distribution scores of each service for measures of neuropsychology report length and content.

Mann-Whitney U tests were performed to determine whether the length and content of neuropsychology reports differed between patients assessed by the rehabilitation service and acute diagnostic service. These analyses revealed that reports written by the rehabilitation service were significantly longer than those written by the acute service ($U=7.00$, $p<0.01$, $N=29$), and that rehabilitation reports contained significantly more categories that the acute diagnostic reports ($U=54.00$, $p<0.05$, $N=29$). As for the individual categories, rehabilitation reports tended to write significantly more than acute diagnostic reports in relation to the

Table 6. Mean and Standard Deviation Scores of each Neuropsychology Service for each Measures of Neuropsychology Report Length and Content.

<table>
<thead>
<tr>
<th>Measures of Report Length and Content</th>
<th>Rehabilitation Service (N=12)</th>
<th>Acute Diagnostic Service (N=17)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Report Length</td>
<td>3.54 (0.40)</td>
<td>2.03 (0.60)</td>
</tr>
<tr>
<td>Number of Categories</td>
<td>12.17 (0.89)</td>
<td>8.59 (4.08)</td>
</tr>
<tr>
<td>Length of Categories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reason for Referral</td>
<td>5.75 (2.93)</td>
<td>1.29 (0.92)</td>
</tr>
<tr>
<td>Background/Patient Information</td>
<td>22.75 (3.33)</td>
<td>5.00 (4.20)</td>
</tr>
<tr>
<td>Behavioural Observations</td>
<td>4.50 (1.24)</td>
<td>2.12 (2.09)</td>
</tr>
<tr>
<td>Presenting Problem</td>
<td>4.75 (1.36)</td>
<td>4.41 (6.02)</td>
</tr>
<tr>
<td>Test Results/Interpretation</td>
<td>38.92 (6.23)</td>
<td>15.29 (7.10)</td>
</tr>
<tr>
<td>Conclusion/Summary</td>
<td>9.33 (3.40)</td>
<td>7.59 (5.08)</td>
</tr>
<tr>
<td>Recommendations</td>
<td>0.42 (1.00)</td>
<td>0.00 (0.00)</td>
</tr>
</tbody>
</table>

$N =$ Number of cases included in the analyses.
reason for referral ($U=7.00$, $p<0.01$, $N=29$), background/patient history ($U=7.00$, $p<0.01$, $N=29$), behavioural observations ($U=7.00$, $p<0.01$, $N=29$), and test results/interpretation ($U=7.00$, $p<0.01$, $N=29$). There was no significant difference in the length of the other report categories between rehabilitation and acute services.
Discussion

The purpose of this survey was to explore differences and similarities between neuropsychology and neurology reports, and determine if variations in the length and content of neuropsychology reports differ with variables such as patient age, diagnosis, and status. The quantitative analysis of those reports surveyed identified several themes as regards to report writing issues for clinical psychologists.

In terms of length and content, neuropsychology reports were found to be consistently longer and contain considerably more categories than their neurology counterparts. The specific categories that appeared to contribute most to the extended length of neuropsychology reports were those with information pertaining to behavioural observation, test results/interpretation, and conclusions drawn from assessment. Both types of reports offered a similar amount of information about the patient’s history and presenting problem, although neurology reports tended to provide more in the way of future recommendations.

In relation to clinical practice, these findings open the door for discussion about how communication of neuropsychological findings may be enhanced. In particular, the contrast between reports with regard to test results/interpretation and recommendations may suggest that neurologists placed less emphasis on reporting test findings and more emphasis on the implications the findings carry for the patient. Indeed, recent debate among psychologists has seen a greater push toward user-friendly communication focusing on the implications for test findings from neuropsychological evaluation, rather than extensive reporting of quantitative test data (Donders, 1999). Unfortunately, the debate over whether to include test data is not clear-cut. On the one hand, presenting all quantitative data and possible interpretations precludes the omission of potential hypotheses under investigation, and permits comprehensive comparison of patient profiles upon retesting (Friedes, 1993). On the other hand, by offering all test data psychologists run the risk that other professionals may interpret their findings without considering all relevant contextual factors (Naugle & McSweeney, 1995). This second point is particularly pertinent in view of the current finding that psychologists reported considerably more behavioural observations than neurologists.

Variations in the length and content of neuropsychology reports were found to be associated with differences in patient diagnosis and patient status. Specifically, reports for patients who
were assessed for the purposes of rehabilitation tended to be longer and contain more information about the reason for referral, the patient’s history, behavioural observations, and test results than those reports for patients assessed in the acute diagnostic service. Although, the patient’s diagnosis did not influence the overall report length, those patients with a specified diagnosis did tend to have more information pertaining to these four categories compared with those patients with an unspecified diagnosis.

In relation to the earlier discussion, these findings suggest that the presentation of test results and primary contextual factors may be influenced by the nature of the assessment. In situations where there is an ongoing assessment program and/or a clear clinical direction being followed (i.e. rehabilitation/specified diagnosis) more information is generated and there is greater emphasis on incorporating this information into reports. Alternatively, in situations where psychological assessment is more exploratory the emphasis toward test results and contextual factors appears to be more succinct reporting of salient findings and observations only.

Overall, this investigation has taken the initial steps toward distinguishing variations in report format and identifying factors associated with these variations. However, several limitations of the survey suggest that the key themes to emerge should be considered with caution. Among these limitations are small sample size and a lack of emphasis on the qualitative differences in information contained within the various report categories. Future studies will need to focus toward objectively evaluating the substance of information contained within reports and validate this information both within the profession and across disciplines.
REFERENCES


Donders, J. (1999). Pediatric neuropsychological reports: Do they really have to be so long? *Child Neuropsychologist, 5*(1), 70-78.


Appendices

Appendix A: Ethics Permission Letter ................................................................. X

Appendix B: Proof of Feedback to Services ...................................................... X
Appendix A: Ethics Permission Letter

Local Research Ethics Committee

Our Ref:

12 April 2002

Dear Mr

Re: The length of neuropsychology reports compared with neurology reports

Thank you for your letter of 4th April 2002. What you propose seems to be an audit of existing practice and, as such, does not require ethical approval.

But we are always glad to be notified of audits, especially in an area which could be sensitive.

With all good wishes.

Yours sincerely

Chairman

Local Research Ethics Committee
Appendix B: Proof of Feedback to Services

Mark Pertini
Trainee Clinical Psychologist
Psych D Clinical Psychology
Department of Psychology
University of Surrey
Guildford
GU2 7XH

Dear Mark

Thank you for coming to the on Monday 03 March 2003 to give a presentation on your research project completed in the Department.

The findings of your research were most interesting, and the staff members appreciated you putting aside the time to talk to us.

As I mentioned, is planning to do a research project on patients' views of their Neuropsychological assessment and I think that she will also be most interested in your project.

Kind regards

Yours sincerely

Consultant Clinical Psychologist
Qualitative Research Project

The influence of first impressions on rapport building: a qualitative investigation into the views of trainee psychologists

Year 2

May 2003
INTRODUCTION

A good therapeutic relationship between client and therapist is widely regarded as the foundation for effective psychotherapy (Barber, Connolly, Crits-Christoph, Gladis, & Siqueland, 2000; Gaston, 1990). Central to this foundation is the idea that the therapist endeavours to create a rapport with the client that will facilitate trust and honesty, which in turn allows the client to feel secure in revealing intimate details about themselves. According to Beck, Rush, Shaw, and Emery (1979), this level of rapport is likely to exist when:

‘the patient perceives the therapist as someone (a) who is tuned in to his feelings and attitudes, (b) who is sympathetic, empathetic, and understanding, (c) who is accepting of him with all his “faults”, and (d) with whom he can communicate without having to spell out his feelings and attitudes in detail or to qualify what he says.’ (p.51).

In looking at the mechanisms of building rapport a number of authors have highlighted the possible influences of first impressions (e.g. Higgins & Rholes, 1976; Laungani, 2002). For the most part this research has focused on identifying how personal and contextual factors influence the client's perceptions of the therapist, and whether these perceptions are linked with the client's willingness to engage in the therapeutic process (e.g. Ditmar, 1980; Hubble and Gelso, 1978). In contrast, considerably less emphasis has been placed on the influence that therapists' first impressions have on the therapeutic process. One might speculate that the sparse development of research in this area reflects an unalienable belief within the counselling community that professional therapists maintain a strict level of neutrality and objectivity.

In a recent discussion paper, Laugani (2002) challenged the likely reality of therapist neutrality and highlighted that both the client and therapist are unavoidably engaged in an overt and covert mutual assessment of each other from the first meeting. Laugani (2002) argued that for therapists the initial assessment was a time not only when they began generating clinical hypotheses about the client but they were also likely to develop subjective impressions of the client and various aspects of their life. These perceptions are suggested to be driven by the therapist's own experiences, belief systems and idiosyncratic stereotypes (Bermudez, 1997; Laungani, 2002). In addition, factors such as diagnostic impression (Gilbert, 1974), expectations for change (Goldstein, 1960), and the therapist's attraction to the
client (Bull and Rumsey, 1988) have been suggested as potential influences on therapists’ impressions and therapeutic rapport. Assuming that all perceptions at some level are theory-laden (i.e. influenced by knowledge of something else; Popper, 1963) and the possible interaction of factors influencing therapists’ perceptions, it would seem that therapists’ first impressions and their influence on therapeutic rapport warrants further investigation.

The present study sought to explore how trainee psychologists view the mechanisms of rapport building and how their first impressions might influence the rapport building process. To carry out this investigation a qualitative research approach was adopted as it was felt this approach would enable the researchers to capture the depth and scope of trainee’s experiences, and through systematic analysis draw out some meaningful interpretations regarding the content and complexity of the processes under investigation.
METHOD

Participants

Participants recruited for this study were Trainee Clinical or Counselling Psychologists, who were approached individually by the researchers and asked if they were willing to be interviewed about the role of first impressions and rapport in the therapeutic relationships. Although no restrictions were placed on participants’ theoretical orientation, they were required to be currently enrolled in a Clinical or Counselling Psychology Doctorate Training Program and to have successfully completed at least one year of the course. These criteria were used primarily to ensure that participants’ main professional role (or at least one of them) was therapeutic practice and that they had at least a minimal amount of clinical experience to draw upon.

In total, four Trainee Psychologists were approached and agreed to be interviewed. They were given a brief description of the study’s goals and procedures, and were asked to give signed consent that they understood these procedures. Particular emphasis was placed on highlighting that the interview would be audio taped and analysed as part of the study, but that they would not be identifiable in this analysis. A copy of the consent form designed for the study is provided in Appendix A.

The Researchers

Information concerning the researchers conducting this study can be found in Appendix B.

Interview Procedure

A semi-structured interview schedule was employed for interviewing participants with the aim of obtaining a descriptive account of how they formed first impressions of clients and how (or indeed if) these impressions influenced the development of rapport in the therapeutic relationship. The schedule began with a series of demographic questions which participants completed for themselves. They were subsequently asked a series of open-ended interview questions about what they understood by the term rapport; the factors involved in the development of an effective/ineffective therapeutic rapport based on their experiences; the influences in constructing a first impression of a client; and the relationship between first impressions and the development a working alliance with their clients. Due to the nature of the research, a non-judgemental approach was adopted throughout the interview to minimise
the potential that participants would feel their therapeutic skills were being evaluated. A copy of the interview schedule is provided in Appendix C.

Interviews were conducted face-to-face with participants and lasted between 30-40 minutes. All four interviews were audio taped, although due to technical difficulties with the audio recording of one interview only three were transcribed (verbatim) and used for data analysis.

Analytic Strategy
Data were analysed using Interpretative Phenomenological Analysis (IPA; Smith, 1995; Smith, Jarman, & Osborn, 1999). IPA holds that narrative data reflects the participant’s personal experiences, perceptions and beliefs, but that their phenomenological perspective in not transparently available from these verbal reports. Instead, researchers are required to interpret the participant’s perspective. This interpretation is invariably influenced by the researcher’s own conception of the world and the context of their interaction with the participant (Smith, et al., 1999). IPA recognises this dynamic interaction between the participant’s accounts and the researcher’s interpretative frameworks, and offers a systematic approach to analysing narrative data so that meaningful interpretations can be drawn out of the participant’s thinking.

In the present study, the systematic analytic strategy began with the researchers reading each transcript and reaching an agreement as to which one offered the richest description of the participant’s experiences (see Appendix D). The selected script was then re-read several times, with each researcher noting their own summaries, connections, and preliminary interpretations of key phrases and processes. These notes were summarised into a list of initial themes. To ensure that these themes reflected the essential quality of the text the researchers (a) cross-referenced and amended themes against the themes identified by the other researcher, and (b) compared the themes with the script to make sure identified themes were consistent with what the participant actually said. Closer examination of the emerging themes was then carried out to identify recurrent patterns across the transcript and connections between themes. A coherent list of themes was then produced and again checked against the transcript to ensure the connections fitted with the data.
This list of themes served as the foundation from which the other transcripts were integrated into the analysis. Each transcript was coded against the theme list with amendments made along the way. The iterative referencing process between identified themes and the transcripts allowed the researchers to identify whether the new data were elaborations of originally identified themes or whether they produced new meanings (i.e. additional themes). A consolidated list of themes was subsequently produced and examined by both researchers to see how they might be meaningfully grouped into broader domains. Different groups of themes were checked against the transcripts and finally a list of grouped themes was agreed as a representation of how participants’ accounts of how their first impressions had influenced the rapport building process.

The analytic strategy in this study highlights two processes that were adopted to mediate the subjectivity of the interpretation of data, and thus evaluate the quality of the interpretative analysis. First, the collaboration between researchers in analysing data was aimed at reducing the probability of summarising data into themes that did not overlook individual statements and personal experiences. Moreover, working collaboratively was seen as a means for challenging and compensating for each researcher’s idiosyncratic interpretations of data. Second, a criterion for evaluating the persuasiveness of the analysis was set up by grounding interpretations using examples from the transcript (Elliot, Fischer, and Rennie, 1999). Thus, throughout this text interpretations are illustrated by extracts from the data set, which will permit readers to evaluate the persuasiveness of the analysis for themselves.


RESULTS

Demographic Information

Information pertaining to the three participants whose interviews were transcribed for data analysis is described below, in the order in which they were analysed.

Lewis was a 34-year-old white British man with postgraduate degree qualifications. At the time of the interview, Lewis was in his third year of training to be a Counselling Psychologist and estimated that he had seen between 16-30 clients throughout this time.

Hugh was a 25-year-old white British man with undergraduate degree qualifications. He was in his third year of Clinical Psychology and estimated that he had seen between 31-45 clients over the course of his training.

Andrew was a 29-year-old white British man with postgraduate qualifications. He was in his second year of Clinical Psychology and estimated that he had seen over 46 clients in this time of training.

All participants described their theoretical orientation as integrative, involving aspects of psychodynamic, systemic and cognitive-behavioural approaches.

Identified Themes

During analysis of the transcripts a wide range of themes emerged and highlighted the participants' multi-dimensional views of how first impressions might influence the mechanisms of therapeutic rapport building. Nine salient themes were identified for analysis and grouped into three broad domains, which are presented in Table 1 along with the number of participants who displayed them. Each domain represents an organisation of themes into heuristically related categories and, therefore, one should not assume that the themes within each domain represent totally independent constructs.

An additional four stand-alone themes were also identified running through the transcripts. However, careful review of the contents of these four themes revealed that they reflected more upon the participants' understanding of rapport rather than how they viewed the impact of first impressions on the rapport process. Thus, in view of the space constraints for this project it was decided that these themes would not consume the analysis. Instead, the themes within the
three domains would provide the primary source of data to illustrate interpretations made in relation to the research topic.

**Therapist Preconceptions**

This domain concerns the preconceptions that therapists take into a first meeting and how these preconceptions influence their impressions of the client and their approach to developing rapport. Themes encompassed within this domain include the formation of expectations, congruence between preconceptions and reality (i.e. expectation match), and the adjustments participants make in view of this information when trying to establish rapport in a therapeutic relationship. Also included is how the participants’ awareness of preconceived impression can generate further expectations about the likely therapeutic work experience.

One of the more salient themes to emerge throughout the analysis was that all participants began to construct an impression of a client before actually meeting them, usually through ‘careful reading of the referral letter’, ‘someone else’s impression or label’, or ‘the reason for
referral' itself. These preconceptions appeared to be heavily influenced by each participant's past experience. For example, Lewis stated:

'your experience up to that point determines to a large extent what you imagine you are going to see in front of you once you have read the [referral] letter'.

In a similar vein, Andrew commented:

'from my point of view past experiences influence how you begin to formulate around the [referral] letter'.

The formation of these preconceptions was widely thought to contrast with the participants' initial impressions upon actually meeting a client. Participants talked about being 'surprised by the way the physical reality of someone impacts on you' and how they do not necessarily 'present like you imagined'. Interestingly, the adjustment of reconciling ideas with the physical reality of meeting the client were deemed to have both negative and positive effects on the process of rapport building. For example, Lewis highlighted that his preconceived personal prejudices evoked strong emotions at times that led him to question his motivation and ability to work effectively with a client:

'I'd be angry with this woman or this man before they'd even walked in the room....and I think if I feel like that then [I] have to examine fairly objectively detached way whether I was the best person to work with them'. (Lewis)

On the positive side, the contrast between preconception and physical reality would lead participants to be more vigilant throughout the early rapport building process. In particular, participants alluded to how they might utilise the similarities and differences between their preconceptions and reality to inform a holistic and individualised evaluation of the client, as illustrated by the following comments:

'I show an interest in the specific person, focus on the individual and not judge....careful not to relate to the person you have constructed in your mind'. (Lewis)

'if gestures and dress went along with what referral had said then it becomes more noticeable....consolidates impression'. (Hugh)

'differences in expectation can make things stand out and for certain things the alarm bells start ringing'. (Andrew)
Furthermore, several participants indicate that drawing together first impression would lead them to generate further expectations, in particular how they anticipate the work with the client might unfold:

'I make judgements about future and impression of working together...that is style of working together and ability to challenge them'. (Hugh)

The participants' various comments concerning preconception, first impression and rapport would seem to echo Popper's (1963) position that no perception of any phenomena is ever neutral, and is invariably influenced by prior knowledge. In terms of a therapeutic relationship, this implies that therapists may draw on past experience when making first impressions as it allows them to integrate and synthesise information into meaningful patterns, even reconciling conflicting/contradicting information (Higgins and Rholes, 1976). Added to this is the idea that first impression may also serve as the starting point from which other judgements are made.

*Client Attributes*

Besides therapists' preconceptions, participants also highlighted how first impressions may be influenced by client attributes, and in particular how perceived client attractiveness, physical qualities, and communication style (verbal/non-verbal) might impact on rapport building.

In the discussion surrounding client attributes, Lewis identified how general attractiveness of a client might affect him developing a therapeutic relationship:

'I think also physical attractiveness is quite important. If you find the other person sat opposite you engaging, physically appealing, I think....that keeps you kind of motivated to do the work, or at least to develop a relationship'.

This recognition fits with the research of Schofield (1964) who found that in general therapists prefer working with young, attractive, intelligent and successful clients, and that therapist judgements on such qualities are likely to affect therapeutic engagement (Bull & Rumsey, 1988).

Several physical qualities were identified for their potential to influence participants' first impressions of attractiveness:
‘whether they [clients] look tired....or care worn’. (Lewis)

‘if they dress really scruffily or look really unkempt then that will obviously make an impression’. (Hugh)

‘two-three rings on every finger, gold earrings, and tattoos....gives you an idea of the client’. (Andrew)

Unfortunately, participants did not elaborate further about how these physical qualities might impact on rapport building, and there seems to be a general dearth of research in this area.

Participants did, however, identify how their perceptions of the client’s verbal and non-verbal communication style was a significant factor in determining if rapport had developed:

‘it’s picking up on social cues, the responses from the person, how they are responding to what you are saying, the positive signs that are coming through, whether it is body language, eye contact, or what they are saying’. (Hugh)

‘eye contact gives you a good idea if you have engaged them [clients] ’. (Andrew)

‘the first thing that comes out of their mouth....often says an awful lot about the way that the work is going. (Lewis)

Hugh went further to qualify how clients’ communication style might be employed to enhance rapport:

‘I seem to pick up on their body language, as well as if they are frowning or looked confuse. This might lead me to give an explanation....if I haven’t got that connection from the first impression I spend a bit more time trying to establish that rapport. Might not go as fast as you were going to go and take a bit more time so slow down the pace’.

Thus, it would seem that the therapist’s capacity to attend to subtle communications would help them determine how proactive they need to be in facilitating the development of rapport.
In fact, attending to verbal and non-verbal communication may be the underlying skill Beck, et al (1979) alluded to when they deemed rapport to exist if the client ‘can communicate without having to spell out his feelings and attitudes in detail or to qualify what he says’ (p.51).

Therapist Attributes
A third domain of themes concerns the therapist’s awareness of their own attributes when developing rapport, in which there was a focus on how they might provide a level receptiveness for the client in the first instance.

Each participant was very conscious of trying to establish a sense of equality between themselves and the client. For example, Andrew stated:

‘put yourself at the level of the client...give them a sense of equality’.

Various endeavours were made by the participants to establish this first impression of equality. Some were quite overt such as ‘not sitting on a higher chair’ or being sure to ‘acknowledge responses from the person’. Other efforts were more subtle and included participants adjusting the language they used to the level of the client and using a lot of ‘non-verbal reciprocation’.

While these strategies may reflect a level of common sense on the therapist’s behalf, there has to date been very little systematic investigation for how such strategies impact on rapport.
DISCUSSION

The aim of the present research was to qualitatively investigate the views of trainee psychologists on the relationship between first impressions and the mechanisms of rapport building. A variety of themes were identified ranging from how therapists’ preconceptions and clients’ attributes impacted on the therapist to the attempts therapists made to create an initial sense of equality for the client when developing rapport.

The interpretations offered throughout this study, as in most qualitative studies, should be considered as tentative, and limited by the context of the work. Several issues in particular need to be considered in order to ground the interpretations made within this project within the wider literature. First, the interview schedule employed was able to glean a good deal of descriptive information from participants about their understanding of the nature of first impressions and rapport. It did not, however, in the researcher’s view sufficiently prompt participants to explore the interaction between these constructs. Consequently, the depth and scope of the interpretations concerning the relationship between first impression and rapport was thought to be limited to some degree. An opportunity to pilot the interview schedule was needed in order to refine questions that would elicit this deeper contextual information.

Second, the nature of the questions may be deemed as sensitive insofar that participants were asked to discuss a topic that they may have felt reflected on their clinical skills. Any scepticism they may have had could have been heightened by the fact they were interviewed by a peer with whom they would have continued contact. Thus, even though researchers adopted a non-judgemental interview approach, future research should give more careful consideration to the impact of the relationship between the research and participant.

A third concern for the current study was the sampling bias among the participants recruited. All participants were young-to-middle aged white males, and consequently interpretations from this study may only be generalised to this select cross-section of trainee psychologists. Again, future research will need to take more care when adopting a sampling procedure, although the strong commonalities of themes identified within this sample may suggest a degree of representation for the broader counselling community.
In conclusion, the present study sought to contribute to the discussion on the practice implications of therapists' first impressions called for recently in the Counselling literature (Laungani, 2002). In doing so, the study has not only illuminated some of the processes operating between first impressions and rapport (which previous research had speculated about) but it has begun to identify some of the ways in which these processes might be employed in a clinical setting to create a more effective therapeutic alliance. Nevertheless, future qualitative work will be essential in exploring the complex and intricate mechanisms that operate between a therapist's impressions and how they develop therapeutic rapport.
REFERENCES


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Appendix A: Consent Form

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5th April 2003

CONSENT FORM RELATING TO PARTICIPATION AND RECORDING OF AN INTERVIEW FOR RESEARCH PROJECT INVESTIGATING THE RELATIONSHIP BETWEEN FIRST IMPRESSIONS AND RAPPORT BUILDING:

a. The purposes of the research project and interview process have been explained to me to the point that I am adequately satisfied that I understand what I am undertaking and I hereby give my permission to be interviewed and for the interview to be recorded.

b. I understand that the audiotape recording will be used for the sole purpose of transcribing the contents of the interview for analysis, that I will not be individually identifiable from this transcript, and that the tape will be erased once it has been transcribed.

c. You may add any special conditions here;

Note: In giving this signature of consent you do not lose any rights of legal action should you ever feel the tape has been shown irresponsibly.

Name ............................... Signature ..............................

Date ..............

Researcher.............................. Signature ..............................

Date ..............
Appendix B: Information about the Researchers

The interviews and data analysis were conducted by **** ******* (31-year-old, second year Clinical Psychology Trainee) and ***** ******* (31-year-old, first year Counselling Psychology Trainee). At the beginning of the project both researchers held the view that therapists are likely to form first impressions of their clients and that a number of different factors are likely to inform the therapist’s first impression. At the same time, the researchers acknowledged that they held no strong views about the influence first impressions might have on therapeutic alliance between therapist and client. This anomaly, along with the desire to improve self-awareness in their own therapeutic practice provided the motivation for undertaking this project.

In the early stages of the developing this project and collecting interview data, **** and ***** (along with two fellow researchers undertaking the same project) consulted on a weekly basis about the interview schedule and procedures; the conduct of the interviews; and the general content of the interview transcripts. At the time of transcript analysis the larger research group divided and **** and ***** worked together on identifying emerging themes and analysis of the data set. Throughout all stages of this project regular consultation was also sort from Dr *, ***** ( of the Doctorate in Psychotherapeutic & Counselling Psychology at the University of *******) who has considerable experience in the use of qualitative research methodology.
Appendix C: Interview Schedule

A. PERSONAL DATA

A1. Are you?  
   Male ________  
   Female ________

A2. How old are you?  [ ] years

A3. How would you describe your ethnic origins?  
Choose one section from (a) to (e) and then circle the appropriate category to indicate your ethnic background.

(a) White
   British
   Irish
   Any other white background, please write in below

(b) Mixed
   White and Black Carribbean
   White and Black African
   White and Asian
   Any other mixed background, please write in below

(c) Asian or Asian British
   Indian
   Pakistani
   Bangladeshi
   Any other Asian background, please write in below

(d) Black or Black British
   Caribbean
   African
   Any other Black background, please write in below

(e) Chinese of Other ethnic group
   Chinese
   Any other, please write in below

(f) Other
A4. What is your highest education qualification?
(tick the appropriate answer)

- Postgraduate degree/ diploma
- Undergraduate degree
- Diploma
- A-level(s)/AS-level(s)
- GCSE(s)/O-levels/CSE(S)
- Other

A5. What is your current marital status?
(tick the appropriate answer)

- Single
- Married
- Divorced/separated
- Widowed

A6a. Do you have any children?
Yes
No

A6b. If yes, how many children do you have?
( )

A7a. What is your current or most recent occupation?

A7b. Could you briefly explain what your main responsibilities are in this role?

A7c. How many years have you held this position?
____ years

A8. As a trainee counselling or clinical psychologist, what would be your estimate of the number of clients you have worked with since the start of your training?

1-15  16-30  31-45  46+
B. MAIN INTERVIEW Rapport and First Impressions

We are interested in how your first impressions of clients impact on rapport in therapeutic relationships? I'd like to start by looking at how counselling and clinical psychologists in training build rapport with their clients and then move on to how our first impressions affect this process? (possible prompts bulleted)

1. What do you understand by the term rapport?

2. Now I'd like you to think about a client whom you saw recently for the first time and with whom you developed an effective working rapport. What do you think helped you to develop that rapport?
   - “What makes you say that?”
   - Was it typical to how you normally try to build rapport?
   - What were the most important factors?
   - At what point do you think you started to build rapport?
   - Any additional factors you would like to add at this point about that experience?

3. Now a client that you saw recently with whom you found it difficult to develop a rapport. What factors do you think made it difficult?
   - (prompts as above)

Now, I’d like to look in more depth at the first impressions that we make of clients.

4. When meeting any new client for the first time what do you feel influences your first impressions?
   - Can you give me an example of that? E.g. Age/Gender/Communication Style e.g. tone of voice/Physical characteristics e.g. dress/Non-verbal behaviour e.g. facial expression.

5. Thinking about the first impressions you mentioned, do you think any of them affect you in building rapport with the client?

6. How do you think that your first impression of a client may influence your rapport with them?
   - Relate to examples from questions 2 and 3 (good and bad rapport)
   - How you conduct the session/your behaviour?
   - Transference/Countertransference mentioned by participant?
   - Theoretical model that they like?
   - If neutral, how do you do that?
   - Is there something that you rely on/trust in yourself to pick up on – (Use of self)

7. Is there any additional information that you want to add?
   - How do you feel about being interviewed on this subject?

Thank you for your time, your answers have been most helpful to our project.
Appendix D: Interview Transcript

Interviewer 1 (I1): Okay... (cough) We are interested in how your first opinions, impressions, of clients impact on rapport in therapeutic relationships. I'd like to start by looking at how counselling and clinical psychologists in training build rapport with their clients and then move on to how our first impressions affect this process. So the first question will be: What do you understand by the term rapport?

Participant 1 (P1): Umm... Well I think it's just really comes down to being able to... have a certain sort of familiarity with the way that each other has a sort of pattern of relating. So there's a sense of being able to sort of tune in to each other, and I think it very much is a reciprocal process. I don't think it's just an issue of me getting use to the way that the client is. I think it's often, umm, them adjusting somewhat, and becoming used, or at least perhaps not adjusting but at least getting used to and familiar to the way that I characteristically interact with them and other people probably as well. And I think it's something about developing that process so that the relating that goes on in the context of a therapeutic relationship becomes more familiar.

I2: Right

P2: And umm, and I don't doubt for one minute that there are all sorts of very subtle ways in which that's generated and I thinks it's quite umm, and I think it's largely about sort of trust, familiarity, umm, and a willingness to work with this other person whose sat opposite you, umm, but essentially I think it comes down to an intunement in a sort of a relationshipsal way, a sort of sense of relationshipsal familiarity.

I3: It's a two way process between...

P3: I think so, very much so.

I4: Okay. If you think about a client that you recently saw for the first time and who you developed an effective working rapport, what do you think helped in that, development of that effective rapport?

P4: I think umm, I think probably a number of things helped, I think the first thing that's quite important is just to show a kind of willingness and openness to begin with. I can't really describe it any more particularly than that. I think it's just a kind of openness that you can communicate to them that all, and this I think happens probably within the first, literally the first few seconds of meeting them that umm, you know, almost in the space between shaking their hand perhaps for the first time or welcoming them into your room and showing them to the chair, and there is a sense of you being open, willing, umm, ready and alert for all the possibilities and things that might happen in the context of this relationship.

And I think that willingness to not judge immediately or not come across as tired or overworked or strained in any kind of way but just a kind of openness that is, is kind of pregnant with opportunity I think is hugely important to begin with...

I5: Right

P5: ... I think there are other things as well, I, I , I think a willingness to just make them feel at ease I think to begin with in the first part of a relationship perhaps for the first session, first two or three sessions, you might be quite, I tend to find that I often find myself at least very initially working what with what I suppose one might call the kind of adult ego functioning that's the client so it is very much like umm you know Patricia Clarkson's stuff about umm adult to adult functioning, tuning in to the other adult that is sat in the chair opposite you
rather than perhaps umm, some more complex or depressed, earlier aspects of the functioning of that individual. So there is a sense of two adults working together and I think to begin with sharing that sense of yourself and the other person, I think is hugely important and I think, I think that makes them feel comfortable, I think that makes them feel like that there's some sense of familiarity in the session that no, there aren't, there's no initially going to be any sort of surprises sprung on them. So in a sense it's developing trust I think, and umm, it's, it's really about developing... developing, a, a sense of familiarity and I think that comes through helping them umm... helping them familiar with the situation and part of that is not, it's not gratifying their need but it is umm doing everything in your power to make them feel that this is their space...

I6: mmm...

P6: ... to use as they want. And they, and also to sort of tacitly to give them permission to use you as they want because of course from that from that you glean so much useful information about their umm their difficulties or whatever they want to bring. I think something of that is hugely important.

I7: Ya. So do you feel about a client that you umm, that was harder to develop a rapport with umm recently, what factors, you've highlighted a number of factors why, what is important in rapport building, but what factors would make it difficult to build a rapport do you feel?

P7: I think umm... I think one of the things that would be difficult would be that if you find that your attempts to sort of tune are kind of battered away a bit... umm, if for some reasons the client opposite you can't seem to umm, tune in to the way that you are as a human being or something about that disturbs them perhaps they find it intrusive or rather ur, just difficult to, to get a handle on. I think, I think that probably for me personally is, is quite difficult. I think the times when I've had difficulties developing a rapport with a client it's been times when essentially umm my attempts to develop... a relationship have kind of been battered away a bit, so that there is a kind of unwillingness to engage on their part that makes it more difficult. Umm, I think perhaps also there are probably other factors I think I'd be, I think umm... Yuh, yuh, I no, I think probably a willingness to engage is, is probably a major factor I think if that's missing on their part, umm, or there's a sort of degree of ambivalence about coming into therapy I think developing that rapport is much more difficult. Umm... but err I think those things make it easier. I think, I think probably also other factors that umm, I don't, well I can't speak for the umm client necessarily, but I think also probably physical attractiveness is quite important. If you find the other person sat opposite you, umm, engaging, physically appealing I think that's probably quite important as well. That, that helps, I think that keeps you kind of motivated as well umm to do the work, or at least to develop a relationship. Umm and I'm not talking necessarily about err, some kind of erotic transference or counter transference I think probably it's, you know I'm not saying that doesn't develop in those situations but it's probably too early in the context of the relationship I'm talking absolutely about initial first impressions, umm, but I do think probably a sense of physical appearance probably important. I mean I can't think actually of a client I've seen that who I've found physically repugnant or umm very difficult in a very kind of physical visceral animal way to to not like immediately. No one has struck me like that in a sort of negative way but I have certainly I'd be, I'd be being disingenuous I think if I said there weren't clients male or female who I've found more just by their physical presence more appealing initially than others that's not to say the relationship I think deepened more significantly with those than with the people I found less immediately appealing but umm I'm sure that helps the process out.
I8: You have kind of like initiated my next questions which would be, umm, you mentioned first impressions about, what I’d like to think about first impressions that we make of clients when we first see umm, them in the first session. Umm, when meeting a new client for the first time umm, you mentioned physical attractiveness, umm, what other factors, umm, do you think might influence your first impressions?

P8: I think there largely very physical and subtle things that they do. I am less interested in what someone wears, for example, that worries me less I’d be more concerned about, not concerned, I think what I would notice more is whether they look tired, whether they looked umm, you know care worn, or whether they looked like they’d, whether they looked after themselves or not in the sense that you know have they, if it’s a bloke, you know and their I don’t know, the information I’ve got about them, for example let’s say, is that they work in an office, if they were dressed like they were worked in an office, if they had a shave, if they kind of, you know, that sort of physical umm, looking after themselves I suppose. So in an extent to which they feel able to, I suppose something of that I would notice. Umm, I think the way that they engage whether they, whether they look at me in the eye or not, umm, the kind of expressions that come across their face, umm, the way that they sit on their seat, do they perch on the edge of it or do they kind of sit back and own it immediately as soon as they sit down or... umm so all those kind of things I think I’d notice. I think also I think what’s very important is the very first thing the patient says to you, or the client says to you, the first thing literally that comes out of their mouth in the first minute I think often says an awful lot about the way that the work is going to go between you. I think it says a lot about what the difficulties is essentially I find often people will be able to tell you in the very few words in the first few minutes of the meeting that they will just sum up probably quite beautifully in retrospect when you look back, precisely what the issue is, you know they almost formulate themselves, I think often, or give you at least some very good clues as to what the is happening for them. And so I try and listen very carefully to what they say and how they say it, especially in that first few minutes, umm, ‘cos often I find things just come up unhidden umm when they are not too guarded, they think it’s, they think it’s that initial kind of meeting, ‘hi how are you? Have a seat.’ Where I might begin, myself setting the, the frame, the scene for what’s going to happen. They’ll often say something then that I think is very, very important, long before I say, ‘so what’s brought you here?’ So I try and pay attention to that.

I9: So it’s the immediate thing that they say when they walk in the session, how they greet and how they then explain...

P9: ... Yeah, very much so.

I10: In thinking about the first impressions that you have mentioned. Do you think that any of them affect your ability to, not your ability, but you building a rapport with a client?

P10: Umm... I think the way that they, and I didn’t so much emphasise this in regard to that last questions but I touched on it before, and that is the way that they umm, make use of me. I think very quickly, umm, I can’t always to do it but I try and tune in to how I feel the client is trying to make use of me and I think that says a lot about the extent in which we might be able to work together and the extent to which perhaps I am going to be able to umm, perhaps do things in the context of the work later on that are umm, more difficult. For example, like challenging them over things, you know, ‘you say this but I’ve also noticed this’ umm, and how they are going to be able to make use of that kind of, that sort of slightly more challenging perhaps more difficult kind of material, that might come up in the context of the work. And I find that, I have found, I think a few times that you can get a pretty good sense of... umm, the level of rapport you are going to be able to develop quite early and, and you know I always feel quite hopeful if I think we are going to build a good rapport because I
always think then in the context of that we can do some perhaps some more challenging work, you know, I suppose.

I11: Okay. Are there any other factors in first impressions that you think may influence you rapport?

P11: Umm... I suppose some of the physical, I suppose other sort of subtle physical things. Umm, not just the way they look but I mean like, for example, umm, do they arrive on time? I mean I often find that some clients turn up and they are waiting in the waiting room for 15 minutes. You know, and you think, well that's a long time to wait before you come and I fantasize to myself, are they expecting me to invite them early? Because that, how will they feel when they come into the room and they've been waiting for 15 minutes because I invite them in at you know, for example at 10 o'clock on the dot. Umm, you know, some people are late for that very first appointment and I wonder what, and I wonder what that means, you know, I wonder how they are going to expect me to experience them, or respond to them, because they are late. And so I try and sort of keep an eye on things like that. And, so just the way that they use their whole time. Umm, I think the way they look round and use the room as well, I mean I find that some people respond, you know, in very particular ways to the space we are in and that often, I think, says a lot about the way they are using you, the way that they are using the space, the extent to which they are prepared to engage in the work. Umm, I think also I'm, I'm, I'm, I'm very much emphasising kind of my... kind of what I notice about them but I suppose also the way I notice myself in relation to them, so the other thing is I suppose what is my gut instinct as soon as I meet someone. You know, and I don't know if I can be anymore kind of inciteful about it than that, it's literally like how does this person move me, literally what impact is this individual have on me, when I first meet them? You know, because often you've read the, umm, you've read a referral letter or you know, you might of even had a little bit of contact on the phone for example. And then all of a sudden you are faced with the physical, corporeal reality of this individual and everything that that encapsulates that in front of you and I think then, that you know often I find myself thinking, 'Good God you are absolutely nothing like I imagined you to be!' or 'You look so much younger than you sound in this referral letter' or 'My God you look so much older than...' So there, that's quite interesting as well. I think often I find that I'm quite surprised by the way that the physical reality of someone impacts on me and I think that so, that's quite nice, that sense of the unexpected and I think it's quite important again, I think that ties into that notion of trusting your first impression, umm, is it Bion that said without memory or desire, and I think that's quite important that sense just, literally just walking into a room and trying to keep as open mind as possible. I mean that's difficult we all have our preconceptions and I certainly have mine and I find that often they are challenged in the, in that first instance just in meeting someone, you know, 'you don't look like I imagined you to look'. And then I think to myself, 'Well why did I imagine you, that you look different or... umm or say something different or...' You know, so that's quite interesting as well and I try and pay attention to a lot of that. I think the important thing though is that, and I think this is largely what it boils down to for me. I think that if a client is ready to work and they are able to work, umm, one of things that I can do, essentially on my part, because like I said I think rapport is a, is a reciprocal process, it's not just something I do and then I always get to where I want to be. It's simply not like that...

I12: Yeah

P12: ... as I’m sure your aware in your experience as well, but in my experience I find that with those clients who are willing and able to engage, umm, err and even if that is a long drawn out process that takes them a long time to be able to trust you. What eventually happens is that they tacitly understand that in some level in themselves that you are doing
everything in your power to try and understand them and once I think that is communicated to them at some important level that is meaningful for them, then they can begin to engage in the process, if it feels safe enough for them. Umm and I think that’s largely what it comes down to, that, that all I do, you know all the little things that I might do, to try and engage with someone, what is ultimately communicated about that is that I am simply another human being who is sat alongside you and I am trying my best, umm, to understand what is going on for you at the moment. And once I think they can pick up on that then… then you know their ability to then tune into you I think is...

113: It sounds like that’s fundamental to your rapport.

P13: I think that’s hugely important, yeah.

114: I just wanted to go back to, you’ve mentioned about preconceptions and first impressions, and first impressions when you meet someone. What kind of things might inform, you mentioned about being on the phone or referral letters, are there any other things that might influence your preconceptions about someone?

P14: I think probably, the way that a GP writes about a patient or the referrer writes about a patient or a client. I think is, is very important, I think, but I think often you get swayed in quite subtle ways. I don’t know if you’ve, I don’t know if one always umm… err is aware of the way that your perceptions are coloured in that regard, but I think they are. I mean, I always and try and read referral letters quite carefully, I suppose when I read them for information and then I kind of read them for spin. And I read them for also ‘how is this impacting on me?’ You know what kind of associations come up for me in the context of having read that letter and I think that probably umm, that, that colours your judgement quite a lot. I think umm… I mean this probably, this perhaps sounds a bit umm, a bit of a truism and therefore not really worth saying but I suppose the sum total of you as a human being umm… and your experience up to that point determines to a large extent, you know, what you imagine you are going to see in front of you once you’ve read this referral letter. And I’m sure that is subtly perhaps in some cases hugely in others different for every individual because we all, you know, I mean we all construct the world around us, you know in by a certain sense that, we kind of construct the world around us and the meaning that we attach to it and I think that, I think the same is true when we’re faced with a piece of paper you know with black and white scribbles on it talking about someone that we might see next week and so when that person comes in the room we have already constructed, the relationship has started. Umm at least in your head because you are thinking about this individual before you even meet them, I think, and, and so, the, the big thing is to what extent are you relating to the person you’ve constructed in your mind, err, err… and how far is that apart from the person you are actually relating to when they walk in the room, when you begin to get to know them and I think the quicker you can, kind of… not just completely loose your preconceptions ‘cos I think they are important they probably say a lot about you, and perhaps they also say something about the, the individual as well that’s sat in front of you but, I think if you can keep that in your mind but at the same time realise that it is a construction umm, err, and, although being with an individual in a room there is always going to be a degree of construction, you are always going to experience someone and that experience is going to be coloured by you so, umm, your never going to be able to divorce yourself from that, but… but the shift from just this, what’s on a piece of paper to the physical presence of someone does change it quite important significantly, so I think that’s quite important as well.

115: It sounds like the construction of your understanding of an individual is a process where it starts at preconceptions from first, initial, maybe a letter being sent to you where by that’s the first time this person comes into existence in your life, to, the initial meeting where by first
impressions become important and then later it’s the building of the rapport so the understanding formulates itself and that this is a continuum rather than any, a stage thing.

P15: Oh Yeah! I mean I think it’s a continuum. I think um... I mean, I was very impressed by um, something I read once that Carl Rogers said, and that was he was talking about a patient that he’s seen and at the end of this work together this patient turned round to him and said, ‘it’s amazing I know absolutely nothing about you at all but I feel I’ve never known anyone so well’ and I think there’s something of that, you know, they may not know an awful lot about my biographical history, where I live, who I go out with, and what I do, etc. etc., in my own time but I do sense that probably what happens in a relationship where a good rapport builds up is that they, is that the person sat opposite me, the client, has a pretty good idea of what they are going to say and how I’m going to experience it. They can construct in their own minds, and I think this is what really rapport is about, it’s a bit like a kind of a theory of mind thing with kids, you know, their able to look into your head and make some pretty good ideas about the way, the things that they say and the way that they are probably going to impact on you. And I think, that, I think that where rapport develops is because both people who are engaged in a one to one relationship are able to some extent umm... to have a sense of how the other person experiences them. Umm and I think that is hugely important in the context of the work.

II6: That’s very helpful. Umm are there any other factors that if we think about the first impressions that you make, or even your preconceptions, umm, that may influence your rapport with the client?

P16: Umm. I think probably umm, I think probably personal prejudices are probably quite significant. Umm, how ever much you don’t necessarily want them, to err... crowd in and sort of make you judge a client I’m sure they do. I mean I know, that for example, that umm, I suppose err I mean in the context of the work there might be individuals who get, who get referred to me, um who um, who probably are not in a good position to work with because I have preconceived ideas about the ways that, the difficulties that they have and before you, you even get the letter. So there’s a preconception almost before the preconception I think probably that’s quite important I’m mean, I’m thinking particularly of umm, for example, I know, I’ve got some personal friends who have had umm, err eating disorders particularly anorexia nervosa. I’ve got two friends who have had that and umm, we have remained friends but it hasn’t been easy to stay friends with them and I think probably if I, if I had someone who a letter from a GP saying this person seems to be exhibiting anorexic behaviour but it is within the bounds of controllability and we think that this is the right, you know, the right context for psychological support for this individual and it was right for me to work with her in the context of that work, I still don’t know whether I’d be the best person to work with them because of my previous experience and I think probably I’d be angry with this woman or this man before they’d even walked in the room. So I think probably personal prejudice is also hugely important and that, that could be kind of, I don’t know, racism or ethnicity or you know, some particular disorder that you hear about or difficulties that they might have that you just really roll your eyes at you know. And umm, I think if you feel like that then you have to examine fairly objective detached way whether you are the best person to work with them.

II7: I think that’s quite difficult. Is there any additional information you would like to add? I mean, how did you feel about being interviewed about this subject?

P17: I thought well! I mean, I think, I think you are touching on something that’s hugely important I think first impressions are hugely important and I think they, they being long before you ever actually meet. You know, the relationships starts really as soon as you get a
letter from your referrer saying we would like you to see this person. Umm and like I said you construct that individual in your mind and that's based on all your preconceived experience and umm, you know everything else and that when that person actually does walk through the door it's always interesting to see, to put the sort of person you constructed against the person that really walked through that door at least the physical presence of that person who walks through the door, and see how they match up and I think that says a lot probably about me as an individual, perhaps about the, and the way they write about this individual, the way that the individual actually is so I think it's always good to just kind of keep that, keep that in mind. But I think this is very important because without, I mean, you know, we are all in this because the relationship is the active ingredient of change. And I think, the irony of about doing the course that we are all doing I think is that.... Umm, I always find, I always think that probably one of the, one of the big paradoxes about doing a doctorate in Counselling Psychology and therefore there's a large element of research in that, is that some I think of the most powerful, significant and in kind of empirical terms the largest, umm, explanatory factors of variance in outcome of process change in therapy you probably can't even capture in language. You know, and therefore you probably can't properly measure them not in any kind of really accurate way. I think we are talking about very, very, very subtle physical things that people do, the way literally that they perhaps catch your eye and then glance away, the, the, the you know, the amount of games that they use, umm, the way that orientate their body in relation to you, the way that they umm, touch their face or use their body in the space that orientates individuals toward them in a very subtle and powerful way but you know they are just the things that because perhaps we are paying a lot of attention to what being said that we don't always see. Umm, you know the kind of characteristic ticks that we all have as, as individuals, the things we do, the way that we stroke our chin, play with our hair, or everything like that I think is probably incredibly powerful about the way that people orientate each other to each other and umm, you know, that's so important. But I think that they are good questions because, you know, to kind of explore that, umm, is very important, just because they are difficult to measure doesn't mean we shouldn't measure them or at least begin to be aware of them.

I18: It sounds like that, you acknowledge the awareness of first impressions, they influence the process and if, to, to a degree they are important part of the process but also there's an unfathomable quality to them, there's an unconscious in both, when you talk about building a rapport it's between two people and there's an unconscious process that's going on at the same time. We may be aware of the first impression but there is something deeper.

P18: I, I totally agree with that. I think probably there is the, you know, there is most definitely conscious to conscious umm, sort of atunement but there is also something about the two unconsciousnesses of two individuals and the way in which they can become tuned in to each other. And I think probably your, the way that your unconsciously moved by the client and the way they are unconsciously shifted around you is also hugely important.

I19: Thank you very much for taking part in this study, your answers are most helpful.
Major Research Project

Investigating spatial reasoning skills among individuals diagnosed with Asperger syndrome

Year 3

July 2004
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ABSTRACT
Specific brain functions underlying the social communication difficulties observed in individuals with Asperger syndrome is poorly understood, although neural systems of the right cortical hemisphere have been implicated in the syndrome. This study aims to examine right hemisphere dysfunction in individuals with Asperger syndrome by investigating spatial memory impairments associated with deficits in the right hippocampus. Twenty children with a clinical diagnosis of Asperger syndrome were recruited for the study, and their spatial memory and reasoning skills compared to 18 healthy controls, matched for age, intelligence, and handedness. Allocentric spatial memory was assessed using a children’s version of the Nine Box Maze Test (Pentland, Anderson, Dye, & Wood, 2003), which also measures associative spatial memory recall and spatial strategy formation. Comparisons between groups were also made on measures of broader spatial processing skills such as place coding and response learning of an object’s location. Results indicated that there was no allocentric spatial memory deficits among the population sampled, but that the individuals with Asperger syndrome performed significantly more poorly than controls on associative spatial memory recall. This difference remained significant once age and intelligence were controlled for, and irrespective of the spatial strategy adopted to complete the associative memory task. Poor associative memory recall among individuals with Asperger syndrome did not impact on broader spatial processing. It was concluded that while the allocentric spatial memory processes associated with the right hippocampus are intact, individuals with Asperger syndrome may have a distinct deficit forming and maintaining a representation of the association between the various objects and their location in the surrounding environment. Theoretical and clinical issues raised by these findings are discussed.

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CHAPTER ONE

INTRODUCTION

Asperger syndrome is a pervasive developmental disorder characterised by the same type of social and behavioural disturbances that typify autism. Commonly described disturbances in social functioning include poor non-verbal communication skills, failure to develop and share in peer relations, and a lack of empathy and socio-emotional reciprocity (Gillberg, 1998; Wing, 1981; World Health Organisation, 1994). Individuals with these disorders also tend to display non-functional and repetitive patterns of behaviour (World Health Organisation, 1994). However, Asperger syndrome differs from autism to the extent that the social and behavioural disturbances outlined above occur against a background of relatively normal development of language skills and general intellectual functioning throughout childhood (World Health Organisation, 1994).

Despite the publication of formal classification criteria by the World Health Organisation (ICD-10, 1994) and the American Psychiatric Association (DSM-IV, 1994), the clinical diagnosis of Asperger syndrome remains controversial. Similarities in social dysfunction displayed in Asperger syndrome and autism, particularly where developmental delay is not clearly documented (i.e. high functioning autism), has led many clinicians and researchers to question the validity of Asperger syndrome as a distinct diagnostic entity (e.g. Miller and Ozonoff, 2000; Ozonoff, South, and Miller, 2000). This dilemma has in turn prompted a considerable body of research aimed at differentiating autistic disorders on the basis of symptom patterns, including symptoms that extend beyond those specified in formal diagnostic criteria; for example, motor clumsiness, executive functioning, and theory of mind (see Ozonoff and Griffith, 2000 for review). While these studies continue to provide important clues for distinguishing Asperger syndrome from autism, the functional organisation of the brain in Asperger syndrome has by comparison been largely ignored. The aim of the current research is to clarify some aspects of brain function associated with social communication difficulties in the absence of general language and intellectual dysfunction. More specifically, this study aims to further investigate the neural systems of the right cerebral hemisphere in particular because it has previously been implicated in Asperger syndrome (e.g. Ellis, Ellis, Fraser, and Deb, 1994; Gunter, Ghaziuddin, and Ellis, 2002; McKelvey, Lambert, Mottron, and Shevell, 1995).
OVERVIEW OF RIGHT HEMISPHERE FUNCTIONING

The right hemisphere plays a pivotal role in a range of cognitive and emotional disorders. The symptoms associated with these disorders have provided a foundation for understanding the functional systems of this area of the brain. For example, damage to cortical regions of the right hemisphere has been linked to a number of symptoms that reflect disorders of spatial functioning. Patients with right hemisphere damage often display difficulties aligning the spatial relationships between component parts of a whole object and cannot appropriately arrange objects in relation to their constituent parts, despite intact primary visual perceptual and motor capacities (see De Renzi, 1982). These patients may also display impairment in judging line orientation (Trahan, 1998) and an inability to represent the spatial relationships between topographically distributed landmarks resulting in route finding difficulties (Maguire, Burke, Phillips, and Staunton, 1996). Together, this cluster of symptoms arising from lateralised cerebral damage presupposes the now well established conceptualisation that the right hemisphere of the brain specialises in spatial processing and spatial perception (Stiles-Davies, Kritchevsky, and Bellugi, 1988).

Besides disorders of spatial functioning, damage to the right hemisphere has also been associated with other categories of symptoms. These categories include anosognosia, which is a lack of awareness or insight into one’s own deficits (Prigatano and Schacter, 1991); neglect, which is a group of deficits characterised by failure to respond to stimuli or events in one half of one’s hemispace that cannot otherwise be explained by primary sensory or motor deficits (Halligan and Marshall, 1993); prosopagnosia, a specific form of visual agnosia involving a deficit of facial recognition against a background of intact visual perception and intellectual functioning (Young, 1992); and aprosodia, which is an inability to either produce or comprehend the prosody (tone) in one’s voice conveying affective information (Ross, 1993). Walsh and Darby (1999) provide an overview of unilateral lesion studies and right hemisphere symptomatology.

A number of the prevailing theories have evolved as a means of explaining the various symptoms associated with right hemisphere dysfunction. One theory to emerge is the attentional-arousal hypothesis, which explains how neglect and elements of unawareness arise as a result of disturbances in the distribution of attentional resources under the control of the right hemisphere (Heilman and van den Abell, 1980; Mesulam, 1981). Another prominent
theory holds that the right hemisphere specialises in negative emotions and that damage to this part of the brain reduces capacity for negative emotions resulting in patients with anosognosia feeling inappropriately positive about their condition (Flor-Henry, 1969). Yet a third theory to emerge provides that the right hemisphere is dominant for the congruence between emotional states and one’s current body state (Damasio, 1994).

More recently, Kaplan-Solms and Solms (2000) have argued that the right hemisphere underpins important aspects of an individual’s relationship with their environment. They reviewed the psychopathological states of several right hemisphere patients who presented for psychotherapy and found that they not only presented with the typical symptoms of spatial dysfunction, but also a level of emotionality typified by an over absorption in their own self interest and extreme intolerance for any kind of frustration. Kaplan-Solms and Solms (2000) conceptualised that the psychological basis of this symptom pattern may best be described as an acquired narcissism arising from disturbances in how one represents relationships with various aspects of their environment. This interesting hypothesis may serve to explain the essential dysfunction underlying the seemingly disparate cluster of symptoms of the right hemisphere.

RIGHT HEMISPHERE DYSFUNCTION IN ASPERGER SYNDROME: A NEUROPSYCHOLOGICAL PERSPECTIVE

A growing body of neuropsychological research has implicated aspects of right hemisphere dysfunction in Asperger syndrome. Several studies investigating the cognitive profile of individuals with Asperger syndrome have found that they display scores on verbal intelligence tests that are normal or above average, but display poorer scores on nonverbal tests (Gillberg, 1991; Klin, Volkmar, Sparrow, Cicchetti, and Rourke, 1995; Wing, 1981). Many of the traditional tests comprising so-called nonverbal intelligence scales are subserved by visuo-spatial processing, which as discussed above is a broad category of cognitive skills largely associated with right hemisphere functioning. This may be deemed prima facie evidence of right hemisphere dysfunction in Asperger syndrome, although one should be aware that the predicted discrepancy between verbal and nonverbal IQ scores have not always been found in individuals with Asperger syndrome (e.g. Ghaziuddin, Butler, Tsai, and Ghaziuddin, 1994; Lincoln, Courchesne, Allen, Handson, and Ene, 1998; Manjiviona and Prior, 1995). These inconsistencies are likely to be linked with methodological differences in diagnostic criteria and assessment measures.
Nevertheless, other neuropsychological studies have implicated right hemisphere dysfunction in Asperger syndrome by drawing comparisons between the clinical features displayed by patients with discrete right hemisphere lesions. For example, Ellis, et al., (1994) administered a battery of neuropsychological tests, including recognition memory tests to seven children diagnosed with Asperger syndrome. Their findings revealed that the recognition memory scores of their Asperger patients were similar to those previously displayed by right hemisphere patients in that they reflected a relative failure to recognise faces but not words. Poor facial recognition is a symptom that is well documented to be associated with posterior regions of the right hemisphere, whereas word recognition is associated with left hemisphere functioning (Luria, 1976). This prompted Ellis, et al., (1994) to argue that their findings strongly imply normal left hemisphere functioning but impaired right hemisphere functioning.

Another study conducted by Jollife and Baron-Cohen (1997) revealed that individuals with Asperger syndrome were faster than healthy controls on the Embedded Figure Test, a task which requires respondents to detect specific geometrical figures within a complex diagram. The explanation offered for these findings was that people with Asperger syndrome have a tendency to focus only on fragmented details of stimuli that confront them, and that this occurs because right hemisphere dysfunction reduces their ability view stimuli coherence within a broader context (Ellis and Gunter, 1999). Ironically, difficulties perceiving structural coherence may prove to be an advantage for individuals with Asperger syndrome in performing tasks such as the Embedded Figure Test.

Right hemisphere dysfunction has also been implicated in the linguistic difficulties displayed in Asperger syndrome. Although Asperger syndrome is associated with good literal language skills, these individuals tend to have poorer pragmatic language abilities. Ellis and Gunter (1999) reported on eight people with Asperger syndrome who were impaired on a test of humour (difficulty determining appropriate punch lines) and in deciding whether or not an unusual metaphor was meaningful. These figurative aspects of language are apragodic in nature and are associated with bilateral activation of language centres in the brain, as well as additional activation of the prefrontal cortex and middle temporal gyrus in the right hemisphere (Bottini, Corcoran, Sterzi, Paulesu, Schenone, Scarpa, et al., 1994).
Based on the various neuropsychological findings highlighted above several research groups have hypothesised that Asperger syndrome can be explained as a deficit of right hemisphere performance (Ellis et al., 1994; Ellis and Gunter, 1999; Gunter et al., 2002). They argue that the profile of cognitive strength and weaknesses reflect a neurodevelopmental disorder centred on incomplete or in some respect dysfunctional white matter. This deficit is thought to differentially impact on the activities under the control of the right hemisphere because it has a higher ratio of white to grey matter than the left hemisphere. The right hemisphere has larger inter-modal associative areas and communication between these areas is supported by longer axons (i.e. white matter) (Goldberg and Costa, 1981). This inter-hemispheric arrangement is thought to be adaptive in enabling individuals to utilise this side of the brain for more novel and complex tasks (Semund-Clikeman and Hynd, 1990).

While the white matter hypothesis explains why right hemisphere dependent tasks seem to be particularly affected by Asperger syndrome, it has several limitations. First, it lacks neuropathological support. Second, in its current form it lacks sufficient specificity to explain or predict the consistency of distinct features of Asperger syndrome.

In view of these limitations, particularly the latter, the current study focuses on distinct aspects of right hemisphere dysfunction in Asperger syndrome. Specifically, the study draws on neurobiological and imaging research to inform deficits that may be implicated in Asperger syndrome. Furthermore, the study aims to evaluate potential right hemisphere deficits within a developmental context by drawing on research in the developmental psychology of cognition. This method takes into account both the developing neurology and psychology of children with Asperger syndrome.

**Neurobiology of Asperger Syndrome**

Studies directly investigating the neurobiology of Asperger syndrome are beginning to emerge. Bauman and Kemper (1997) reported a series of studies investigating post mortem brain tissues from six high functioning individuals with autistic spectrum disorder. They found abnormalities in the size and density of neurons in the amygdala, hippocampus, entorhinal cortex, and cingulate gyrus. These structures form part of an integrated circuitry of structures and pathways that is broadly referred to as the **limbic system**, which has far reaching interconnections with the midbrain reticular formation (i.e. the arousal system of the brain).
and medial regions of the temporal and frontal cerebral cortices (Walsh and Darby, 1999). Illustrations of the neuroanatomical structures that comprise the limbic system are presented in Figure 1. This finding fits broadly with the view that the limbic system and surrounding medial temporal lobe structures of the brain, such as the cerebellum, may be important determinants of autistic spectrum disorders (Damasio and Maurer, 1978). Indeed, the limbic

Figure 1. Model of the Human Limbic System in Relation to Other Neuroanatomical Structures

(a) Model of the human limbic system and its major structures.

(b) Medial view through the centre of the brain showing the position of the limbic systems in relation to other structures mentioned in the text.
system as a whole plays an important role in mediating aspects of memory, social, and emotional functioning, which are broad areas of impairment in autistic disorders.

The recent emergence of in vivo brain imaging studies of Asperger syndrome have also identified structural and functional anomalies in and around the limbic system (e.g. Abell, Krams, Ashburner, Passingham, Friston, Frackowiak et al., 1999; Aylward, Minshew, Goldstein, Honeycutt, Augustine, Yates et al., 1999; McAlonan, Daly, Kumari, Critchley, van Amelsvoort, Suckling, et al., 2002; McKelvey, et al., 1995). For example, one study employing functional magnetic resonance imaging compared brain activity between nine individuals with autistic disorder (seven with Asperger syndrome) and nine controls when explicitly (consciously) and implicitly (unconsciously) processing emotional facial expressions (Critchley, Daly, Bullmore, Williams, van Amelsvoort, Robertson, et al., 2000). Emotional states displayed in facial expressions provide important cues in social communication and are largely mediated via the temporal lobe regions (explicit processing of expressions) and the limbic/paralimbic areas (implicit processing of expressions) (Critchley, Daly, Phillips, Brammer, Bullmore, Williams, et al., 2000). The findings indicated that there were significant differences in the relative patterns of activity in the medial limbic areas (junction of the amygdala and hippocampus), cerebellum, and lateral temporal lobe when processing facial expressions. Particular differences were highlighted when shifting from explicit to implicit processing of expressions, at which time the group of individuals with autistic disorder showed significantly less activation in the amygdalohippocampal region.

In general, imaging studies of Asperger syndrome have supported the view of developmental abnormalities in the limbic system. Several studies have even highlighted the lateralisation of anomalies, although studies are in disagreement. Some have found predominately left hemisphere limbic structures to be involved (Critchley, Daly, Bullmore, et al., 2000) or abnormalities restricted to the right limbic system (McKelvey, et al., 1995), while others have identified bilateral abnormalities (Castelli, Frith, Happe, and Frith, 2002). This variation can to some extent be explained by the use of different imaging techniques and methodological inconsistencies (i.e. different diagnostic criteria and variability in intellectual functioning). Nevertheless, current neuroanatomical evidence from a cross-section of individuals at the high functioning end of the autistic spectrum does suggest that the limbic system is an important biological substrate of Asperger syndrome and worthy of further investigation.
Linking Functions of the Limbic System of the Brain to Asperger Syndrome

Structures within the limbic system are situated at the medial surface of each cerebral hemisphere, commonly referred to as the medial temporal lobes. As mentioned earlier, medial limbic structures have an extensive and complex array of interconnections with surrounding areas of the brain, which implicates them in a range of cognitive and emotional functions. One area in which a good deal of evidence has accumulated is the role the limbic system, and in particular the hippocampus, plays in memory disorders. Experiments involving the removal of the hippocampus, amygdala, and surrounding structures reveal deficits in storing and ordering mnemonic representations in structured contexts. More specifically, there is strong evidence linking the left hippocampus with memory processes for learning and arranging verbal semantic representations (Petrides, 1985; Smith and Milner, 1981), whilst the right hippocampus is implicated in processing spatial information about objects and their location (spatial mapping) (Abrahams, Morris, Polkey, Jarosz, Cox, Graves, and Pickering, 1999; Goldstein, Canavan, and Polkey, 1989; Nunn, Polkey, and Morris, 1998; Piggot and Milner, 1993).

In relation to the difficulties observed in Asperger syndrome, the capacity to store and order memory representations may be crucial for guiding social behaviour. Representations of spatial maps are essential for online tracking and integration of the changing objects within one's surrounding environment, and therefore ongoing spatial orientation for the organism (Sholl, 2000). Without this orientation individuals might be expected to have difficulties interacting with their environment. Thus, spatial memory impairments consistent with damage to the right hippocampus may underlie some aspects of the behavioural phenotype observed in individuals with Asperger syndrome.

Preliminary evidence of spatial memory impairments consistent with right hippocampal damage among individuals with Asperger syndrome stems from a recent study carried out by Morris, Rowe, Fox, Feigenbaum, Miotto, and Howlin, (1999). In this study, spatial working memory in 15 individuals with Asperger syndrome was compared with groups of patients with unilateral focal frontal and temporal lobe lesions. Using an Executive Golf Task as a measure of spatial working memory and spatial strategy formation, the study found that the Asperger group displayed substantial deficits in spatial working memory but no impairment in strategy formation. By comparison, patients with left frontal lobe excisions displayed a less substantial deficit, while patients with right frontal lobe excisions showed a large spatial deficit.
working memory deficit, some of which was accounted for by strategy formation deficits. Of the group of unilateral temporal lobectomy patients, only those in the right temporal lobectomy group were impaired on spatial working memory. This group, like the Asperger group, showed normal strategy formation. Each of the patients who had undergone right hemisphere temporal lobectomy (as part of the neurosurgical treatment of epilepsy) had approximately the anterior two thirds of the right hippocampus removed. In other words, the study found a similarity between the group of patients with right temporal lobectomy and the Asperger group.

The current study aims to extend these findings by conducting a more comprehensive evaluation of the right hemisphere spatial functioning system, including aspects of spatial working memory associated with the right hippocampus.

SPATIAL MEMORY SYSTEMS
All objects exist in space and possess certain attributes that permit them to be identified. Recognition of these attributes will also afford knowledge of how to interact with the object. However, interactions with objects requires not only that they are recognised, but that their location in relation to the self and in relation to other objects is continuously represented.

Two separate but interconnected visuospatial systems are postulated to operate in determining what an object is and where an object is (see Ungerleider and Mishkin, 1982 for review). The ventral (occipital-temporal) pathway, often referred to as the ‘what’ system, specialises in object perception and is responsible for encoding and storing object properties such as shape and size. The second system is the dorsal (occipital-parietal) pathway, or the ‘where’ system, which specialises in spatial perception and manipulation. An illustration of these visuospatial pathways is provided in Figure 2. This model of dual visual processing pathways originated

**Figure 2. Illustration of the Two Streams of Visual Processing.**
from work carried out with animals and is illustrated above on the brain of a rat. The arrows represent each of the cortical visual pathways, beginning at the primary visual cortex and divulging either ventrally into the inferior temporal lobe or dorsally into the inferior parietal lobe.

The what/where visuospatial distinction is far from straightforward and understanding the integration of the ventral and dorsal systems poses a serious theoretical challenge. Indeed, recent evidence suggests that there is a degree of cross-referencing between these two systems with the ‘what’ system encoding certain types of ‘where’ information and vice versa (Dobbins, Jeo, Fiser, and Allman, 1998). At this stage the degree of overlap and interaction between the two systems remains unclear. What is perhaps more clear is that several different types of spatial reference frames are utilised in representing the location of objects in a specified spatial context.

**Egocentric Spatial Reference Frames**

One form of spatial referencing, commonly referred to as **egocentric referencing**, identifies object location using the body and its parts as a reference framework. Information from visual, auditory, and kinetic (motor muscle) sources is used to code the distance and direction of objects in the surrounding environment relative to one’s own body co-ordinates and motor movements. Two kinds of body-centred spatial coding systems that utilise egocentric reference frames are response learning and dead reckoning.

In ‘response learning’ the location of objects are coded relative to the self by a pattern of motor movements and/or in relation to a body-centred frame of reference. Thus, a pattern of movements or even a sensorimotor route representation is laid down in memory and simply run off in a fashion unmodified by changes in the individual’s body position or changes in the relative position of external landmarks in the environment. For example, an individual eating dinner reaches for their glass of wine in its usual location using a learned motor response. The limitation of such response coding is that it is only useful when the person and external object(s) are in exactly the same situation as they were when the motor movements used for coding the location were learned (see Figure 3a).
Figure 3. Illustration of Spatial Coding of Location using Egocentric and Allocentric Spatial Reference Frames.

**Egocentric Representation**

(a) *Response Learning*: Objects in the environment are simply coded relative to the viewer's own body. Spatial representations derived from this form of egocentric referencing and coding are held in memory, but are only useful in locating objects if neither the individual nor the external objects change position.

(b) *Dead Reckoning*: Location of objects in the environment is not directly represented in this form of egocentric-based coding system. Rather, object location, which is acquired at position 1, may be subsequently inferred at position 2. This inference is made by integrating the available dead reckoning information (distance and direction P2 to P1) with previously coded egocentric response coding information (P1 to the object) to acquire a representation of the object at position 2.

**Allocentric Representation**

(c) *Place Learning*: Representation of objects located in the external environment are coded within a coordinated reference system, which allows the individual to specify object location following their own movements without having to refer to where they started, so long as their current position exists within the coordinated reference framework.

NOTE: The terms egocentric and allocentric reference frames refer to the cognitive or neural representation of the self and objects within a specified spatial context. They will be updated within the confines of the given spatial coding system following one's movements and retained in spatial memory (adapted from Vogeley and Fink, 2003).
In ‘dead reckoning’ spatial coding the location of the self in the spatial environment can be derived following more extensive shifts in body position, but without reference to the location of other landmarks in the environment. In other words, egocentric referencing of one’s shift in body position is used to code the distance and direction that one has moved to update self-referenced location knowledge (Newcombe and Huttenlocher, 2000). There is considerable evidence demonstrating that retaining a memory of dead reckoning (i.e. spatial memory of one’s own movements in relation to their current location) permits individuals to roam quite complicated and winding paths in undifferentiated surroundings yet return to the originating position using the most direct route with some degree of accuracy (Gallistel, 1990). Location of objects in the external environment (besides the self) will not be directly represented within a dead reckoning coding system. However, their location could be inferred from one’s own movements through a series of geometric calculations anchored to the individual’s original location (Figure. 3b).

**Allocentric Spatial Reference Frames**

The other main form of spatial referencing used to represent the location of objects in space is referred to as *allocentric referencing*. In contrast to referencing spatial information relative to the self, allocentric referencing incorporates external cues and landmarks from the surrounding environment into a coordinated reference system. Within this system the relative location of objects are represented independent of one’s current position. In other words, allocentric representations of the surrounding environment are referenced within a Cartesian-like coordinate system in which the distance and direction of various environmental objects are specified relative to each other from any given stand point, independently of the viewer’s perspective (Vogeley and Fink, 2003).

Allocentric referenced spatial representations are essential for spatial coding systems such as ‘place learning’. In this instance, a person codes the location of objects in terms of the distance and direction from landmarks. In some cases, the landmarks are conceptualised as a point and an object’s location is coded by the distance and/or direction from this point. An example of this might be when the lost keys are thought to be three feet behind the right goal post. In other situations, the landmarks may be laid out across an extended region and one will code location in terms of distance and direction information within this region, using the
shape and edges as reference points. An example of this might be when the lost keys are thought to be a certain distance inside the boundaries of the playing field.

The implicit use of a co-ordinate system aids fine-grained coding of distance and direction, that is, the degree of accuracy in locating objects. Moreover, different systems may be effectively utilised by different people or across different situations. For example, if one considers two sides of the playing field to constitute an X and Y axis the location of objects could be derived from estimating the degrees between the axes. Alternatively, the location of objects could be located by coding grid-like coordinates along the X and Y axes. What is essential if one wants to achieve a coherent allocentric spatial representation is the need for a coordinate system that makes landmarks relatable to each other. Unless different locations are coded using landmarks with known relations to each other it may not be possible to infer relations between the locations (Figure 3c).

Role of the Hippocampus in Spatial Memory
The spatial representation of objects and locations derived from allocentric referencing are thought to be mediated by the hippocampus and more specifically the right hippocampus (Burgess, Jeffery, and O'Keefe, 1999 for review). One of the prominent theoretical models of hippocampal functioning is the Cognitive Mapping Theory proposed initially by O'Keefe and Nadel (1978). They suggested that sensory information reaches the brain via the surface of the body and therefore arrives in the various egocentric frames of reference of the receptors. Initially, this information is presumed to be translated and topographically organised into various egocentric reference frames that are mediated via the posterior parietal lobes. The hippocampus is deemed to subsequently translate these inputs into an allocentric framework represented in the form of an integrated cognitive map. This map represents positions of objects (including themselves) within the context of the wider environment, but independent of one's own body orientation or movements (see O'Keefe, 1991 for review).

The cognitive mapping theory has been the focus of substantial research and has gained support from investigations across both animal and human studies. Support was initially founded on results of cell recording studies showing neuronal discharges in the hippocampal formation, which corresponded to a rats position in an environment with a controlled
configuration of landmarks (most commonly a maze) (e.g. O'Keefe, 1976; O'Keefe and Conway, 1978).

In human studies, spatial memory deficits have been demonstrated in patients who have undergone right unilateral temporal lobectomy surgery, with impairment observed in a range of tasks with allocentric spatial memory components proportional to the extent of hippocampal excision (Pigott and Milner, 1993). Human MRI studies involving design layout recall (spatial memory task) have found a significant correlation between the integrity of hippocampal functioning after right unilateral temporal lobectomy surgery and spatial memory performance (Nunn, et al., 1998). Also, positron emission tomography (PET) studies have shown activation of the right hippocampus whilst learning to navigate and orientate oneself in a new environment, a task which is thought to rely on allocentric spatial memory (Maguire, Burgess, Donnett, Frackowiak, Frith, and O'Keefe, 1998).

However, perhaps some of the most convincing support for the preferential role of the right human hippocampus in allocentric spatial memory stems from a series of recent behavioural studies investigating how patients with selective hippocampal damage performed on a human version of the radial arm maze test (Abrahams, et al., 1999; Abrahams, Pickering, Polkey, and Morris, 1997). In its original form the radial arm maze was employed as an animal paradigm to test visuospatial recognition, working memory, and cognitive mapping in rats. In 1997, Abrahams and her colleagues developed a human analogue of the radial arm maze (the Nine-Box Maze Test; NBMT) to compare these components of spatial memory in patients with unilateral damage to the right hippocampal formation arising from temporal lobe epilepsy or temporal lobe resection (Abrahams, et al., 1999; Abrahams, et al., 1997).

The task comprised nine containers placed in front of patients in a circular array, along with a set of everyday objects. Across several trials, four objects were hidden in four containers in view of the patients. The patient was then asked to walk around the array to a different seating position before identifying the to-be-remembered objects and the containers in which they were hidden, followed by a recognition memory test for the objects. An illustration of the NBMT is provided in Figure 4.
Figure 4. Diagrammatic Representation of the Nine Box Maze Test.  
(Adapted from Abrahams, et al., 1999)

A. Examiner places different objects into separate plastic containers in full view of participant on the right.

B. Examiner withdraws and participant begins move to new position.

C. Once examiner reaches new positions, s/he undertakes a filler task for a specified retention interval.

D. Examiner points to the four containers that have objects hidden in them.

E. Memory for the four objects hidden in the containers is tested using a recognition memory format.

Across each individual trial two of the containers and two of the objects used were varied as a means of measuring both object-based working memory and location-based (spatial) working memory. This conceptualisation of memory emphasises how information pertinent to the current situation may be held and manipulated only within the specified temporal context of
the event (i.e. a single trial) (Olton, 1986). In this way, working memory is comparable to the concept of working memory proposed by Baddeley and Hitch (1994). At the same time, however, two of the containers and objects used remained constant across each of the individual trials as a measure of object-based and location-based reference memory. This memory system is similar to the notion of episodic memory. That is, contextually specific information must be encoded and held, but it is independent of the temporal context (see Abrahams, et al., 1999). Referencing memories are not necessarily time limited, nor are they necessarily held in current thought.

The effect of devising the NBMT in the manner outlined above is that it would evaluate at least four components comprising the spatial memory system; object-based (visual) and location-based (spatial) working memory that was trial dependent, and object-based and location-based referencing memory that was trial independent. Moreover, by making patients move around the array of containers within each trial the task prompted allocentric spatial coding. Hence, this was a test of the cognitive mapping theory given that patients presented with selective hippocampal damage.

Findings from the studies carried out by Abrahams and her colleagues using the NBMT revealed a similar degree of spatial memory impairment in patients with right sided temporal lobe damage on the working and referencing memory measures, whereas patients with left sided damage were unimpaired on these measures. Neither patient groups nor healthy controls displayed deficits in object-based working memory, although patients with right and left temporal lobe damage showed mild deficits in object-based reference memory (non-spatial episodic memory) (Abrahams, et al., 1997). Interestingly, the pattern of spatial memory deficits was found to be confined to a subgroup of 33 patients with right unilateral localised atrophy of the hippocampus and parahippocampal gyrus, as verified by volumetric analysis of magnetic resonance images. More specifically, spatial memory errors significantly correlated with volumetric measures of mesial temporal lobe structures and not measures of the remaining temporal cortex. In contrast, the object-based referencing errors correlated with volumetric measures of the temporal cortex and not with mesial temporal lobe structures. Overall, these findings support a specialised role for the right hippocampal region in spatial memory tasks that rely on allocentric spatial coding.
Extended Role of the Hippocampus in the Spatial Memory System

Despite support for the role of the human hippocampus in allocentric spatial memory the full extent to which the hippocampus facilitates location and navigation around one's environment is not clearly established. First, there is limited evidence as to whether the hippocampus plays a role in the spatial memory system beyond allocentric spatial coding. Second, the precise nature by which allocentric spatial coding might combine with other spatial referencing systems to achieve a coherent spatial representation of one's environment remains controversial.

Involvement of the Hippocampus in Egocentric Spatial Memory

In a recent study, Holdstock, Mayes, Cezayirli, Issac, Aggleton, and Roberts (2000) argued that the majority of studies supporting the role of the hippocampus in allocentric spatial memory (e.g. Abrahams et al., 1999; Abrahams et al., 1997; Goldstein, et al., 1989) did not incorporate a comparable egocentric task, and as a result it was unclear whether the hippocampus also plays an equivalent mapping role in egocentric spatial memory. To investigate this possibility further Holdstock et al., (2000) conducted a case study in which they compared a patient with selective hippocampal damage with a control group on a task designed specifically to measure allocentric and egocentric spatial memory. Spatial recall was tested by getting the respondents to view a single point of light on a uniform board and then mark the position of the light following a delay after it had disappeared. Initially, spatial memory was tested in a condition which allowed the use of either allocentric or egocentric frames of reference. After it was established that spatial information could be successfully encoded, the task was modified such that respondents viewed the light from one position and then moved to another position around the board before indicating its location. This condition whereby the relationship between the observer and environmental landmarks is changed but the relationship between these cues and the target location is maintained was thought to strongly encourage respondents to use an allocentric spatial reference frame to encode position.¹ In a separate condition, participants viewed the target light and indicated its location in the dark in order to eliminate external allocentric cues and encourage subjects to rely on their egocentric spatial memory.

¹ Holdstock, et al., (2000) assumed that in effect this manipulation was the equivalent of that used by Abrahams, et al., (1999) to assess allocentric spatial memory in patients with compromised hippocampal functioning.
In comparison with healthy control participants, the patient (who had discrete bilateral hippocampal damage and a small degree of general parietal lobe atrophy) was found to be more impaired at recalling allocentric than egocentric information. This impairment was shown to increase proportionally as the delay interval between viewing and marking the position of the target location became longer. These results provide preliminary evidence that the human hippocampus has greater involvement in allocentric than egocentric spatial memory. Moreover, the hippocampus appears to be involved with the consolidation of allocentric information into episodic memory (i.e. spatial referenced memory) rather than the initial encoding of allocentric spatial information (i.e. spatial working memory). These findings, in conjunction with evidence that the updating of egocentric spatial relationships is under the control of the right posterior region of the parietal lobe (e.g. Farrell and Robertson, 2000; Maguire, et al., 1998), would appear to support the neuro-anatomical dissociation between allocentric and egocentric memory.

**Integration of Spatial Referencing Systems**

The operations by which information coded by the various referencing systems is smoothly integrated into a coherent spatial representation remains controversial. Within the developmental psychology literature on spatial functions a number of contrasting theoretical models have been put forward to generate and guide empirical research concerning the cognitive integration of spatial information (see Marshall and Fink, 2001 for review).

Huttenlocher, Hedges and Duncan (1991) presented a model in which various sources of spatial information are combined to produce a ‘best estimate’ of location. The model was originally introduced to explain a well known phenomenon in judging object position, namely a bias in locating objects toward the centre of their spatial context. Children, and indeed adults typically show a tendency to locate objects toward the centre of a given space when estimating its locations (Newcombe and Huttenlocher, 2000). This bias is thought to arise because the locations of various objects in one’s environment are coded hierarchically at a fine-grained level using distance and/or direction and at a categorical level.

Fine-grained coding uses accurate measurements of distance and direction to locate an object, either in relation to one’s own body (in the case of egocentric referencing) or coordinated landmarks in the environment (in the case of allocentric referencing). This fine-grained
Coding invariably takes place within a broader spatial context, which may or may not be broken down into categories, for example breaking down the space of the playing field into two halves.

Fine-grained distance and direction information is not always encoded exactly, but rather with varying degrees of approximation. When fine-grained values of distance or direction are inexact, the information that is retained is combined with categorical knowledge of an object's position. That is, object location is narrowed down by implicitly placing it within a subdivided category of the spatial context, as defined by the hypothetical boundaries of the coordinate system (Huttenlocher, Hedges, and Vevea, 2000). In other words, the spatial context for coding object location is broken into regions and the objects located in one of these regions. However, this form of categorical processing is associated with a bias toward the centre point of a given subdivided region, which means an increasingly systematic bias will be introduced in locating objects the more categorical processing is used to adjust inexact information.

Using this model, Huttenlocher, et al., (1991) argue that it is adaptive to combine information encoded via different forms of fine-grained spatial coding (i.e. dead reckoning or place learning) as well as across hierarchical levels of spatial resolution. Such integration in spatial processing may introduce bias but does not necessarily indicate fundamental misrepresentation of object location.

In a series of studies investigating the development of fine-grained and hierarchical spatial coding Huttenlocher and her colleagues (e.g. Huttenlocher, Newcombe, and Sandberg, 1994; Newcombe, Huttenlocher, Drummey, and Wiley, 1998) have been able to chart the emergence of allocentric (and egocentric) fine-grained coding and the pattern of systematic bias displayed when these systems have developed.

Newcombe, et al., (1998) asked children aged 16-36 months to search for objects hidden in a continuous space (a long rectangular sandbox). The children observed the object being hidden before being asked to move to the opposite side of the sandbox to locate it. They did this under two conditions; either with external landmarks visible or with curtains drawn around the sandbox to restrict access to external landmarks. The contrast between accuracy with and
without visible external landmarks was deemed to be crucial in determining the relative
contribution of allocentric and egocentric spatial coding. Data from this study identified a
distinct contrast in the spatial coding seen in children after the age of 22 months. Children
younger and older than 22 months were found to search for object location with an equivalent
degree of accuracy when external landmarks were not available. However, children under this
age did not refine the accuracy of their location coding using external landmarks when they
were available, whereas children older than 22 months did. These findings suggest that the
capacity to form fine-grained coding for locating objects based on egocentric and allocentric
spatial referencing begin to co-exist toward the end of the second year of the child's
development. Prior to this time, children appear to be more reliant on egocentric referencing
for locating objects. These findings are consistent with other studies investigating the
development of spatial referencing systems in children (e.g. Mangan, Franklin, Tignor,
Bolling, and Nadel, 1994).

In an earlier investigation of the development of spatial coding using the sandbox,
Huttenlocher, et al., (1994) not only provided evidence of fine-grained coding with respect to
the self and external landmarks but also provided evidence for the early availability of a
hierarchical coding system involving a combination of fine-grained and categorical coding. In
the initial series of experiments the kind of hierarchical representation shown in adult patterns
of bias were different from those seen in children and toddlers in the sandbox. For adults,
errors for locations in the left half of the rectangle sandbox were shown to move toward the
centre of the left half of the rectangle, whereas errors in the right half were biased toward the
centre of the right half. This finding indicated that adults coded location not in the rectangle
sandbox as a whole, in which case errors in place location would be expected toward the
centre of the sandbox. Instead, errors in place locations were toward the centre of each half of
the rectangle, indicating two mentally imposed categories: the left or the right half.

The hierarchical representations of children in the sandbox differed from that of adults.
Children aged four to six years-old showed bias towards the centre of the sandbox, indicating
no superimposed categorisation of the space. Ten-year-old children showed evidence that the
sandbox had been organised into two halves, with a similar pattern of bias to that of adults.
Thus, it would appear that children do not show any kind of mentally imposed subdivision of
a perceptually given category until later childhood. However, the formation of mental subcategorisation within a one dimensional spatial unit was observed in younger children.

In an adaptation of the sandbox task in which children aged four to ten years-old were asked to remember the location of dots within a small rectangle (presented on a piece of paper), Huttenlocher et al., (1994) found clear evidence of division of the rectangle into halves for categorical coding in children as young as four-years-old. While the contrast in these developmental spatial findings may be attributed to different factors, such as the scale and dimensions of space, it is also suggested that perceptual salience (such as corners and edges) continue to exert an important influence on spatial coding over an extended developmental period (Newcombe and Huttenlocher, 2000).2

Summary of the Spatial Coding System
The right hemisphere plays a critical role in mediating various aspects of spatial memory functioning. The existing literature suggests that the right hippocampus is involved in coordinating allocentric spatial references into an integrated cognitive map. The individual uses this map to define the position of objects (including themselves) within the context of a wider environment that is independent of their own body orientation or movements. Consistent with impairment in such a mapping system, individuals with selective right hippocampal damage show impairments in their ability to access spatial information held on-line for distinct periods of time (spatial working memory) and impairments to bring other relevant spatial information on-line from recently passed temporal contexts (spatial reference memory). Whilst such allocentric spatial memory deficits appear to be confined to the right hippocampus, there is evidence that deficits in updating egocentric spatial relationships, that is referencing objects positions relative to the observers own position and movement, is related to damage in the right posterior parietal lobe.

Within the human spatial development literature there is a good deal of evidence to suggest that egocentric spatial referencing precedes the development of allocentric spatial referencing (see Burgess, Jeffery, and O'Keefe, 1999). Indeed, egocentric referencing is widely regarded 2 This aspect of spatial coding might best be described as a form of cue learning (Newcombe and Huttenlocher (2000). Cue learning refers to a specified association between the to-be-located object and coincident landmarks (e.g. edges and corners). Providing the association is retained it can be sufficient to cue the location of objects in space.
as the more primitive form of processing spatial information, which is available from infancy. What is perhaps less well established is how either egocentric and/or allocentric referencing deficits manifest in behaviour. That is, how they impact on more general spatial coding capacities. To investigate this impact requires an understanding of the cognitive development of spatial reasoning.

According to one prominent model of spatial reasoning, effective object location and navigation requires not only coding and storage of fine-grained information about an object’s distance and direction. Effective location and navigation is also thought to involve a degree of hierarchical coding, whereby exact information about the distance and direction is combined with categorical knowledge. This hierarchical coding may be especially adaptive in so far that ongoing retention of fine-grained coding requires a large degree of cognitive and mnemonic resources, whereas categorical coding permits object location to be estimated within a defined spatial region and thus less demanding on limited resources.

**AIMS OF THE CURRENT RESEARCH**

The aims of the current research are essential twofold. First, the study aims to investigate potential allocentric spatial memory impairments associated with deficits in right hippocampal function in individuals with Asperger syndrome. Preliminary empirical evidence to suggest that the integrity of right hippocamal functioning may be impaired in individual’s with Asperger syndrome is provided by Morris et al., 1999. This study wants to extend these findings by directly evaluating aspects of allocentric spatial processing associated of right hippocamal functioning using a children’s version of the Nine Box Maze Test (Pentland, Anderson, Dye, Wood, 2003) in a group of boys with a clinical diagnosis of Asperger syndrome.

The second aim of this study is to investigate how any allocentric spatial memory deficit(s) might be manifest within the development of other spatial processing capacities. The rationale behind extending the research in this way is that it offers a broader developmental context for evaluating the quality and quantity of any neuroanatomical deficits identified in the first aim. In order to achieve this, egocentric referencing and hierarchical spatial coding as potential coinciding spatial processes influenced by the right hemisphere were evaluated in conjunction with allocentric spatial processes. This involved using spatial reasoning tasks that
were analogous to Newcombe and Huttonlocher's sandbox task (Huttonlocher, et al., 1994; Newcombe, et al., 1998) and Holdstock et al., (2000) projected light on the wall task.

In the Spatial Place Coding task individuals were asked to code spatial position in a continuous space while they still had access to external landmarks, which permitted evaluation of systematic hierarchical coding bias with the influence of allocentric spatial processing. In contrast, the Spatial Response Learning Task required spatial coding in a continuous space without access to external cues, permitting evaluation of systematic hierarchical coding bias under the influence of egocentric spatial processing. Performance of the Asperger group on each of these spatial reasoning tasks was compared to a control group matched approximately for age, IQ, and handedness.

Hypotheses

Nine Box Maze Test – Children’s Version

- The quality of allocentric spatial referencing is hypothesised to be impaired in individuals with Asperger syndrome, and therefore it is expected that the Asperger group will make significantly more errors on both the reference and working location-based (i.e. spatial) memory recall than the control group
- The Asperger group will also make significantly fewer object-location associations than the control group.
- There will be no significant difference between the Asperger group and control group on the reference or working object-based (i.e. non-spatial) memory recall.

Spatial Place Coding Task

- Individuals in the Asperger group are expected to rely more heavily on categorical coding as a result of impaired allocentric fine-grained coding, and hence show a significantly greater systematic bias toward the centre of the continuous space compared with individuals in the control group. The bias is expected to be larger than that of the control group, especially at locations close to the ends of the cardboard.

Spatial Response Learning Task

- Individuals in the Asperger group and control group are both expected to be able to integrate egocentric fine-grained coding and categorical coding, and hence there will be
no significant difference in the degree of systematic bias toward the centre of the continuous space by either group.
CHAPTER TWO

METHOD

Design
The study is designed as a cross-sectional comparison between a group of individuals with a clinical diagnosis of Asperger syndrome and a healthy control group. Groups will be compared on object and spatial location memory (including object reference and working memory, location reference and working memory, object-location association memory); integrated allocentric and hierarchical spatial coding; integrated egocentric and hierarchical spatial coding; verbal and non-verbal IQ; handedness; and age.

An a priori power analysis using G*POWER indicated that a total of 21 participants in each group would be needed for sufficient power (Erdfelder, Faul, and Buchner, 1996). See Appendix A for power calculation.

Ethics
Ethics approval was obtained from the hospital trust ethics committee and from the University of Surrey Advisory Committee on Ethics. Research indemnity was obtained through the hospital trust. See Appendix B for ethics committee and research and development correspondence.

Participants
Asperger Group: Individuals for the Asperger syndrome group were recruited from a Child and Adolescent Mental Health Services (CAMHS) in South West London. Clinicians working in the service were approached and asked to refer boys (aged 6-16 years) who had been given a clinical diagnosis of Asperger syndrome. All referred cases (n=49) were then screened by the lead researcher in conjunction with the referring clinician to ascertain whether the individual met specific inclusion criteria.

The process of satisfying inclusion criteria involved asking clinicians whether, based on their experience and within the limitations of the clinic setting, they considered that the individual being referred met ICD-10 diagnostic criteria for Asperger syndrome. These criteria are outlined in Table 1. ICD-10 diagnostic criteria were selected in order that individuals deemed eligible to participate in the Asperger group shared a degree of homogeneity with
Table 1. ICD-10 Criteria for Diagnosis of Asperger Syndrome.

- No clinically significant general delay in language or cognitive development
- Qualitative impairments in reciprocal social interaction
- Restricted, repetitive, and stereotyped patterns of behaviour, interests and activities
- Exclusion of other disorders (autism, Obsessive Compulsive Disorder)
- Suggestive but not required for an ICD-10 diagnosis of AS
  - delayed motor milestones and presence of motor ‘clumsiness’
  - isolated, unusually all-absorbing special skill or activity

respect to the social communication deficits characteristic of Asperger syndrome. Individuals were not considered eligible for participation if the diagnosis of Asperger syndrome could not be unequivocally confirmed by the referring clinician in accordance with the ICD-10 criteria outlined.

Additional inclusion criteria were also imposed on the eligibility of individuals for participation in the Asperger Syndrome group. These included the use of English as their first language, no known visual acuity impairment, or any other comorbid medical or psychiatric conditions that may prevent completion of the spatial reasoning tasks (e.g. severe learning disability, other neurological disorder/head injury; psychiatric diagnosis of major depression, severe social/performance anxiety, or early onset psychosis).

The eligibility criteria imposed for participation in the Asperger syndrome group meant that a number of the 49 clinically diagnosed cases referred for participation in the study were excluded on the grounds that they did not satisfy inclusion criteria (n=15). A further 14 individuals referred for participation were not included because they could not be contacted (n=9), they (or their families) declined to participate (n=3), or they did not attend the assessment appointment (n=2). The Asperger syndrome group consisted of a final sample of 20 boys.

**Asperger Control Group:** Individuals for the Control group were recruited from two mainstream schools in the South West London region. Letters were sent to the parents of all
male pupils from selected year levels asking if they consented for their child to take part in the research (n=125). Care was taken to identify and exclude any pupils within the targeted year levels with a diagnosis of Asperger syndrome or social communication difficulties suggestive of Asperger syndrome (n=2). Additional inclusion criteria for eligibility of pupils to participate in the Control group were also cleared with teaching staff. These criteria included the use of English as their first language, no known visual acuity impairment, or any other comorbid medical or psychiatric conditions that may prevent them from completing the spatial reasoning tasks (which is the same as for Asperger syndrome group).

From the initial pool of 125 pupils, 34 parents responded to indicate that they were willing for their son to participate. Due to restrictions on time and access to schools (to conduct assessments) not all of the eligible pupils with consent could be assessed. The Control group consisted of a final sample of 18 boys with no known social communication difficulties.

**Measures**

Assessment measures comprised three spatial reasoning tasks, a standardised measure of intelligence and handedness, and a demographic questionnaire. Copies of the various record forms used in the assessment are in Appendix C.

*Nine Box Maze Test – Children’s Version (NBMT-CV)*

The NBMT-CV (Pentland, Anderson, Dye, & Wood, 2003) was used as a measure of non-verbal memory. The NBMT-CV is a multi-dimensional measure adapted specifically by Pentland et al., (2003) for use with children and designed to tap the allocentric spatial processes of the right hippocampus. Traditional measures of non-verbal memory are often criticised on the grounds that they are influenced by multiple factors and provide no means for differentiating the relevant non-verbal cognitive processes from the end-point scores. The NBMT-CV is strongly grounded in O’Keefe and Nadel’s (1978) cognitive mapping theory and include separate measures of object-based (ventral/identification) memory functioning and location (dorsal/spatial) memory functioning. Investigations by Abrahams and colleagues (Abrahams et al., 1999; Abrahams et al., 1997) indicated that the location (spatial) memory measures of the NBMT are consistently the most sensitive indicator of right hippocampal damage (and allocentric processing deficits) in a group of neurosurgical patients with known temporal lobe pathology, particularly atrophy of the hippocampal formation.
The NBMT-CV consisted of nine identical cylindrical containers (18cm height X 14cm diameter) with detachable lids, ten everyday objects (a toy car, spoon, apple, lollipop, ball, book, felt marker, toothbrush, teddy bear, and cup), and an object recognition booklet containing seven A4 size photographs of five and nine-item arrays of the objects (See Figure 5).

Administration of the NBMT-CV was completed in three stages: (1) Object Familiarisation, (2) Five Box Maze (practice memory test), and (3) the Nine Box Maze (spatial and object memory test).

_Stage 1 - Object Familiarisation:_ Participants were instructed “I’m going to show you some things that I want you to remember.” The ten objects were then individually presented for approximately 10 seconds in a fixed order. To focus attention on the object and establish that the participant recognised the object the examiner asked “What is it?” and “Would you play with it” as each item was presented. After a one-minute filled delay the participant was asked to recall as many objects as they could. All delays throughout the experiment were filled with simple tasks, such as the questions from the demographic questionnaire and the Handedness Inventory.

_Figure 5. Nine-Box Maze Test Apparatus_
Stage 2 – Five Box Maze: The Five Box Maze was used as a simplified practice version of the Nine Box Maze in order to evaluate if the instructions and task were simple enough to tap emerging allocentric memory function. The task utilised five containers, which were placed in predetermined positions at equal distances from one other around the table to form a symmetrical circle (L. Pentland, personal communication, 15th December, 2003).

Participants commenced the Five Box Maze from the seat they began the assessment (Position 1). They were informed by the examiner that “I am going to put two things into two separate bins, then get you to change seats and tell me which things and which bins were used.” The selected objects were placed into the bins in full view of the participant and the lids were then placed on each bin. Great care was taken to ensure that the lids for each bin were secured in the same position in order to restrict the lids providing inadvertent cueing of target locations.

Once the lids were secure, the participant was asked to move to a designated position around the table (either Position 2, the seat immediately to the right of Position 1; Position 3, the seat directly opposite Position 1; or Position 4, the seat immediately to the left of Position 1). Once re-seated, the examiner asked “Which things were hidden?” Positive feedback and one point were scored for each object freely recalled. If the participant was unable to freely recall one or more objects they were asked to identify the remaining object(s) from the first page of the object recognition booklet in which photographs of the five objects utilised in this stage (i.e. the ball, spoon, apple, felt marker, and booked) were presented in a spatial array. Positive feedback and one point was scored for each object recognised. If the participant was still unable to remember one or more of the objects the examiner told them which items were hidden. Participants that did not require the recognition trial were credited with the object recognition points. The examiner then requested the participant to “Point to the bins with things in them?” Positive feedback and one point was scored for each bin correctly identified as containing an object. Bin(s) not correctly identified as containing an object were pointed out by the examiner. The participant was then asked “Which things were hidden in which bins?” After the participant responded, the lids were taken off the bins to reveal what was inside. A point was score for each correct association identified.

Where the participant offered multiple responses or it was not clear which response the participant intended as their answer the examiner asked them which response they intended as
their final response(s). In situations where the participant simultaneously pointed to the bins and named the hidden objects correctly, the procedure outline above was condensed and the participant received the maximum score for the trial. However, if an error was made the participant was asked to separately nominate the objects hidden, the location of the hidden objects, and which objects were hidden in which bins.

If the participant successfully identified both objects, both locations, and linked the information correctly they proceeded directly to the Nine Box Maze Test. If not, the participant attempted a second five box trial. If they did not correctly identify both objects, locations, and the association between objects and locations on this second trial, a third five box trial was administered. The instructions and procedures for the second and third trials were repeated as described above. Across each trial the participant’s starting position, the position they moved to, the bins used and the objects hidden were determined using a quasi-experimental sequence that was fixed for all participants (L. Pentland, personal communication, 15th December, 2003). If required, page two and three of the object recognition booklet, which depicted the same five objects but in different arrays, were used on the respective trials. If the participant was unable to successfully complete both trial 2 and trial 3, the maze test was discontinued on the grounds that the participant had not displayed the capacity to cope with the more demanding Nine Box Maze.

Stage 3 – Nine Box Maze: The instructions and procedures for the Nine Box Maze were similar to the Five Box Maze. However, the Nine Box Maze utilised nine containers arranged on the table at equal distances from one another to form a circle, four objects were hidden within the nine bins, and the photographs in the object recognition booklet displayed nine objects (the car, spoon, apple, ball, book, felt marker, toothbrush, teddy bear, and cup) in four different arrays. Participants completed four trials on the Nine Box Maze regardless of the accuracy of the objects recalled, objects recognised, locations identified or object-location links. Across each trial two objects (the car and cup) and two locations (bin three and eight) remained constant, providing a measure of object and location reference memory. The remaining two objects and locations varied in a quasi-experimental sequence over each trial, providing a measure of object and location working memory. The quasi-experimental sequence of these objects and locations, along with the participant’s starting position and the
position they moved for each trial were the same for all participants (L. Pentland, personal communication, 15th December, 2003).

After the final trial, participants were asked “What did you do to help you remember what things were hidden and where they were hidden?” Responses were coded into five levels (1, no strategy; 2, watching carefully; 3, object based; 4, location based; 5, both object and location based) and used as an indication of strategy formation.

**Spatial Place Coding Task**

The Spatial Place Coding Task was analogous to the sandbox tasks employed in Huttenlocher, Newcombe, & Sandberg (1994), and provided a measure of two elements central to Newcombe and Huttenlocher’s (2000) developmental theory of spatial processing; namely fine-grained allocentric place coding and hierarchical spatial coding.

The Spatial Place Coding task consisted of a sheet of plain white cardboard (80cm width X 40cm depth), a small target object (i.e. small thin figurine), and an office swivel chair. The cardboard was placed on the table directly in front of the participant and they were instructed “On this test (game) I will place the object on this cardboard sheet. I want you to look carefully where the object is on the cardboard before I take it away. I then want you to slowly turn around in your chair and put the object back on the cardboard in the same place that you just saw it.” They were also informed that the cardboard would be moved to a different location. The effect of moving the cardboard was that it altered the participant’s viewpoint of the to-be-remembered spatial location between presentation and recall. This, in effect, encouraged them to rely on the formation of allocentric spatial referencing because reliance on egocentric coding strategy would make it difficult to remember the spatial location. Also, the dimensions of the cardboard were chosen on the grounds that it increased the likelihood that participants would impose mental subdivisions along horizontal axis of the cardboard, but not vertical axis (Newcombe and Huttenlocher, 2000).

A total of 24 trials were administered. On each trial the experimenter placed the object in one of eight predetermined positions, which are at equal intervals across the middle of the cardboard (three trials for every predetermined position). The participant is exposed to the position of the object for five seconds on each trial before turning around in their swivel chair.
in order to prevent eye gaze or motor straining toward the correct position. While their eye
gaze is diverted the sheet of cardboard is moved to one of two different locations; either 20cm
to the left of its original location or 20cm to the right of its original location. Upon returning
their eye gaze to the apparatus, the participants are asked to place the object on the cardboard
in the same position as it was before they turned away.

The participant's first positioning of the object is taken as their response for the trial. Changes
in the positioning of the object and the relocation of the cardboard in each trial followed a
fixed quasi-random sequence. The performance measure was the mean horizontal line
distance from the right side of the cardboard sheet and the position nominated by the
participant on each trial (in millimetres).

Spatial Response Learning Task
The Spatial Place Coding task also provided a measure of two elements central to Newcombe
and Huttenlocher's (2000) developmental theory of spatial processing; namely fine-grained
egocentric response learning coding and hierarchical spatial coding.

The Spatial Response Learning task consisted of the same apparatus as the Spatial Place
Coding Task - a sheet of plain white cardboard (80cm width X 40cm depth) and a small target
object (i.e. small thin figurine). The cardboard was placed on the table directly in front of the
participant and they were instructed “On this test (game) I want you to take this object in your
hand and hold it at your side. I then want you to close your eyes and I am going to guide your
hand to where I want you to put the object on the cardboard sheet. When I let go, I want you
to take the object back down by your side, count to three, and put it back down in exactly the
same position on the cardboard”. The cardboard remained secured in front of the participant
throughout the Spatial Response Learning task. The effect of participants closing their eyes
was that it restricted the use of external landmarks in the room at the point of encoding the to-
be-remembered spatial location. In effect, this encouraged reliance on the use of one's own
bodily movements to accurately recall spatial location (i.e. egocentric response learning), and
not allocentric spatial referencing.

A total of 8 distinct trials were administered. For each trial the experimenter guided the
participants hand in placing the object to one of eight predetermined positions, which were at
equal intervals across the middle of the cardboard (one trial for every predetermined position). The positioning of the object by the experimenter at the beginning of each of the eight distinct trials varied quasi-randomly, until a trial had been undertaken for each of the eight predetermined positions. The performance measure was the mean horizontal line distance from the right side of the cardboard sheet and the position nominated by the participant across 8 trials (in millimetres).

In terms of content validity, both the *spatial place coding task* and *spatial response learning task* were devised in consultation with an expert in spatial cognition. Feedback was also obtained from piloting the assessment measures and procedures with two health controls. On both the place coding and response learning tasks these individuals indicated that they used categorical subdivisions as a general strategy to guide their responses. On the spatial response learning task they also indicated the use of muscle movements to guide their responses, which is consistent with spatial coding using egocentric response learning. On the spatial place coding task, they were unable to elaborate additional means by which their responses were guided, which might be expected given the implicit nature of allocentric place coding that the task was devised to tap.

An overview of the variables and scoring procedures derived from all three spatial reasoning tasks (NBMT-CV, Spatial Place Coding Task, and Spatial Response Learning Task) are summarised in Table 2.

*Weschler Abbreviated Scale of Intelligence (WASI)*

The WASI (Psychological Corporation, 1999) was used as a multidimensional measure of general intellectual functioning. The WASI comprises four subtests; Vocabulary, Similarities, Block Design, and Matrix Reasoning. Raw scores for each subtest are converted to Age-related Scaled scores, which are in turn combined to provide composite measured scores of Verbal IQ (VIQ; combining Vocabulary and Similarities Scaled scores), Performance IQ (PIQ; Block Design and Matrix Reasoning Scaled scores), and Full Scale IQ (FSIQ; all four subtest Scaled scores). Scores on each of these IQ scales ranges from 50 to 160 with a mean of 100 and standard deviation of 15. Higher scores reflect greater intelligence on the given IQ scale (see Table 2).
Table 2. Summary Description of the Variables and Scoring Procedures

<table>
<thead>
<tr>
<th>Task</th>
<th>Variable/Scoring</th>
<th>Range</th>
<th>Cognitive Demands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Object familiarisation</td>
<td>Free object recall after filled delay.</td>
<td>0-10</td>
<td>Processing capacity</td>
</tr>
<tr>
<td>Five Box Maze (5BM)</td>
<td>Total of all measures (objects recalled, objects recognised locations recalled and objects and locations associated correctly) across three trials.</td>
<td>0-24</td>
<td>Composite measure of allocentric memory function</td>
</tr>
<tr>
<td>Nine Box Maze (9BM)</td>
<td>Total of all measures (objects recalled, objects recognised, locations recalled and objects and locations associated correctly) across four trials.</td>
<td>0-64</td>
<td>Composite measure of allocentric memory function</td>
</tr>
<tr>
<td></td>
<td>Total number of objects recalled across trials</td>
<td>0-16</td>
<td>Object recall</td>
</tr>
<tr>
<td></td>
<td>Number of reference memory objects recalled</td>
<td>0-8</td>
<td>Object recall</td>
</tr>
<tr>
<td></td>
<td>Number of working memory objects recalled</td>
<td>0-8</td>
<td>Object recall</td>
</tr>
<tr>
<td></td>
<td>Total number of objects recognised across trials</td>
<td>0-16</td>
<td>Object encoding</td>
</tr>
<tr>
<td></td>
<td>Total number of locations recalled</td>
<td>0-16</td>
<td>Location recall</td>
</tr>
<tr>
<td></td>
<td>Number of reference memory locations recalled</td>
<td>0-8</td>
<td>Location recall</td>
</tr>
<tr>
<td></td>
<td>Number of working memory locations recalled</td>
<td>0-8</td>
<td>Location recall</td>
</tr>
<tr>
<td></td>
<td>Total number of correct object/locations associations</td>
<td>0-16</td>
<td>Associative recall</td>
</tr>
<tr>
<td></td>
<td>Strategy</td>
<td>1-5</td>
<td>Executive function</td>
</tr>
<tr>
<td>Spatial Place Coding Task</td>
<td>Measured distance (mm) from the right side of the cardboard for 24 trials</td>
<td>0-800</td>
<td>Integrated allocentric spatial memory function and hierarchical coding</td>
</tr>
<tr>
<td>Spatial Response Learning Task</td>
<td>Measured distance (mm) from the right side of the cardboard for 8 trials</td>
<td>0-800</td>
<td>Integrated egocentric spatial memory function and hierarchical coding</td>
</tr>
<tr>
<td>Full Scale IQ</td>
<td>Age scaled measure of four WASI subtests</td>
<td>50-160</td>
<td>Composite measure of general intellectual functioning</td>
</tr>
<tr>
<td>Verbal IQ</td>
<td>Age scaled measure of two verbal WASI subtests (Vocabulary and Similarities)</td>
<td>55-156</td>
<td>Composite measure of general verbal intellectual functioning</td>
</tr>
<tr>
<td>Performance IQ</td>
<td>Age scaled measure of two performance WASI Subtests (Block Design and Matrix Reasoning)</td>
<td>53-157</td>
<td>Composite measure of general non verbal intellectual functioning</td>
</tr>
</tbody>
</table>
The WASI is an established scale of intelligence that has been standardised on a large nationally representative sample of children and adults aged 6 to 89 years. On a sample of 1100 children aged 6-16 years the WASI has demonstrated good internal consistency. Average reliability coefficients for each of the WASI subtests ranged from 0.87-0.92, while the average reliability coefficient for VIQ, PIQ, and FSIQ were 0.93, 0.94 and 0.96, respectively. Test-retest reliability based on a sample of 116 children over a period of 2-12 weeks is good (VIQ r=.92; PIQ r=.88; FSIQ r=.93). Construct validity of the WASI is supported by expected patterns of intercorrelations between various WASI subtests and the IQ scales, and by results of factor analyses. The WASI also correlated highly with other established ability measures, including the Weschler Intelligence Scale for Children (WISC-III), with correlations between subtests and IQ scales ranging from r=.69 to .87.

The Handedness Inventory
The Handedness Inventory (Biggs and Nebes, 1975) was used as a measure of cerebral lateralisation reflected in the individual’s hand preference. This inventory consists of 12 five-point Likert items of hand-related activities for which participants indicate their hand preference (‘always left’=-2, ‘usually left’=-1, no preference’=0, ‘usually right’=1 or ‘always right’=2). Scores -9 and below are categorised left-handed, -8 to +8 are mixed handed, and scores above +9 are categorised right-handed. Using this method, Biggs and Nebes (1975) found that 14% of a large standardisation sample was designated non right-handers, which is in accordance with population studies of hand preference (Lezak, 1995).

Demographic Questionnaire
A standard protocol form was completed for each participant to record age, level of education and ethnicity. These data were collected for potential evaluation as covariates.

Procedure
Letters of Invitation were sent to the families of the individuals deemed eligible to participate in the study. Enclosed with the Letter of Invitation were an Information Sheet and Consent Form, which outlined the study in detail and emphasised that participation in the study was completely voluntary. Parents who agreed to let their children take part in the study were asked to return a signed copy of the consent form in the reply paid envelopes provided (Copies of the Invitation Letters, Information Sheets, and Consent Forms are in Appendix D).
A single assessment session was arranged for those eligible participants with consent to take part in the study. This session was conducted individually with the lead researcher and was expected to last 60 minutes, as estimated from piloting the assessment with two healthy controls. Assessment sessions were conducted in a room provided by either the referring CAMHS or Educational facility. In order to facilitate a degree of consistency between various room locations and eliminate distractions during assessment all unnecessary items were removed from the rooms prior to beginning assessments. A single square table (70cm X 70cm) was placed in the centre of the room along with four matching chairs – one on each side of the table. Permanent features contained within the various rooms such as cupboards, windows and pictures on the wall were left in the room to serve as external landmarks for the spatial reasoning tasks.

The assessment battery described above was administered in a semi-structured order. Demographic details were collected at the beginning of the assessment session and formed part of the rapport building process with the participant. This was followed by the three spatial reasoning tasks, which were administered in random order to control for any unforeseen fatigue or order effects. Items on The Handedness Inventory were completed during the specified delays of the spatial reasoning tasks and administration of the WASI was left until after all other measures were completed.
CHAPTER THREE

RESULTS

Analyses
Descriptive statistics were used to examine the characteristics of the Asperger group and Control group, and where possible parametric tests of analysis of variance were used to test for between and within group differences. Chi-square was used to compare group categorical data.

Preliminary examination of variable characteristics revealed that working memory object recall (9BMT) for the Control Group had significant negative skewness, while Spatial Place Coding for Position 1 for the Asperger Group had significant positive skewness and kurtosis (see Appendix E). Statistical transformations could not be satisfactorily applied to these variables across both research groups. For this reason, non-parametric tests (Mann-Whitney U) were used to investigate group differences involving the variables 'working memory object recall' and 'spatial place coding for position 1'.

Participant Characteristics
As far as possible, participants in the Asperger Group and Control Group were matched for age, handedness, and intellectual functioning (FSIQ, VIQ, and PIQ). Participant's characteristics for these background factors are presented in Table 3.

A one-way multivariate analysis of variance (MANOVA) was conducted to determine if there were any group differences for age and intelligence scores (IQ). Significant differences were found between the two groups on these dependent variables, $F(4, 33) = 2.83, p<0.05$. The multivariate $\eta^2$ was 0.26, indicating that 26% of multivariate variance of age and IQ is associated with the group factor. Independent-group t-tests on age and IQ measures were conducted as follow up tests to the MANOVA and are reported in Table 3. The t-tests revealed that the mean age of the Asperger group was statistically significantly higher than that of the control group, but that there were no significant differences between the groups for mean FSIQ, VIQ, or PIQ scores.

Further calculations were completed to assess whether the non-significant results were due to the sample size or lack of effect size. The results of these calculations can be found in Appendix F.
Table 3. Background Characteristics of Asperger Syndrome and Control Group.

<table>
<thead>
<tr>
<th></th>
<th>Asperger Syndrome Group (n=20)</th>
<th>Control Group (n=18)</th>
<th>Group Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age in Years</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean †</td>
<td>10.60</td>
<td>9.11</td>
<td>2.85 0.01**</td>
</tr>
<tr>
<td>SD</td>
<td>2.01</td>
<td>1.13</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>7-14</td>
<td>8-11</td>
<td></td>
</tr>
<tr>
<td><strong>Handedness</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left/Right‡‡</td>
<td>4 / 16</td>
<td>3 / 15</td>
<td>0.07 0.56</td>
</tr>
<tr>
<td><strong>Full Scale IQ</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>103.35</td>
<td>106.17</td>
<td>-0.72 0.48</td>
</tr>
<tr>
<td>SD</td>
<td>12.73</td>
<td>11.40</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>84-128</td>
<td>90-126</td>
<td></td>
</tr>
<tr>
<td><strong>Verbal IQ</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>95.50</td>
<td>101.28</td>
<td>-1.39 0.17</td>
</tr>
<tr>
<td>SD</td>
<td>13.27</td>
<td>12.26</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>75-123</td>
<td>80-128</td>
<td></td>
</tr>
<tr>
<td><strong>Performance IQ</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>110.65</td>
<td>110.00</td>
<td>0.16 0.87</td>
</tr>
<tr>
<td>SD</td>
<td>13.04</td>
<td>11.56</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>85-132</td>
<td>89-129</td>
<td></td>
</tr>
</tbody>
</table>

** Significant at p<0.01
† Levene’s test for equality of variance was significant (p<0.05) and therefore group differences calculated based on equal variances not assumed.
‡‡ Group differences analysed using Chi-square. Cell frequency less than five for left-handers prompted use of Fisher’s exact test, which has no sample size restrictions.

A Chi-square test conducted to investigate differences for handedness indicated no group differences ($\chi^2(1, n=38) = 0.07, p>0.05$). The low frequency of left handedness was expected and is in accordance with population studies of hand preference (Lezak, 1995).

**Nine Box Maze Test – Children’s Version**

Results for measures of the NBMT-CV are presented in Table 4. Group differences on Object Familiarisation was evaluated using an independent-group t-test, which revealed that there was no significant difference in processing capacity between the groups, as measured by the number of items freely recalled at the object familiarisation stage, $t(36) = -0.81, p>0.05$.  

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## Table 4. Performance on the NBMT-CV

<table>
<thead>
<tr>
<th>Measure</th>
<th>Asperger Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Object familiarisation (max.=10)</td>
<td>6.25</td>
<td>1.48</td>
</tr>
<tr>
<td>Five Box Maze</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (max. 24)</td>
<td>23.85</td>
<td>0.67</td>
</tr>
<tr>
<td>Nine Box Maze - Summary Scores</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Object recall (max. 16)</td>
<td>14.50</td>
<td>1.36</td>
</tr>
<tr>
<td>Object recognition (max. 16)</td>
<td>15.65</td>
<td>0.59</td>
</tr>
<tr>
<td>Location recall (max. 16)</td>
<td>13.95</td>
<td>1.85</td>
</tr>
<tr>
<td>Object/location recall (max. 16)</td>
<td>11.30</td>
<td>2.06</td>
</tr>
<tr>
<td>Total (max. 64)</td>
<td>55.40</td>
<td>4.57</td>
</tr>
<tr>
<td>Nine Box Maze – Reference Memory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference object recall (max. 8)</td>
<td>7.30</td>
<td>0.73</td>
</tr>
<tr>
<td>Reference location recall (max. 8)</td>
<td>6.90</td>
<td>0.79</td>
</tr>
<tr>
<td>Nine Box Maze – Working Memory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working object recall (max. 8)</td>
<td>7.20</td>
<td>0.77</td>
</tr>
<tr>
<td>Working location recall (max. 8)</td>
<td>7.05</td>
<td>1.28</td>
</tr>
</tbody>
</table>

Children generally performed the 5BMT without difficulty and a ceiling effect was observed. All children performed close to maximum with 36 children (95%) achieving a maximum score. Every child progressed to the Nine Box Maze stage.

**Nine Box Maze Summary Scores**

Multivariate analysis of variance (MANOVA) and independent group t-test were used to test the hypotheses that the Asperger group and control group would perform at similar levels on object memory recall, but that the Asperger group would perform more poorly on the location (spatial) memory recall and object/location association recall.

The MANOVA indicated that there were no significant differences in summary scores between the two groups for the linear combinations of object recall, location recall, or object/location recall, F (3, 34)=2.18, p>0.05. The multivariate $\eta^2$ was 0.16, indicating that 16% of multivariate variance of the various recall scores was associated with the group factor.
Although the amount of multivariate variance was not deemed statistically significant, 16% of variance may be of clinical relevance, especially if the group factor is contributing this amount of variance to predominantly one of the 9BMT memory recall variables. For this reason, independent group t-tests on each of the 9BMT recall scores were conducted as a follow up to the MANOVA. The t-test on object recall scores ($t(36)=-1.08, p>0.05$) and location recall scores ($t(32.66)=0.12, p>0.05$) were not significant. However, the t-test on object/location recall scores was significant $t(36) = -2.13, p<0.05$. In other words, the Asperger group and control group performed at a similar level on the object recall and location recall components of the 9BMT, but the control group performed significantly better than the Asperger group in their capacity to associate object and location.

**Exploratory Analysis**

To explore the group difference between object/location association recall in more detail, analysis of covariance (ANCOVA) were conducted with age, intelligence, and handedness as potential covariates. Age and intelligence were selected as covariates because there is considerable evidence that spatial memory development correlates with both age and intellectual function (see Newcombe and Huttenlocher, 2000). Handedness was selected as a covariate on the grounds that right-handers have consistently been shown to perform better than left-handers on visuo-spatial tasks (Bradshaw, 1989), which is linked with the theory that visuo-spatial functions in left-handers is mediated in a more diffuse manner across both hemispheres rather than localised on the right, as is typical for right-handers (Lezak, 1995).

The first ANCOVA investigated whether object/location recall scores differed between the Asperger group and control group once the influence of age was held constant. No significant interaction between age and the group factor were found suggesting that the difference on object/location recall did not vary as a function of age, $F(1,34)=0.78, p=0.39$. The ANCOVA was significant, $F(1,35)=6.46, p=0.02$. Partial $\eta^2$ revealed that 15.6% of variance on object/location recall scores is associated with differences in Asperger and control group, controlling for the influence of age. Conventionally, $\eta^2$ of 0.156 represents a large effect size (Green, Salkind, & Akey, 2000).

4 Again, further calculations were completed to assess whether the non-significant results were due to the sample size or lack of effect size. The results of these calculations can be found in Appendix F.
A second ANCOVA investigated whether object/location recall scores differed between the Asperger group and control group once the influence of intelligence was held constant. No significant interaction between verbal IQ, performance IQ, and the group factor was found suggesting that the difference on object/location recall did not vary as a function of intelligence, $F(2,32)=1.05$, $p=0.36$. The ANCOVA was significant, $F(1,34)=4.02$, $p=0.05$. The variance on object/location recall scores associated with the difference between the Asperger and control group fell to 11.0% (partial $\eta^2$ of 0.11), but remained significant once the influence of intelligence was controlled for. A $\eta^2$ of 0.11 represents a moderate to large effect size (Green, et al., 2000).

An ANCOVA (or more specifically a 2x2 ANOVA), investigating whether object/location recall scores differed between the Asperger group and control group after controlling for the influence of handedness (cerebral lateralisation) was not recommended (Green, et al., 2000). The number of left-handers in the sample was small and markedly different from the sample size for right-handers. Instead, an independent group t-test was used to determine whether object/location recall performance differed between right-handers in the Asperger group and right-handers in the control group. The t-test revealed that object/location recall scores for right-handers in the control group was significantly higher than object/location recall scores for right-handers the in Asperger group, $t(29) = -2.29$, $p<0.05$, $d=0.77$. Due to the small number of left-handers in the sample, informal comparison were used to summarise differences in object/location recall performance between left-handers in the Asperger and left-handers in the control group. The comparisons revealed that lefthanders in both groups averaged object/location recall scores of 12. Both groups also displayed scores ranging from 10 to 14.

These exploratory findings indicate that the control group continued to perform significantly better than the Asperger group in recalling the association between object and location, irrespective of their age or level of intelligence. Right-handers in the control group also performed significantly better than the right-handers in the Asperger group on object/location association recall. However, there is some tentative evidence that performance on object/location recall was much the same for left-handers across the sample.
Nine Box Maze Reference and Working Memory Scores
The 9BMT summary scores for object recall and location recall, although not significantly different for the Asperger and control group, were broken down further into separate reference and working memory components, as detailed in Table 4. Mixed factorial ANOVAs were employed to investigate the difference between reference and working memory for objects and locations. Two separate analyses were performed.

In the first analyses, the difference between reference and working memory object recall for the Asperger and control group were examined. The main effect for the object recall condition was not significant ($F(1,36)=0.02, p=0.90$) and the main effect of group was not significant ($F(1,36)=1.16, p=0.28$). There was also no significant group X object recall interaction ($F(1,36)=0.21, p=0.65$).

In the second analyses, the difference between reference and working memory location recall for the Asperger and control group were examined. The main effect for the location recall condition was not significant ($F(1,36)=1.41, p=0.24$) and the main effect of group was not significant ($F(1,36)=0.01, p=0.91$). There was also no significant group X location recall interaction ($F(1,36)=3.52, p=0.07$).

These analyses involving reference and working memory scores reveal that the stability or variability of objects and their location did not affect the recall performance of children with Asperger syndrome, which was similar to that of the children in the control group.

Nine Box Maze Strategies
Strategies used in the 9BMT are summarised in Table 5. The table shows that 11% of the children in the study reported adopting no strategy or a simple watching strategy in undertaking the 9BMT, while 42% adopted either an object or location based strategy, and 47% used more complex object and location based strategies.

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5 Box’s test of equality of covariance was significant ($F(3, 381694)=3.09, p<0.001$), indicating heterogeneity of covariance. A conservative mixed factorial ANOVA was made (i.e. Greenhouse-Geisser). Related and independent group t-test and nonparametric tests of group differences (Mann-Whitney U) does not require population variances to be equal (Tabachnick and Fidell, 2001) and were carried out to confirm the ANOVAs. No significant between or within group differences were identified using individual tests of group differences. These results can be found in Appendix G.
Table 5. Type of Strategies Each Group Employed Across the Nine Box Maze Test.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Asperger Group</th>
<th>Control Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No Strategy</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2. Watch carefully</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3. Object based</td>
<td>2</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>4. Location based</td>
<td>5</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>5. Both object and location based</td>
<td>10</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>TOTAL</td>
<td>20</td>
<td>18</td>
<td>38</td>
</tr>
</tbody>
</table>

A non-parametric Mann Whitney U test, in which the strategy categories were ranked according to their level of sophistication to create a continuous variable, revealed that there was no overall group difference for strategy type $z= -0.22$, $df=36$, $p=0.85$. Spearman correlation revealed that for the control group strategy type was significantly correlated with 9BM total scores ($p=0.70$, $p=0.00$), the number of objects and locations recalled ($p=0.79$, $p=0.00$; $p=0.55$, $p=0.02$, respectively), but was not correlated to the number of object/location associations ($p=0.33$, $p=0.18$). No significant correlations between strategy type and the various 9BM scores were found for the Asperger group.

In conjunction with earlier analyses of group differences for 9BM scores, the correlation findings suggest that the Asperger group and control group performed object recall and location recall at similar levels irrespective of strategy type employed. ANCOVA confirmed this relationship indicating that after statistically controlling for strategy, group differences remained non-significant for objects recall ($F(1,35)=1.06$, $p=0.31$) and for location recall ($F(1,35)=0.08$, $p=0.78$). No link between strategy type and object/location recall was found for either the Asperger or control group, suggesting that the group differences in associative memory is not linked with employment of different types of strategy, as measured by the 9BMT. ANCOVA confirmed this relationship indicating that after statistically controlling for strategy, group differences remained significant for object/location recall ($F(1,35)=4.52$, $p=0.04$).

Spatial Place Coding Task
The spatial place coding task was established to evaluate hierarchical spatial processing, specifically the integration of fine-grained allocentric place coding and categorical coding.
Original (or true) locations of object placement were represented by a scale of 1-8, with each number representing one of the eight evenly spaced true object locations across the middle of the cardboard sheet. One represented the first true object location from the right side of the cardboard at 89mm, two represented the second true object location from the right side of the cardboard at 178mm (2x89mm), through to eight which represented the true object location eight at 712mm (8x89mm) from the he right side of the cardboard. On each of the 24 place coding trials participants received a response location score, which was the horizontal distance from the right side of the cardboard sheet to the location of the objects position that they nominated, measured in millimetres (mm).

Participants obtained three response location scores at each of the eight intervals (i.e. 24 trials), which were averaged to give mean response locations. The mean response locations and standard deviations for the Asperger and control group are presented in Table 6.

The metric accuracy of the sample’s mean response locations were examined using one-way repeated measures ANOVA. This procedure evaluated the effect of the true object locations on the magnitude and direction of the mean response locations. Results showed there was a significant effect of true object locations on mean response locations, $F(4.79, 167.73) = 1029.20, p=0.00$, partial $\eta^2=0.97^6$. Planned comparisons revealed that each mean response

<table>
<thead>
<tr>
<th>True Object Location</th>
<th>Asperger Group</th>
<th>Control Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean Response Location</td>
<td>Mean Response Location</td>
<td>Mean Response Location</td>
</tr>
<tr>
<td>P1 89</td>
<td>109.59</td>
<td>127.72</td>
<td>118.66</td>
</tr>
<tr>
<td>P2 178</td>
<td>204.46</td>
<td>188.80</td>
<td>196.63</td>
</tr>
<tr>
<td>P3 267</td>
<td>261.70</td>
<td>264.57</td>
<td>263.14</td>
</tr>
<tr>
<td>P4 356</td>
<td>358.45</td>
<td>333.56</td>
<td>346.00</td>
</tr>
<tr>
<td>P5 445</td>
<td>454.76</td>
<td>447.56</td>
<td>451.16</td>
</tr>
<tr>
<td>P6 534</td>
<td>525.75</td>
<td>534.20</td>
<td>530.00</td>
</tr>
<tr>
<td>P7 623</td>
<td>610.09</td>
<td>599.33</td>
<td>604.71</td>
</tr>
<tr>
<td>P8 712</td>
<td>696.96</td>
<td>664.13</td>
<td>680.55</td>
</tr>
</tbody>
</table>

Note: All scores and standard deviations (SD) reported in mm.

$^6$ Mauchly’s Test of sphericity was significant indicating heterogeneity of covariance. Conservative F-test made for repeated measures ANOVA. F-test with sphericity assumed was $F(7, 245)=1029.20$, $p=0.00$. 

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location was significantly different from the next closest mean response location, which substantiates the pattern observed in Figure 6, and suggests that mean response locations are systematically related to the object’s true location.

Separate one-way repeated measures ANOVAs were also carried out on the mean response location for the Asperger group and the control group. True object location was found to have a significant effect on the mean response locations for the Asperger group, $F(7, 119)=730.24$, $p=0.00$, partial $\eta^2=0.98$ and the control group, $F(3.45, 58.70)=406.99$, $p=0.00$, partial $\eta^2=0.96$. Planned comparisons for each group again revealed that each mean response location was significantly different from the next closest mean response location. Thus, the estimation of distance by eye was well developed in both groups.

In order to evaluate the hypothesis that the Asperger group would rely more heavily on categorical coding than fine-grained allocentric coding than the control group required a comparison of the error bias of mean response locations. This was done by comparing the size of errors between the response location and true location for each group; that is, by subtracting the true object location from the individual’s response location, as shown in Figure 7.
Positive errors indicate a mean response to the right of the true location while a negative error indicates a mean response to the left of the true location. While participant’s responses are quite accurately placed the general trend observed in Figure 7 is a bias toward the centre of the cardboard. That is, responses for locations to the left of centre are misplaced to the right (positive errors for P1 and P2) while responses for locations to the right of centre are misplaced to the left (negative errors for P6, P7, and P8). The pattern of bias is less consistent for response locations around the centre of the cardboard (P4 and P5).

Bias toward the centre is predicted by a model in which inexactlly coded locations are weighted toward the centre of the categorised space (Newcombe and Huttenlocher, 2000). The extent of such bias would be consistent if uncertainty at the fine-grained level was equal at all locations. Moreover, the bias should be larger when fine-grained coding is impaired. The nature of the spatial place coding task is expected to tap allocentric fine-grained coding. In the present study it is hypothesised that allocentric fine-grained coding for the Asperger group but not the control group is impaired, thus it is expected that the Asperger group will show a consistent bias across each location on the cardboard. The bias is also expected to be larger than that of the control group, especially at locations close to the ends of the cardboard.
One-way repeated measures ANOVA were employed to investigate the effect of true object location on the absolute mean response error for each group. The dependent variable was the mean absolute value of errors in participant’s response location. Absolute values were used because of the interest in the consistency and size of the bias as stated in the hypotheses rather than the bias reflected in signed errors. For the Asperger group, the ANOVA revealed that there was no significant difference in absolute error bias across the eight true object locations, $F(7, 119)=0.65$, $p>0.05$, partial $\eta^2=0.04$. For the control group, the ANOVA also revealed that there was no significant difference in absolute error bias across the eight true object locations, $F(3.21, 54.61)=2.02$, $p>0.05$, partial $\eta^2=0.11$. In other words, the Asperger group and control group both displayed a consistent level of bias across all locations.

A MANOVA was conducted to investigate differences in error responses between the Asperger and control group for the various true object locations. The dependent variables were the mean error responses that included size and direction from true location. The MANOVA indicated that there were no significant group differences in error responses, $F(8, 27)=2.04$, $p=0.08$. The multivariate $\eta^2$ was 0.38, indicating that 38% of multivariate variance of the various true object locations was associated with the group factor.

Although the amount of multivariate variance was not deemed statistically significant, 38% of variance is strong (Green et al., 2000). Also, the Box test of multivariate homogeneity was significant suggesting that there were differences in variances among the dependent variable. For this reason, follow-up between group comparisons of mean error responses were conducted for each true location. The results are summarised in Table 1.

Inspection of the mean error differences indicates that there were no significant error differences between the Asperger and control group except at position four, where the Asperger group were biased to the right of the true location (i.e. toward the centre of the cardboard) but the Control group were biased to the left of the true location (i.e. toward the centre of the right half of the cardboard). Thus, only one significant between group error

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7 Again, further calculations were completed to assess whether the non-significant results were due to the sample size or lack of effect size. The results of these calculations can be found in Appendix F.
Table 7. Mean Error Responses Across the Eight True Response Locations: Spatial Place Coding Task.

<table>
<thead>
<tr>
<th>True Object Location</th>
<th>Asperger Group Mean Error Response</th>
<th>Control Group Mean Error Response</th>
<th>Group Difference t(34) p</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 89†</td>
<td>21.59</td>
<td>39.72</td>
<td>-1.14 0.26</td>
</tr>
<tr>
<td>P2 178</td>
<td>26.46</td>
<td>10.80</td>
<td>2.73 0.11</td>
</tr>
<tr>
<td>P3 267</td>
<td>-5.30</td>
<td>-2.43</td>
<td>0.06 0.81</td>
</tr>
<tr>
<td>P4 356</td>
<td>2.45</td>
<td>-22.44</td>
<td>5.39 0.03*</td>
</tr>
<tr>
<td>P5 445</td>
<td>9.76</td>
<td>2.56</td>
<td>0.25 0.62</td>
</tr>
<tr>
<td>P6 534</td>
<td>-8.25</td>
<td>0.20</td>
<td>0.47 0.50</td>
</tr>
<tr>
<td>P7 623</td>
<td>-12.92</td>
<td>-19.19</td>
<td>0.37 0.55</td>
</tr>
<tr>
<td>P8 712†</td>
<td>-15.04</td>
<td>-47.87</td>
<td>-1.68 0.10</td>
</tr>
</tbody>
</table>

Note: All scores are reported in mm. Standard deviations were calculated for the Mean Response Location and are reported in Table 6.
† Between group comparisons of error responses based on non-parametric Mann Whitney-U test because non-normal variable distributions and unequal variances.
* p<0.05

Spatial Response Learning Task

The spatial response learning task was established to evaluate hierarchical spatial processing, specifically the integration of fine-grained egocentric spatial coding and categorical coding. As with the spatial place coding task, the original (or true) locations of object placement were represented by a scale of 1-8, with each number representing one of the eight evenly spaced true object locations across the middle of the cardboard sheet. The response location score was once again measured as the horizontal distance from the right side of the cardboard sheet to the location of the objects position that they nominated, measured in millimetres (mm).

On each of the eight response coding trials participants received a response location score (i.e. one for each of the eight intervals, in contrast to the three response location scores received for each interval across 24 trials in the spatial place coding task). The response location scores and standard deviations for the Asperger and control group are presented in Table 8.

The metric accuracy of the sample’s response locations were examined using one-way repeated measures ANOVA. This procedure evaluated the effect of the true object locations on the magnitude and direction of the participant’s response locations. Results were
### Table 8. Response Location Scores and Standard Deviations on the Spatial Response Learning Task.

<table>
<thead>
<tr>
<th>True Object Location</th>
<th><strong>Asperger Group</strong></th>
<th></th>
<th></th>
<th><strong>Control Group</strong></th>
<th></th>
<th></th>
<th><strong>Total</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean Response Location</td>
<td>SD</td>
<td>Mean Response Location</td>
<td>SD</td>
<td>Mean Response Location</td>
<td>SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 89</td>
<td>103.95</td>
<td>34.47</td>
<td>105.50</td>
<td>37.49</td>
<td>104.70</td>
<td>35.47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2 178</td>
<td>211.16</td>
<td>55.02</td>
<td>182.78</td>
<td>53.84</td>
<td>197.35</td>
<td>55.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 267</td>
<td>295.37</td>
<td>42.99</td>
<td>281.39</td>
<td>52.37</td>
<td>288.57</td>
<td>47.64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P4 356</td>
<td>394.63</td>
<td>52.47</td>
<td>370.50</td>
<td>53.02</td>
<td>359.78</td>
<td>53.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P5 445</td>
<td>485.68</td>
<td>61.29</td>
<td>459.72</td>
<td>56.40</td>
<td>473.05</td>
<td>59.61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P6 534</td>
<td>568.68</td>
<td>47.17</td>
<td>573.50</td>
<td>35.63</td>
<td>571.03</td>
<td>41.45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P7 623</td>
<td>633.16</td>
<td>50.67</td>
<td>641.94</td>
<td>51.49</td>
<td>637.43</td>
<td>50.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P8 712</td>
<td>712.42</td>
<td>35.68</td>
<td>707.06</td>
<td>35.11</td>
<td>709.81</td>
<td>35.01</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: All scores and standard deviations (SD) reported in mm.

significant, $F(5.06, 182.15)=960.59$, $p=0.00$, partial $\eta^2=0.96^8$. Planned comparisons revealed that the mean response location for each true object location was significantly different from the next closest mean response location, which substantiates the pattern observed in Figure 8, and suggests that mean response locations are systematically related to the object’s true location.

Separate one-way repeated measures ANOVAs were also carried out on the mean response location for the Asperger group and the control group. True object location was found to have a significant effect on the mean response locations for the Asperger group, $F(7, 126)= 520.87$, $p=0.00$, partial $\eta^2=0.97$, and the control group, $F(3.81, 64.81)=457.63$, $p=0.00$, partial $\eta^2=0.96$. Planned comparisons for each group again revealed that each mean response location was significantly different from the next closest mean response location. Thus, the estimation of distance by egocentric body movement was well developed in both groups.

The original hypothesis relating to the spatial response learning task stated that both the Asperger group and control group would successfully integrate fine-grained egocentric coding with categorical coding. Thus, it was expected that there would be no significant group difference in the pattern of error bias of mean response locations. This hypothesis was tested

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8 Mauchly’s Test of sphericity was significant indicating heterogeneity of covariance. Conservative F-test made for repeated measures ANOVA. F-test with sphericity assumed was $F(7, 252)=960.59$, $p=0.00$. 

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by comparing the size of errors between the response location and true location for each group; that is, by subtracting the true object location from the individual’s response location, as shown in Figure 9. Positive errors indicate a mean response to the right of the true location while a negative error indicates a mean response to the left of the true location. While participant’s responses are quite accurately placed the general trend observed in Figure 9 is a bias toward the right of the true object locations. That is, responses for locations to the left of centre are misplaced to the right (positive errors for P1, P2 and P3) and responses for locations to the right of centre were also generally misplaced to the right (positive errors for P5, P6, and P7). The pattern of bias to the right of true object location was less consistent for response locations P4 and P8.

Bias toward the centre of the cardboard is predicted by a model in which inexactely coded locations are weighted toward the centre of the categorised space (Newcombe and Huttenlocher, 2000). The extent of such bias would be consistent if uncertainty at the fine-grained level was equal at all locations. Moreover, the bias should be larger when fine-grained coding is impaired. The nature of the spatial response learning task is expected to tap egocentric fine-grained coding. In the present study it is hypothesised that egocentric fine-
grained coding is not impaired in either the Asperger group or the control group. Thus it is expected that the Asperger group and control group will both show a consistent level of bias across each location on the cardboard, and that there will be no significant difference in error bias between the groups at any one location.

One-way repeated measures ANOVA were employed to investigate the effect of true object location on the absolute mean response error for each group. The dependent variable was the mean absolute value of errors in participant's response location. Absolute values were used because of the interest in the consistency of the bias as stated in the hypotheses rather than the bias reflected in signed errors. For the Asperger group, the ANOVA indicated a significant effect of true object location on error response, $F(7, 119)=2.60, p=0.02, \text{partial } \eta^2=0.13$. Follow-up polynomial contrasts indicated a significant quadratic effect with mean errors decreasing at locations at either end of the cardboard and in the middle, $F(1, 17)=9.37, p=0.01, \text{partial } \eta^2=0.36$. Linear and other higher-order polynomial contrasts were non-significant.

<table>
<thead>
<tr>
<th>True Location</th>
<th>Asperger Group Mean Error Response</th>
<th>Control Group Mean Error Response</th>
<th>Group Difference t(34)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 89</td>
<td>15.89</td>
<td>17.50</td>
<td>0.02</td>
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Note: All scores are reported in mm. Standard deviations were calculated for the Mean Response Location and are reported in Table 8.

For the control group, the ANOVA revealed that there was no significant difference in absolute error bias across the eight true object locations, $F(4.26, 72.46)=0.51, p=0.74$, partial $\eta^2=0.03$. Thus, while the Asperger group displayed significantly smaller errors in their responses at the far ends of the cardboard and in the middle (compared with error responses at other locations), the control group showed a consistent level of bias across all locations.

A MANOVA was conducted to investigate differences in error responses between the Asperger and control group for the various true object locations. The dependent variables were the mean error responses that included size and direction from true location. The MANOVA indicated that there were no significant group differences in error responses, $F(8, 27)=0.79, p=0.62$. The multivariate $\eta^2$ was 0.19, indicating that 19% of multivariate variance of the various true object locations was associated with the group factor. Individual between group comparisons confirmed that there were no significant differences in error responses at the various true object locations. These comparison results are summarised in Table 9.

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9 Again, further calculations were completed to assess whether the non-significant results were due to the sample size or lack of effect size. The results of these calculations can be found in Appendix F.
CHAPTER 4

DISCUSSION

Recent research has identified spatial working memory impairments among individuals with Asperger syndrome that is suggestive of damage to the right hippocampus (e.g. Morris et. al., 1999). This finding is consistent with broader neuropsychological findings in which right hemisphere dysfunction has been implicated in Asperger syndrome (e.g. Ellis et. al., 1994; Ellis & Gunter, 1999; Jollie and Baron-Cohen, 1997). It is also consistent with neuroimaging data in which developmental abnormalities in limbic system structures have been identified among groups with Asperger syndrome (e.g. Abell et. al., 1999; McAlonan et.al., 2002).

Spatial memory processing associated with right hippocampal functions provides co-ordinated representations (or mapping) of objects within the environment, which are independent of one's body orientation and are essential for the ongoing integration and tracking of one’s spatial environment (Sholl, 2000). Impairments in such (allocentric) spatial memory processing may underlie aspects of behaviour observed in individuals with Asperger syndrome. Indeed, an allocentric spatial memory disorder may even be the primary deficit responsible for the collection of symptoms that make up the syndrome. No direct investigation of hippocampal spatial processing has been empirically tested in people with Asperger syndrome.

The Nine Box Maze Test (NBMT) has been widely used as a measure of allocentric spatial memory and integrated spatial mapping. This maze paradigm has consistently identified spatial memory and mapping impairments among individuals who have undergone right temporal lobectomy involving partial hippocampal excision, and individuals with unilateral damage to the right hippocampus a result of temporal lobe epilepsy (Abrahams et al., 1997; Abrahams et al., 1999; Morris, 1996). Recently, the NBMT has been adapted for children (NBMT-CV; Pentland et. al., 2003).

In this study the aim was to use the NBMT-CV in a population of children with Asperger syndrome to investigate deficits in allocentric memory functions associated with the role of the right hippocampus formation. Moreover, the study took the opportunity to investigate how neuroanatomically related deficit(s) identified using the NBMT-CV might be manifested
in the broader context of developing spatial cognition. Specifically, a Spatial Place Coding task was used to investigate the hierarchical integration of fine-grained allocentric spatial coding and categorical coding. That is, the extent to which categorical spatial information is utilised to accurately estimate the location of objects when precise fine-grained information concerning the distance and direction of location is inexactly represented. A Spatial Response Learning task was used to investigate the hierarchical integration of categorical coding when fine-grained egocentric spatial information is inexactly represented.

Two groups were compared on the NBMT-CV, Spatial Place Coding task, and Spatial Response Learning task: boys with a clinical diagnosis of Asperger syndrome and a control group of boys attending mainstream school with no known social communication difficulties.

**FINDINGS**

**Nine-Box Maze Test – Children’s Version (NBMT-CV)**

It was hypothesized that individuals in the Asperger group and control group would display similar levels of object memory recall, but that the AS group would perform significantly worse than the controls in terms of location recall and their capacity to associate objects with locations. Results showed that there was no difference between groups on non-spatial object memory or spatial location memory recall. However, as predicted children in the Asperger group performed more poorly than the healthy controls when it came to associating objects with their location.

Current findings also showed that levels of non-spatial and spatial memory recall did not differ between groups as a result of the stability or variability of objects and their location. In other words, memory recall for children in the Asperger group and control group were much the same irrespective of whether objects and locations to be recalled remained consistent across trials (reference memory) or varied from trail to trial (working memory).

The pattern of findings observed in this study is suggestive of a select spatial memory deficit in individuals with Asperger syndrome. However, it is not necessarily the pattern of findings one would expect if there was a distinct impairment with forming and maintaining a spatial map that represents objects relative to each other and which is independent of the viewer’s perspective. The NBMT-CV was designed to minimise the use of egocentric processing
strategies by encouraging participants to utilise cues from around the room to form and subsequently retain representations of locations of objects, independent of themselves. If this form of allocentric memory process was absent (or significantly impaired) one would not expect individuals to recall locations of specified bins within the spatial array after changing their viewpoint. Yet the current findings suggest that children with Asperger syndrome were capable of forming and retrieving spatial representations that were allocentric in nature. They were able to do so at a level comparable with that of healthy controls. Moreover, they can form and hold such representations within a specific temporal context (working memory), as well as across temporal contexts (reference memory). Thus, it would appear that allocentric memory processes associated with the right hippocampal formation are intact among individuals with Asperger syndrome.

Despite intact allocentric spatial memory among individuals with Asperger syndrome, the integrity of right hippocampal spatial processing may still be drawn into question. In the current study, the Asperger syndrome group displayed select spatial memory deficit in associating objects with their location. In the 5BM, both the Asperger group and the control group displayed an ability to recall objects and locations. Both groups were also capable of associating specified objects with their location in the spatial array. In contrast, the Asperger group performed more poorly than the control group in associating object location on the 9BM task. The 5BM was a less demanding version of the 9BM only in terms of cognitive load and not with regard to the nature of the task at hand. This would suggest that there is a deficit in object-location association among the Asperger group. The nature of the deficit appears to be quantitatively rather than qualitatively different from that of healthy controls.

Results from the present study also highlight that the difference in associative spatial recall between the Asperger group and healthy control group was not a function of age, intelligence, or the utilisation of more efficient executive strategies. Individuals with Asperger syndrome continued to perform more poorly than the healthy controls on the measure of associative memory once age and intelligence were controlled for (statistically). Furthermore, the majority of participants in the study reported using more complex strategies combining aspects of object and location. Yet the Asperger group continued to display poorer associative memory recall compared with the healthy controls irrespective of the strategy type they employed.
These findings run counter to the extensive literature linking performance on spatial memory tasks to age, intelligence, and executive strategy formation (Luciana and Nelson, 1998; Newcombe and Huttenlocher, 2000). Instead, the current findings would suggest that there is a genuine deficit in associative memory among individuals with Asperger syndrome, which arises from a lack of development or impairment of memory functions rather than a delay related to age, intelligence, or executive functioning.

Selective impairment of associative memory (or relational memory processing as it is also referred to as) has been linked with the hippocampal system (e.g. Cohen, Ryan, Hunt, Romine, Wszalek, and Nash, 1999; DeLong, 1992; Squire and Zola-Morgan, 1991). Cognitive mapping in the spatial domain involves forming a representation between objects in space. If these representations are to be effectively utilised then the integration of both egocentric and allocentric information is needed. There is also a need to incorporate broader declarative knowledge into the spatial map, such as object features or principles for how to use or negotiate landscapes. Some of this processing will invariably take place in regions outside the hippocampal formation. However, the hippocampus (and related structures in the medial temporal lobe memory system) is thought to temporarily hold formed conjunctions between spatial information and knowledge (processed and represented by distinct cortical zones) (Cohen, et al., 1999). In other words, the hippocampal system is thought to serve an important function in binding the information from different cortical sites into a spatial representation.

The importance of the hippocampal associative memory function varies. The need to form and integrate spatial representations may be less important so long as objects and locations are in view. Associative memory becomes crucial, however, when access or attention to objects and locations is diverted (Eichenbaum, Otto, and Cohen, 1994). In this instance, one must be able to hold and access the original integrated representations. If associative memory is impaired one can expect the retrieval of an integrated spatial representation to be impaired. What the current findings suggest is that individuals with Asperger syndrome are capable of recalling objects and locations in isolation, even when locations are represented from an allocentric perspective. However, they cannot readily bind and hold converging information of the various mnemonic components that make up the spatial representation. In effect, this relational memory deficit may limit the individual’s ability to make sense of the relationship
between various components represented in a spatial field (i.e. the outside world), especially relationships that are in some way implicit or cannot be directly assessed from observation. In other words, if the ability to integrate information is impaired among individuals with Asperger syndrome, then the relationship between various components in their surrounding environment are unlikely to be adequately and wholly represented. At a behavioural level, one might expect this deficit to be expressed in relatively unusual attitudes and interactions with external objects, which are noticeably different from individuals who have formed and held on to the necessary relational connections between objects.

Methodological Constraints
Several methodological factors should be considered before the associative memory impairment observed among the individuals with Asperger syndrome can be unequivocally linked with unilateral hippocampal damage. There is currently no direct comparison of the Asperger group to patients with known right hippocampal damage. As a result, there is a lack of concurrent validity in drawing conclusions about the associative memory impairments observed in the current study and the quality of hippocampal spatial memory function.

Additionally, previous applications of the NBMT involving populations with known unilateral hippocampal damage have not evaluated association memory (e.g. Abrahams, et al., 1999; Abrahams, et al., 1997). The design and scoring procedures of the NBMT in these other studies have focused on measuring location recall across trials and did ask participants to nominate which objects were in which bins. Even if they were to have been asked there is the potential that the location recall deficits observed in these studies would have precluded identification of association memory deficit as distinct from allocentric spatial memory deficit. To this end, the link between association memory and the hippocampal formation remains largely theoretical, at least until a more direct comparison of both allocentric and associative memory performance is made with children with select hippocampal damage.

Questions may also be raised about the sensitivity in measuring strategy approaches employed by individuals in this study. Pentland et. al., (2003) initially raised concerns that the free recall of strategy employment was ambiguous. In the current study, children often needed to be prompted in response to the question asking them what they did to remember what things were hidden and where they were hidden. To prompt unresponsive participants without being
suggestive the author would ask participants to describe what went through their mind when trying to remember objects and their location. Still, children at the younger end of the sample were thought to lack the reasoning skills to elaborate their own thinking. Thus, potentially there may be a confounding effect between poor executive function and associative memory that was not detected in the present findings because of insensitive measures of executive strategy functions.

**Spatial Place Coding & Response Learning**

A developmental model of spatial reasoning was employed to evaluate the expression of neuroanatomical spatial memory deficit(s) in the context of broader spatial cognitive functioning. According to this model, locations of objects are encoded hierarchically, at a fine-grained level and at a categorical level. Information at these two levels is combined to estimate location when the more precise fine-grained information concerning the location of an object is inexact, as is commonly the case even in normal spatial information processing. At these times, memory for superimposed categories on the spatial field (such as the left half of the room) can be used to reduce the variability of estimates enough so that a degree of accuracy is maintained, although some bias will be introduced in adjusting for the location of object(s). This adjustment bias is typically toward the centre of category boundaries and will be larger when fine-grained coding is retained with less certainty (Huttenlocher, et al., 2000).

In line with previous investigations of this model, it was expected that individuals would show systematic bias toward the centre of the category space, and that the bias would be larger at locations further from the centre of this space if fine-grained encoding was limited. Allocentric fine-grained coding was predicted to be impaired among individuals with Asperger syndrome and it was, therefore, hypothesised that they would show a consistent central bias across all object locations on the Spatial Place Coding task. Furthermore, this bias was expected to be larger than that of the control group at the more extreme locations from the centre of the categorical space (which was a cardboard sheet in this case). In contrast, egocentric fine-grained coding was predicted to be intact for both the Asperger group and control group. Thus, it was hypothesised that there would be no difference in systematic bias displayed by either group on the Spatial Response Learning task.
For the Spatial Place Coding task, results showed that the children with Asperger syndrome displayed a consistent bias across a variety of positions when asked to accurately place code the locations of objects using an allocentric perspective. This bias was systematically biased toward the centre of the cardboard. Healthy controls also displayed a consistent systematic bias toward the centre of the cardboard, which was comparable to that of the Asperger group. In other words, all children in this study showed a similar ability to utilise categorical information to supplement the accuracy of allocentric spatial coding.

For the Spatial Response Learning task, results showed that both the children with Asperger syndrome and healthy controls displayed a similar characteristic bias to the right of original locations when they were asked to accurately code object locations with respect to their own body movement. For the Asperger group this bias was less at central and extreme locations. Thus, all participants showed a similar pattern of response learning when integrating categorical information. However, those with Asperger syndrome showed greater accuracy, and hence potential superior fine-grained egocentric response learning at central and extreme locations in the spatial field.

These findings suggest that children with Asperger syndrome, like the healthy controls display vital aspects of mature spatial functioning. They have intact sensorimotor knowledge that enable them to utilise feedback from their own body movement to locate objects relative to the self. At the same time, they have the ability to engage more complex spatial processing skills in which they objectively relate and incorporate information from the wider environment, independent of their own movement. Participants in this research also displayed patterns of systematic bias that would indicate an adaptive combination of various grains of spatial information to enhance coding accuracy (i.e. hierarchical coding). The associative spatial memory deficit identified earlier did not appear to impact on broader spatial processing of location accuracy.

**Interpretation of the Spatial Place Code Task Findings**

The unexpected similarity in the performance displayed by the Asperger group and control group on the Spatial Place Coding task suggests that place coding was not impeded by impaired allocentric spatial processing. The Spatial Place Coding task was designed such that the repositioning of the entire cardboard sheet between the learning and recall of object
location would render place coding relative to one's own body an ineffective location strategy. Instead, it would encourage participants to rely on external landmarks (which included the geometric frame of the cardboard sheet) to reference the location of the object. In this sense the Spatial Place Coding task was allocentric in nature. Similarities in performances observed on this task would suggest that the level of development of allocentric processes among individuals with Asperger syndrome was on par with that of the healthy controls.

Earlier results from the Nine-Box Maze Test also suggest that children with Asperger syndrome did not have allocentric spatial memory deficits that impact on location recall. The findings from the Spatial Place Coding task further confirm this conclusion and provide a degree of validity for asserting that allocentric spatial processing remains intact among this Asperger population.

Interpretation of the Spatial Response Learning Task Findings

Another interesting finding was the unexpected differences observed in the Spatial Response Learning task. Participants with Asperger syndrome displayed greater accuracy at locating object position based on sensorimotor knowledge than healthy controls. Superior location accuracy was observed for both central and extreme locations. This finding suggests that children with Asperger syndrome have superior fine-grained egocentric spatial locations skills at locations with more salient reference points to cue responses.

At present there has been no direct investigation of egocentric spatial coding among the Asperger population. Nevertheless, the literature concerning the development of spatial functioning may provide some insight in explaining egocentric superiority. Piaget's approach to spatial development posits that infants are born without knowledge of space and that initial conception of relating to objects in space is defined almost solely in relation to the infant's own activity (Piaget, 1952). Research over the past decades has generally supported Piaget's claim that infants initially encode location in egocentric terms based on their own sensorimotor movements but that they subsequently go through a series of qualitative shifts toward more complex allocentric spatial processing (see Acredolo, 1990). This developmental change has been shown to be propelled by increased interactions with social environments. Specifically, the more complex one's interactions with their surroundings become the more adept they become at resolving conflicts that arise between response
learning (i.e. processing spatial information relative to their own movements) and cued learning (i.e. the use of adjacent and distal landmarks to aid object location) (Bertenthal, 1996).

It is possible, although only speculative at this point, that children with Autistic Spectrum Disorder are slower at interacting with their environment, and that their neural systems can sufficiently adapt the use of response learning to cope with their level of spatial processing at a young age. In other words, children with Autistic Spectrum Disorder may rely on egocentric coding for longer in infancy and early childhood, and refine such coding before shifting toward cued learning that are allocentric in nature.

THEORETICAL AND CLINICAL IMPLICATIONS

A deficit in associative spatial memory against a background of otherwise intact spatial coding carries a number of theoretical and clinical implications for individuals with Asperger syndrome.

Theoretical Implications

Evidence of associative memory deficits in the spatial domain offers a degree of specificity to current right hemisphere theories of Asperger syndrome such as the ‘white matter hypothesis’. In its present form, the white matter hypothesis adopts a rather broad view of deficits displayed in Asperger syndrome by suggesting that there is poor communication between inter-modal areas of the right hemisphere. To some extent, this hypothesis may be reconciled with impairment in associative memory, in that the central deficit centres on the drawing together of information. It is possible that the associative memory impairments observed in the current sample are the result of restricted transmission of mnemonic information along white matter fibres involving the hippocampus. As a result of this restriction, there may be limited binding of information within the cognition map at the site of the hippocampal formation.

In view of criticisms levelled at a lack of specificity of the white matter hypothesis, the current findings can be seen to highlight potential communication breakdown between and within more distinct neural systems of the right hemisphere.
The current findings may also carry interesting implications of broader theories of right hemisphere functioning (e.g., Kaplan-Solm & Solm, 2000) and the social communication difficulties displayed by individuals with Asperger syndrome. There is evidence that individuals with Asperger syndrome have knowledge of other people’s state of minds, but they are unable to apply this knowledge effectively (Bowler, 1992). They can intellectualize what a person may be thinking or feeling, but cannot recognize when such skills are necessary for the situation at hand. This deficit is widely deemed to be reflected in the difficulties these individuals have recognizing emotion and making sense of non-literal and metaphoric utterances (Happé, 1994).

However, in relation to the current findings these behavioural deficits, often deemed stereotypical of a diagnosis of Asperger syndrome, can be reconciled with difficulties forming and retrieving associative memories. Based on the current findings, children with Asperger syndrome would seem to be able to represent individual and explicit components of their environment and verbal input into a spatial map. They would also appear able to recall isolated components of information independent of their own perspective, even following a diversion in attention. What is less certain is their ability to maintain the memory of the association between various implicit and explicit components in this spatially processed representation when it cannot be directly observed or attention is diverted. Thus, the current findings raise the question about whether associative spatial memory deficits linked with the right hippocampus is a fundamental deficit of Asperger syndrome, which subsequently gives rise to more general social communication deficits throughout development.

Clinical Implications

Recognition of an associative spatial memory deficits among individuals with Asperger syndrome will have clinical implication for the assessment and remediation programmes offered to these individuals. If, as suggested by the findings of the current study, associative spatial memory deficits cannot be accounted for by delays in general intellectual and executive functions, than distinct assessment of the deficit may serve as a potential indicator of Asperger syndrome in the diagnostic process. In the past, assessment of memory deficits among children with autism have not been utilised as part of diagnosis; partly because studies have tended to show that these children are not deficient in cued recall compared with amnesic patients (Boucher and Lewis, 1989). This also applies to children with Asperger
syndrome who show normal cued recall, even though they fail to use semantic information to aid recall (Bowler, Matthews, and Gardiner, 1997).

However, the current results suggest that neuropsychological assessment of memory among patients with AS should not simply focus on recall of explicit spatial and verbal memory. Assessment should also incorporate measures of memory that permit evaluation of the individuals' ability to associate aspects of spatial and visual representation, especially if the association is implicit in nature. In other words, assessing associative spatial memory may help in the clinical assessment process that has been clouded thus far by a range of ('non-verbal') tests that are traditional but nevertheless neuropsychologically vague. A potentially more specific and purer task that has some neuropsychological and neuroanatomical validity may help to specify distinct memory deficits that underlie the social communication difficulties expressed as symptoms of Asperger syndrome.

Remediation programs for children with Asperger syndrome have also tended to have limited focus on memory strategies. In general, parents and clinicians comment of the extensive and accurate recall of long-term and relatively detailed information these children display (Cesaroni and Garber, 1991). At the same time, difficulties with more immediate working memory have tended to be attributed to poor executive functions of the prefrontal cortex (McCarthy, Puce, Constable, Krystal, Gore, and Goldman-Rakic, 1996). Yet the current findings suggest that there are select spatial memory impairments consistent with deficits in the medial temporal lobe memory system. Parents and clinicians may therefore need to begin considering how they might adapt behavioural and modelling strategies to draw out the implicit aspects of spatial representation in order to increase the child's efficiency at recalling and/or reforming memory associations in social interactions. The rationale behind such an approach is that by treating the basic deficit, other social communication skills might have an opportunity to develop in line with other children without Asperger syndrome.

**Future Directions**

The results of this study generate questions for future research.

A direct comparison between individuals with Asperger syndrome and patients with known unilateral hippocampal damage would be important. Such an investigation would permit a
contrast of allocentric spatial coding and associative memory functions related to the integrity of the hippocampal system.

Other methods for investigating associative memory deficits would be useful to consider. Associative memory as measured by the Nine-Box Maze Test focuses on one's capacity to associate information within a spatial representation. It would be useful to extend these findings by investigating whether or not individuals with Asperger syndrome have distinct associative memory deficits across other modes of information processing. In particular, binding together sources of available verbal information may bear direct relevance to the pragmatic language difficulties observed among individuals with Asperger syndrome (DeLong, 1992; Ellis and Gunter, 1999) and right hemisphere damage (Siegal, Carrington, and Radel, 1996). Commonly observed phenomena among both these populations is their ability to retain various aspects of what has been said, but an inability to draw inferences from this information when asked questions that do not explicitly highlight relevant verbal information (Surian and Siegal, 2001). It is possible that these language deficits can be reconciled with a deficit of multidimensional associative memory for sensory stimuli.

Further investigation of allocentric spatial memory deficits among individuals with Asperger syndrome may also want to be considered, even though no such deficits were identified in the current study. It is possible the measures of spatial functioning employed in this study did not sufficiently access allocentric spatial processing. For example, the Nine-Box Maze Test could (at least theoretically) be performed by the participant forming an image of the spatial array and then mentally rotating that image at the point of recall in order that they could utilise a learned response coding strategy. In the same vein, participants asked to recall object location on the Spatial Place Coding task could mentally adjust their body position in relation to the cardboard sheet and recall location using a learned response. To compensate for these taxing, yet theoretically feasible egocentric strategies, both the Nine-Box Maze task and Spatial Place Coding task could incorporate a location coding trial in which neither the person or the coding space were repositioned before asking for object location to be recalled. This adaptation to the current measures would provide data on the impact of changing perspective, which is assumed to evoke allocentric processing of distal cues.
More complex forms of allocentric spatial processing should also be investigated. An implicit assumption in the current research has been that allocentric spatial processing is an all-or-nothing ability; that once the qualitative development of this ability emerged it was absolute. However, development of spatial thought extends beyond simply representing information in a cognitive map, and includes how one thinks about and acts upon spatial location information. In other words, successful spatial navigation does not begin and end with allocentric spatial representations. Individuals still develop the capacity to manipulate spatial thought, which may be symbolic or imagined, and which will enable spatial perspective taking (see Newcombe and Huttenlocher, 2000 for detailed review). These areas of more complex allocentric spatial development warrant further investigation.

Finally, the collaboration in paediatric neuropsychology between the neurosciences and developmental psychology should be recognised as a useful line of investigation to guide the continued mapping of neural systems implicated in deficits of Asperger syndrome. In particular, the use of advanced neuroimaging techniques to compare neural activation of brain regions implicated in the development and maintenance of associative memory functions, such as the hippocampus and anatomically related structures of the medial temporal lobe memory system (entorhinal, perirhinal, and parahippocampal cortex) (Squire and Zola-Morgan, 1991), could help narrow down specific limbic system structures that play a pivotal role in the phenotypical behaviours that define Asperger syndrome.
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Appendix A: Power Calculations


Effect size $d = 0.8$ Based on the convention that $d=0.8$ represents a large effect size for between group comparison design and t-tests (Cohen, 1988).

Any significant group differences found using a large effect size in relation to the population under investigation is likely to be more clinically relevant than a statistical significance found using a small effect size (Clark-Carter, 2003).

Alpha 0.05
Power 0.8
Groups 2

Total sample required = 42
Appendix B: Ethics Approval Letter and Research and Development Correspondence

Wandsworth Local Research Ethics Committee

Our Ref: CH/DL/03.0266

05 December 2003

Mr Mark Pertini
Trainee Clinical Psychologist
Dept of Psychology
University of Surrey
Guildford
GU2 7XH

Dear Mr Pertini

Re: Spatial Representation Skills among Individuals diagnosed with Asperger Syndrome

The Wandsworth Local Research Ethics Committee considered the above study at its recent meeting. We are happy to give conditional approval for this project to proceed subject to the following points being addressed:

1. The Committee felt that the Patient Information Sheet should contain more detail about the purpose of the study. The expression "specific spatial reasoning difficulties" should be explained in the Patient Information Sheet.

2. The Patient Information Sheet for control subjects should explain more clearly that the control groups are normal.

3. The information sheets should explain that the research is being undertaken as a part of a Doctor of Philosophy Degree.

4. Child friendly information sheets for older children (both controls and patients with Asperger Syndrome) should be produced.

5. The Committee sought further clarification of the study statistics and wondered whether the advise of a statistician had been obtained.

6. The Committee felt that the questions in the questionnaire should be strictly relevant. eg. 1A should be amended as all participants are male. If the upper age limit is 16, it may not be relevant to enquire about A-Levels (Question A5).

7. The reluctance on the part of the child to participate in the study overrides parental consent.

We look forward to hearing from you.

Yours sincerely

Dr Christine Heron
Vice-Chair and Clinical Secretary/Wandsworth Local Research Ethics Committee

An advisory committee to South West London Strategic Health Authority
Mr Mark Pertini
Trainee Clinical Psychologist
Dept of Psychology
University of Surrey
Guildford
Gu2 7XH

Dear Mr. Pertini

Re: Spatial Representation Skills among Individuals diagnosed with Asperger Syndrome

Thank you for your letter dated 12th December 2003 concerning the above study. Your letter and accompanying revised documentation have satisfactorily addressed the points raised by the Committee and we are happy to give final approval for this project to proceed.

Yours sincerely

Dr Christine Heron
Vice Chair/Clinical Secretary - Wandsworth Local Research Ethics Committee

An advisory committee to South West London Strategic Health Authority
Terms and conditions of Approval

South West London and St. George’s NHS
Mental Health NHS Trust

Research and Development

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Acting R&D Co-ordinator: Ms Barbra O'Keefe
Email: bokeefe@sghins.ac.uk

Wednesday 26th November, 2003

Dear Mark,

Research Title: Spatial reasoning skills among individuals diagnosed with asperger syndrome

Project ID: PF172

Following various discussions your project has now been approved. This letter ensures that you and the researchers holding a Trust/NHS contract are indemnified by the Trust under DoH (HSG (96) 48) (only for non-commercial research). Under your contract of employment you are required to adhere to the Research Governance Framework and Trust research-monitoring procedures.

In addition to ensuring that the dignity, safety and well being of participants are given priority at all times by the research team you need to ensure the following:

- **Patient contact**: Only trained or supervised researchers holding a Trust/NHS contract (honorary or full) are allowed to make contact with patients.

- **Informed consent**: is obtained by the lead or trained researcher according to the requirements of the ethics committee. The original signed consent form should be kept on file. Informed consent will be monitored by the Trust at intervals and you will be required to provide relevant information.

- **Data Protection**: All data involving patient data will remain anonymised, where possible, and held on protected systems so as not to compromise the Data Protection Act.

- **Adverse events reporting**: Adverse events or suspected misconduct must be reported to the R & D department, in conjunction with the ethics committee.
Terms and conditions of Approval

• Annual review: An annual review form will be sent to you, which you will be required to complete and return to the R & D Department.

• Closure Form: On completion of your project a closure form will be sent to you (according to the end date specified on the R & D database), which needs to be returned to the R & D Department.

• Publications: Any publications will need to be reported to the R & D Department. This is vital in ensuring the quality and output of the research for your project and the Trust as a whole.

The R & D Department needs to be informed of any changes to the protocol such as patient recruitment, funding, etc. If any major changes are made to the protocol then this would need to go to the R & D Committee.

If you have any queries regarding the above points please contact Barbra O’Keefe, Acting R & D Co-ordinator on 020 8725 3463 (St. George’s) bokerfe@sghrs.ac.uk

Yours sincerely,

Dr. Mohammed Abou-Saleh
Chairman
Research & Development Committee
11 February 2004

Mr M Pertini
Trainee Clinical Psychologist
Department of Psychology
School of Human Sciences

Dear Mr Pertini

**Spatial representation skills among individuals diagnosed with Asperger Syndrome (EC/2004/17/Psych) - FAST TRACK**

I am writing to inform you that the University Ethics Committee has considered the above protocol under its 'Fast Track' procedure, and has approved it on the understanding that the Ethical Guidelines for Teaching and Research are observed. For your information, and future reference, these Guidelines can be downloaded from the Committee's website at http://www.surrey.ac.uk/Surrey/ACE/.

This letter of approval relates only to the study specified in your research protocol (EC/2004/17/Psych) - Fast Track. The Committee should be notified of any changes to the proposal, any adverse reactions and if the study is terminated earlier than expected, with reasons.

Date of approval by the Ethics Committee: 11 February 2004
Date of expiry of approval by the Ethics Committee: 10 February 2009

Please inform me when the research has been completed.

Yours sincerely

Catherine Ashbee (Mrs)
Secretary, University Ethics Committee
Registry

cc: Professor T Desombre, Chairman, Ethics Committee
    Dr S Ungar, Supervisor, Dept of Psychology
Appendix C: Record Forms for Assessment Measures Employed in the Study

DEMOGRAPHIC QUESTIONNAIRE

Participant Identification Number _____

BACKGROUND INFORMATION

A1. How old are you? [ ] years / DoB:

A2. What year are you in at school (younger participants)?
What Exams have you taken (older participants)?
(tick the appropriate answer)

GCSE(s)/O-levels/CSE(S)
Year 9
Year 8
Year 7
Year 6
Year 5
Year 4
Year 3
Year 2
Year 1
Other

A3. How would you describe your ethnic origins?
Choose one section from (a) to (e) and then circle the appropriate category to indicate your ethnic background (If you descend from more than one ethnic group to which group do you consider best describes you).

(a) White
   British
   Irish
   Any other white background, please write in below

(b) Mixed
   White and Black Carribbean
   White and Black African
   White and Asian
   Any other mixed background, please write in below

(c) Asian or Asian British
   Indian
   Pakistani
   Bangladeshi
   Any other Asian background, please write in below
(d) **Black or Black British**
Caribbean
African
Any other Black background, please write in below

(e) **Chinese of Other ethnic group**
Chinese
Any other, please write in below

(f) **Other**
# THE HANDEDNESS INVENTORY
(Briggs and Nebes, 1975)

<table>
<thead>
<tr>
<th>Name</th>
<th>Sex</th>
<th>Age</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Indicate Hand Preference</th>
<th>Always Left</th>
<th>Usually Left</th>
<th>No Preference</th>
<th>Usually Right</th>
<th>Always Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To write a letter legibly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. To throw a ball to hit a target</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. To play a game requiring the use of a racquet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. At the top of a broom to sweep dust from the floor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. At the top of a shovel to move sand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. To hold a match when you strike it</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. To hold scissors to cut paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. To hold a thread to guide through the eye of a needle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. To deal playing cards</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. To hammer a nail into wood</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. To hold a toothbrush while cleaning teeth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. To unscrew the lid of a jar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Are either of your parents left handed? If yes, which? __________
Are any of your siblings left handed? If yes, how many? Male _______ Female _______
Which eye do you use when using only one (e.g. telescope, keyhole)? _______

## Scoring Criteria
Five point scale measuring laterality: two points for 'always', one point for 'usually', and none for 'non preference'. Scoring left preferences as negative and right preferences as positive gives a range of -24 for most left-handed to +24 for most right-handed. Score of +9 and above right-handed, +8 to -8 mixed handed, and -9 to -24 as left-handed.
OBJECT FAMILIARISATION

"I'm going to show you some things that I want you to remember."
(10sec presentation).

"What is it?" / "Would you play with it?"

(One minute delay before recall filled with Handedness questionnaire).

"What things did I show you before?"

<table>
<thead>
<tr>
<th>ITEM</th>
<th>RECALL ORDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>car</td>
<td></td>
</tr>
<tr>
<td>spoon</td>
<td></td>
</tr>
<tr>
<td>apple</td>
<td></td>
</tr>
<tr>
<td>lollipop</td>
<td></td>
</tr>
<tr>
<td>ball</td>
<td></td>
</tr>
<tr>
<td>book</td>
<td></td>
</tr>
<tr>
<td>texta</td>
<td></td>
</tr>
<tr>
<td>toothbrush</td>
<td></td>
</tr>
<tr>
<td>teddy</td>
<td></td>
</tr>
<tr>
<td>cup</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL RECALLED**

247
FIVE BOX TRIAL

<table>
<thead>
<tr>
<th>PRESENTATION</th>
<th>RECALL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seat</td>
<td>Object</td>
</tr>
<tr>
<td>1 → 3</td>
<td>Spoon</td>
</tr>
<tr>
<td></td>
<td>Ball</td>
</tr>
<tr>
<td>3 → 2</td>
<td>Texta</td>
</tr>
<tr>
<td></td>
<td>Book</td>
</tr>
<tr>
<td>2 → 4</td>
<td>Spoon</td>
</tr>
<tr>
<td></td>
<td>Apple</td>
</tr>
<tr>
<td></td>
<td>Total</td>
</tr>
</tbody>
</table>

1. “I am going to put two things into two separate bins, then get you to change seats and tell me which things and which bins were used.”
2. Place items in appropriate bins, secure lids, and reseat participant
3. “Which things were hidden?” (Well done)
4. “Which of the objects in this picture is the other hidden object(s)?”
5. “Point to the bins with things in them?” (Well done)
6. “Which things were hidden in which bins?” (Well done – immediate feedback and move on to next association)
### NINE BOX TRIAL

<table>
<thead>
<tr>
<th>PRESENTATION</th>
<th>RECALL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seat</td>
<td>Object</td>
</tr>
<tr>
<td>1 → 2</td>
<td>Cup*</td>
</tr>
<tr>
<td>Teddy</td>
<td>3*</td>
</tr>
<tr>
<td>Car*</td>
<td>8*</td>
</tr>
<tr>
<td>Toothbrush</td>
<td>7</td>
</tr>
<tr>
<td>2 → 4</td>
<td>Cup*</td>
</tr>
<tr>
<td>Spoon</td>
<td>8*</td>
</tr>
<tr>
<td>Car*</td>
<td>4</td>
</tr>
<tr>
<td>Ball</td>
<td>3*</td>
</tr>
<tr>
<td>4 → 3</td>
<td>Apple</td>
</tr>
<tr>
<td>Cup*</td>
<td>8*</td>
</tr>
<tr>
<td>Toothbrush</td>
<td>6</td>
</tr>
<tr>
<td>Car*</td>
<td>3*</td>
</tr>
<tr>
<td>3 → 4</td>
<td>Book</td>
</tr>
<tr>
<td>Car*</td>
<td>9</td>
</tr>
<tr>
<td>Cup*</td>
<td>8*</td>
</tr>
<tr>
<td>Spoon</td>
<td>3*</td>
</tr>
</tbody>
</table>

1. “I am going to put two things into two separate bins, then get you to change seats and tell me which things and which bins were used.”
2. Place items in appropriate bins, secure lids, and reseat participant
3. “Which things were hidden?” (Well done)
4. “Which of the objects in this picture is the other hidden object(s)?”
5. “Point to the bins with things in them?” (Well done)
6. “Which things were hidden in which bins?” (Well done – immediate feedback and move on to next association)
STRATEGY

“What did you do to help you remember what things were hidden and where they were hidden?”

1. No strategy
2. watching carefully
3. object based
4. location based
5. both object and location based
SPATIAL REASONING TEST FORM

SPATIAL RESPONSE LEARNING TASK
"On this test (game) I will place the object on this cardboard sheet. I want you to look carefully where the object is on the cardboard before I take it away. I then want you to slowly turn around in your chair and put the object back on the cardboard in the same place that you just saw it."

<table>
<thead>
<tr>
<th>Trial</th>
<th>(Position of object/relocation of cardboard)</th>
<th>Distance in mm/Direction from original position</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>(Pos2/R)</td>
<td>T9 (Pos4/R)</td>
</tr>
<tr>
<td>T2</td>
<td>(Pos7/L)</td>
<td>T10 (Pos7/R)</td>
</tr>
<tr>
<td>T3</td>
<td>(Pos4/L)</td>
<td>T11 (Pos2/L)</td>
</tr>
<tr>
<td>T4</td>
<td>(Pos8/R)</td>
<td>T12 (Pos5/L)</td>
</tr>
<tr>
<td>T5</td>
<td>(Pos1/L)</td>
<td>T13 (Pos3/L)</td>
</tr>
<tr>
<td>T6</td>
<td>(Pos5/R)</td>
<td>T14 (Pos6/R)</td>
</tr>
<tr>
<td>T7</td>
<td>(Pos3/R)</td>
<td>T15 (Pos8/L)</td>
</tr>
<tr>
<td>T8</td>
<td>(Pos6/L)</td>
<td>T16 (Pos1/R)</td>
</tr>
</tbody>
</table>

SPATIAL RESPONSE LEARNING TASK
"On this test (game) I want you to take this object in your hand and hold it at your side. I then want you to close your eyes (or your mum/dad to cover your eyes) and I am going to guide your hand to where I want you to put the object on the cardboard sheet. When I let go, I want you to take the object back down by your side, count to three, and put it back down in exactly the same position on the cardboard.

| T1     | (Pos2)                                       |
| T2     | (Pos7)                                       |
| T3     | (Pos4)                                       |
| T4     | (Pos8)                                       |
| T5     | (Pos1)                                       |
| T6     | (Pos5)                                       |
| T7     | (Pos3)                                       |
| T8     | (Pos6)                                       |
Appendix D: Letters of Invitation - Asperger Group

1st February 2004

Dear Parent(s)

INVITATION TO PARTICIPATE IN A CLINICAL RESEARCH STUDY

Title of Project
Investigating Spatial Reasoning Skills among Individuals Diagnosed with Asperger Syndrome.

Name of Researcher
Mark Pertini

As you know your child has been seen by Child and Adolescent Mental Health Service within the South West London and St George’s NHS Trust. As part of our continuing effort to improve the service provided, we are carrying out a study to investigate whether children diagnosed with Asperger syndrome have specific difficulties processing information about their spatial relationships to other objects, compared with children who do not display features of Asperger syndrome. I would like to ask if you would be willing to give permission for your child to take part in this study, to help us do this.

I have enclosed an information sheet, which explains the study in more detail, and a consent form for you to sign if you are happy for your child to take part. I would be grateful if you could return the signed consent form in the envelope provided if you agree.

If you have any further questions about the study, do not hesitate to contact me on (telephone number) or by email on markpertini@yahoo.com.

Yours sincerely

Mark Pertini
Trainee Clinical Psychologist
1st February 2004

Dear Parent(s)

INVITATION TO PARTICIPATE IN A CLINICAL RESEARCH STUDY

Title of Project
Investigating Spatial Reasoning Skills among Individuals Diagnosed with Asperger Syndrome.

Name of Researcher
Mark Pertini

I am currently carrying out a study to investigate whether children diagnosed with Asperger syndrome have specific difficulties processing spatial information compared with healthy children who do not display features of Asperger syndrome. I would like to ask if you would be willing to give permission for your child to take part in this study as part of the comparison group of healthy children without Asperger syndrome.

I have enclosed an information sheet, which explains the study in more detail, and a consent form for you to sign if you are happy for your son to take part in this study. If you agree to give permission for your son to take part in the study I would be grateful if you could return the signed consent form in the envelope provided. Your son can return the envelope to his home room teacher.

If you have any further questions about the study, do not hesitate to contact me on (telephone number) or by email on markpertini@yahoo.com.

Yours sincerely

Mark Pertini
Trainee Clinical Psychologist
INFORMATION SHEET FOR PARENTS

Your son has been invited to take part in a research study. Before you decide to give permission for your child to participate, it is important that you understand why the research is being done and what it will involve. Please take time to read this information sheet carefully and discuss it with others if you wish. Do not hesitate to ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part before returning the consent form.

Title of Research Study
Investigating Spatial Reasoning Skills among Individuals Diagnosed with Asperger Syndrome.

Purpose of the study
Recent research has suggested a link between the social communication difficulties displayed by individuals with Asperger syndrome and spatial working memory. It is thought that spatial working memory plays a crucial role in social interactions insofar that it enables a person to track ongoing changes in the environment relative to their own movement, as well as changes in the environment that occur independently of their own body. The aim of the present study is to investigate whether children with Asperger syndrome have specific difficulties with spatial working memory tasks compared with healthy children without Asperger syndrome.

What the study involves
The study involves a one-hour session with the research investigator (Mark Pertini). As part of this session, your child would undertake three forms of assessment:

(1) They would be administered a standard assessment of general intelligence.

(2) They would undertake a spatial coding task in which they are asked to observe the location of a target object and recall the objects location subsequent to its removal from their visual field.

(3) They would be asked to observe the location of various objects placed within one of several identical containers around a table and asked to locate the various objects after they have moved their body position.

The session will take place at your local Child and Adolescent Mental Health Service at a time that is convenient for you and your child.

Why has my child been chosen?
Your child has attended Child and Adolescent Mental Health Services in the South West London and St George’s NHS Trust and has been given a diagnosis of Asperger syndrome. Children with this diagnosis who are currently or who in the past have been involved with South West London and St George’s NHS Trust are being asked to take part.
**Possible benefits of taking part**
The study aims to highlight whether poor spatial memory skills is a distinct clinical feature of Asperger Syndrome, and whether it can account for some of the social communication difficulties experienced by individuals with Asperger Syndrome. The information you provide would be used to gain a better understanding of the core features used in diagnosing and treating children with Asperger syndrome.

**Consent and Confidentiality**
It is up to you to decide whether or not to take part in this study. If you decide to take part you would be given this information sheet to keep and asked to sign a consent form. If you decide to let your child take part in the study, either you or your child is still free to withdraw at any time and without giving any reason. This would not affect the standard of care your child receives.

All information that is collected about your child during the course of the research will be kept strictly confidential. Any information about your child which leaves the clinic will have their name and address removed so that they can not be recognised from it. You will be asked if it is acceptable for the researcher to notify your child’s GP that they are taking part in the research.

**What if something goes wrong?**
It is highly unlikely that the methods being used in this study will have any harmful effects. There are no known risks to your child from taking part in this study and the procedures being used have been designed to be child friendly. All attempts will be made to put your child at their ease in order to make the situation as comfortable as possible.

In the unlikely event that your child was to be harmed by taking part in this research project, there are no special compensation arrangements. If they were harmed due to someone’s negligence, then you may have grounds for legal action but you may have to pay for it. Regardless of this, if you wish to complain, or have concerns about any aspect of the way you have been approached or treated during the course of this study, the normal National Health Service complaints mechanisms should be available to you.

**What will happen to the results of the research study?**
The results of the study will be written up and submitted as a Major Research Project as part of a Doctorate in Clinical Psychology. The results may also be submitted for publication in peer-reviewed journals. You or your child will not be identified in any report or publication. If you should wish, you will be sent a brief summary of the findings at the end of the study (August 2004).

**Who is organising and funding the research?**
The research is being organised and carried out by Mr. Mark Pertini as part of a Doctor of Psychology degree being undertaken at the University of Surrey. The research is being supervised by Mr. Avron Moss (Consultant Paediatric Neuropsychologist at St George’s Hospital and Head of Clinical Psychology for the Sutton CAMHS) and Dr. Simon Ungar (Research Tutor at the University of Surrey).
Who has reviewed the study?
This study has been reviewed and approved by the Wandsworth Local Research Ethics Committee and by the University of Surrey’s Advisory Committee on Ethics.

What should I tell my child?
You may wish to discuss the research with your child and whether they would like to take part. It is important that you let your child know that they do not have to take part and if they do, they may change their mind at anytime. It is also useful that they know that if they do not take part their will be no consequences for them or their family. Any reluctance on behalf of your child to participate in the study should be taken seriously and they should not be pressured into taking part in the study.

You may wish to explain what is involved with this study, although the procedures will be discussed with the child when he meets with the researcher.

Further Information
For further information about the study, please contact: Mark Pertini, Trainee Clinical Psychologist via. Department of Paediatric Psychology, St George’s Hospital or e-mail markpertini@yahoo.com

This copy of the Information Sheet is yours to keep. If you agree to take part, then you will be asked to sign a Consent Form, and you will be given a copy of that form.

Thank you for considering taking part in this study.

Yours sincerely

Mark Pertini
Trainee Clinical Psychologist
INFORMATION SHEET FOR PARTICIPANTS IN THE STUDY

I am inviting you to take part in a research project. Before you decide to take part in
this project it is important that you understand why it is being done and what it will
involve. Please take time to read this information sheet carefully and discuss it with
your family and friends. Do not hesitate to ask us if there is anything that is not clear or
if you would like more information. Take time to decide if you want to take part before
returning the consent form.

Title of Research Study
Investigating Spatial Reasoning Skills among Individuals Diagnosed with Asperger
Syndrome.

Purpose of the study
Research suggests that some of the difficulties displayed by individuals with Asperger
syndrome could be due to their working memory. It is thought that working memory
plays a crucial role in social situations because it helps a person keep up with the changes
in the environment while they move around and changes in the environment that occur
while they are standing still. The aim of my project is to investigate whether children
with Asperger syndrome have specific difficulties with spatial working memory tasks
compared with healthy children without Asperger syndrome.

What the study involves
The study involves a one-hour session with the research investigator (Mark Pertini). As
part of this session you will perform three tasks:

(1) You will be administered a standard assessment of general intelligence.

(2) You will undertake a spatial coding task in which you are asked to observe the
location
of a certain object and recall the location of the object after it has been moved out of
sight.

(3) You will be asked to observe the location of various objects placed in one of
several identical containers around a table and asked to locate the various objects
after you have moved around.

Why have you been chosen?
All children who have been diagnosed with Asperger syndrome and who go to the
local CAMHS (either now or in the past) are being asked to take part in the project.

Possible benefits of taking part
The study aims to highlight whether poor spatial memory skills is a distinct feature of
Asperger syndrome, and whether it can account for some of the difficulties you may
experience in social situations. The information you provide will be used to gain a better
understanding of the core features used in diagnosing and treating children with Asperger
syndrome.

Consent and Confidentiality
It is up to you to decide whether or not to take part in this study. If you decide to take part
you would be given this information sheet to keep and asked to sign a consent form. If
you decide to take part in the project now, you are still free to withdraw at any time and
without giving any reason.
All information that is collected about you during the project will be kept strictly confidential. Other people will not be able to tell you have taken part in the project and all details will be kept private.

What if something goes wrong?
There are no known risks in taking part in this study and the procedures being used have been designed to be child friendly. All attempts will be made to make you as comfortable as possible in the time it takes to do the various tasks.

What will happen to the results of the research project?
The results will be written up as a research project and may also be submitted for publication in a research journal. You will not be identified in any report or publication. If you should wish, I will send a brief summary of the findings at the end of the project (August 2004).

Who is organising and funding the research?
The research is being carried out by Mark Pertini as part of a Doctor of Psychology degree being undertaken at the University of Surrey. The research is being supervised by Mr. Avron Moss (Consultant Paediatric Neuropsychologist at St George’s Hospital and Head of Clinical Psychology for the Sutton CAMHS) and Dr. Simon Ungar (Research Tutor at the University of Surrey).

Who has reviewed the study?
This study has been approved by the Wandsworth Local Research Ethics Committee and by the University of Surrey’s Advisory Committee on Ethics.

Who to ask questions to?
You may wish to talk to someone in helping decide if you should take part in the project. Your parents may already have information about the project, but if they haven’t there are information sheets available for them at your request.

Also, if you want more information about the project you can contact me, Mark Pertini, at the Department of Paediatric Psychology, St George’s Hospital or on e-mail markpertini@yahoo.com

This copy of the Information Sheet is yours to keep. If you agree to take part, then you will be asked to sign a Consent Form, and you will be given a copy of that form.

Thank you for considering taking part in this study.

Yours sincerely

Mark Pertini
Trainee Clinical Psychologist
INFORMATION SHEET FOR PARENTS

Your son has been invited to take part in a research study. Before you decide to give permission for your child to participate, it is important that you understand why the research is being done and what it will involve. Please take time to read this information sheet carefully and discuss it with others if you wish. Do not hesitate to ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part before returning the consent form.

Title of Research Study
Investigating Spatial Reasoning Skills among Individuals Diagnosed with Asperger Syndrome.

Purpose of the study
Recent research has suggested a link between the social communication difficulties displayed by individuals with Asperger syndrome and spatial working memory. It is thought that spatial working memory plays a crucial role in social interactions insofar that it enables a person to track ongoing changes in the environment relative to their own movement, as well as changes in the environment that occur independently of their own body. The aim of the present study is to investigate whether children with Asperger syndrome have specific difficulties with spatial working memory tasks compared with healthy children without Asperger syndrome.

What the study involves
The study involves a one-hour session with the research investigator (Mark Pertini). As part of this session, your child would undertake three forms of assessment:

(1) They would be administered a standard assessment of general intelligence.

(2) They would undertake a spatial coding task in which they are asked to observe the location of a target object and recall the object’s location subsequent to its removal from their visual field.

(3) They would be asked to observe the location of various objects placed within one of several identical containers around a table and asked to locate the various objects after they have moved their body position.

The session will take place at your son’s school at a time that is convenient for the school, you, and your child.

Why has my child been chosen?
Your child has been selected to participate in this research as part of the comparison group of healthy normal children who do not have Asperger syndrome. All parents of boys currently in Years (X) and (X) at (Name) Primary School are being asked to give consent for their son to participate in the research as part of this healthy comparison group.
**Possible benefits of taking part**

The study aims to highlight whether poor spatial memory skills is a distinct clinical feature of Asperger Syndrome, and whether it can account for some of the social communication difficulties experienced by individuals with Asperger Syndrome. The information you provide would be used to gain a better understanding of the core features used in diagnosing and treating children with Asperger syndrome.

**Consent and Confidentiality**

It is up to you to decide whether or not to take part in this study. If you decide to take part you would be given this information sheet to keep and asked to sign a consent form. If you decide to let your child take part in the study, either you or your child is still free to withdraw at any time and without giving any reason. This would not affect the standard of care or education that your child receives.

All information that is collected about your child during the course of the research will be kept strictly confidential. Any information about your child which leaves the clinic will have their name and address removed so that they can not be recognised from it. You will be asked if it is acceptable for the researcher to notify your child’s GP that they are taking part in the research.

**What if something goes wrong?**

It is highly unlikely that the methods being used in this study will have any harmful effects. There are no known risks to your child from taking part in this study and the procedures being used have been designed to be child friendly. All attempts will be made to put your child at their ease in order to make the situation as comfortable as possible.

In the unlikely event that your child was to be harmed by taking part in this research project, there are no special compensation arrangements. If they were harmed due to someone’s negligence, then you may have grounds for legal action but you may have to pay for it. Regardless of this, if you wish to complain, or have concerns about any aspect of the way you have been approached or treated during the course of this study, the normal National Health Service complaints mechanisms should be available to you.

**What will happen to the results of the research study?**

The results of the study will be written up and submitted as a Major Research Project as part of a Doctorate in Clinical Psychology. The results may also be submitted for publication in peer-reviewed journals. You or your child will not be identified in any report or publication. If you should wish, you will be sent a brief summary of the findings at the end of the study (August 2004).

**Who is organising and funding the research?**

The research is being organised and carried out by Mr. Mark Pertini as part of a Doctor of Psychology degree being undertaken at the University of Surrey. The research is being supervised by Mr. Avron Moss (Consultant Paediatric Neuropsychologist at St George’s Hospital and Head of Clinical Psychology for the Sutton CAMHS) and Dr. Simon Ungar (Research Tutor at the University of Surrey).
Who has reviewed the study?
This study has been reviewed and approved by the Wandsworth Local Research Ethics Committee and by the University of Surrey’s Advisory Committee on Ethics.

What should I tell my child?
You may wish to discuss the research with your child and whether they would like to take part. It is important that you let your child know that they do not have to take part and if they do, they may change their mind at anytime. It is also useful that they know that if they do not take part their will be no consequences for them or their family. Any reluctance on behalf of your child to participate in the study should be taken seriously and they should not be pressured into taking part in the study.

You may wish to explain what is involved with this study, although the procedures will be discussed with the child when he meets with the researcher.

Further Information
For further information about the study, please contact: Mark Pertini, Trainee Clinical Psychologist via. Department of Paediatric Psychology, St George’s Hospital or e-mail markpertini@yahoo.com

This copy of the Information Sheet is yours to keep. If you agree to take part, then you will be asked to sign a Consent Form, and you will be given a copy of that form.

Thank you for considering taking part in this study.

Yours sincerely

Mark Pertini
Trainee Clinical Psychologist
Appendix D: Consent Form - Asperger Group

CONSENT FORM

Title of Project:
Investigating Spatial Reasoning Skills among Individuals Diagnosed with Asperger Syndrome.

This research project has been approved by the South West London Strategic Health Authority, Wandsworth Local Research Ethics Committee (REC No. 03.0266).

Name of Researcher:
Mark Pertini

1. I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions.

2. I understand that my child’s participation in the study is voluntary and that either my child or I can freely withdraw from the study at any time, without giving any reason, and without my child’s medical care or legal rights being affected.

3. I understand that sections of my child’s CAMHS file may be looked at by Mark Pertini where it is relevant for taking part in the research. I give permission for Mark Pertini to have access to my child’s records.

4. I am satisfied with the explanations that I have been given and hereby give consent for my child to take part in the above study.

Please provide your contact details for the purposes of arranging a convenient appointment time (i.e. telephone, email,...).

______________________________  ___________________________  ___________________________
Name of Parent/Guardian        Date                   Signature

______________________________  ___________________________
Researcher or Name of person taking consent (if different from researcher)  Date                   Signature
Appendix D: Consent Form - Control Group

CONSENT FORM

Title of Project:
Investigating Spatial Reasoning Skills among Individuals Diagnosed with Asperger Syndrome.

This research project has been approved by the South West London Strategic Health Authority, Wandsworth Local Research Ethics Committee (REC No. 03.0266).

Name of Researcher:
Mark Pertini

Please initial box

1. I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions. ☐

2. I understand that my child’s participation in the study is voluntary and that either my child or I can freely withdraw from the study at any time, without giving any reason, and without my child’s education or legal rights being affected. ☐

3. I am satisfied with the explanations that I have been given and hereby give consent for my child to take part in the above study. ☐

Please provide your son’s name and your contact details so that you can be informed when the assessments are scheduled to take place (i.e. telephone, email....).

Name of Parent/Guardian ____________________ Date __________ Signature ____________________

Researcher or Name of person taking consent (if different from researcher) ____________________ Date __________ Signature ____________________
Appendix E: Variables with Significant Skewness and Kurtosis

Significant Skewness for Working memory object recall (9BMT)

*Control Group*

<table>
<thead>
<tr>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Working memory object recall</td>
<td>Skewness</td>
</tr>
<tr>
<td></td>
<td>-1.76</td>
</tr>
<tr>
<td></td>
<td>0.54</td>
</tr>
<tr>
<td></td>
<td>-3.29</td>
</tr>
</tbody>
</table>

S = skewness, S<sub>s</sub> = standard error of skewness
K = kurtosis, K<sub>k</sub> = standard error of kurtosis
Z = z score

**Significant skewness or kurtosis = z scores greater than or equal to +/- 3.29.**

Significant Skewness and Kurtosis for Spatial Place Coding for Position 1

*Asperger Syndrome Group*

<table>
<thead>
<tr>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Spatial Place Coding for Position 1</td>
<td>Skewness</td>
</tr>
<tr>
<td></td>
<td>2.16</td>
</tr>
<tr>
<td></td>
<td>0.54</td>
</tr>
<tr>
<td></td>
<td>4.04</td>
</tr>
</tbody>
</table>

S = skewness, S<sub>s</sub> = standard error of skewness
K = kurtosis, K<sub>k</sub> = standard error of kurtosis
Z = z score

**Significant skewness or kurtosis = z scores greater than or equal to +/- 3.29.**
## Appendix F: Effect Size Calculations for Group Differences

### Effect Size Calculations for Significant and Non-significant Differences in Patient Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Asperger Group Mean (SD)</th>
<th>Control Group Mean (SD)</th>
<th>Group Difference t(36) p</th>
<th>Observed Power</th>
<th>Effect Size calculated (d)</th>
<th>Alpha</th>
<th>Power</th>
<th>Total N required to be significant at this effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>10.60 (2.01)</td>
<td>9.11 (1.13)</td>
<td>2.85 0.01</td>
<td>0.56</td>
<td>0.83</td>
<td>0.05</td>
<td>0.8</td>
<td>38</td>
</tr>
<tr>
<td>Full Scale IQ</td>
<td>103.35 (12.73)</td>
<td>106.17 (11.40)</td>
<td>-0.72 0.48</td>
<td>0.04</td>
<td>0.23</td>
<td>0.05</td>
<td>0.8</td>
<td>454</td>
</tr>
<tr>
<td>Verbal IQ</td>
<td>95.50 (13.27)</td>
<td>101.28 (12.26)</td>
<td>-1.39 0.17</td>
<td>0.12</td>
<td>0.45</td>
<td>0.05</td>
<td>0.8</td>
<td>126</td>
</tr>
<tr>
<td>Performance IQ</td>
<td>110.65 (13.04)</td>
<td>110.00 (11.56)</td>
<td>0.16 0.87</td>
<td>0.01</td>
<td>0.05</td>
<td>0.05</td>
<td>0.8</td>
<td>8806</td>
</tr>
</tbody>
</table>

### Effect Size Calculations for Significant and Non-significant Differences in Nine Box Maze Memory Scores

<table>
<thead>
<tr>
<th></th>
<th>Asperger Group Mean (SD)</th>
<th>Control Group Mean (SD)</th>
<th>Group Difference t(36) p</th>
<th>Observed Power</th>
<th>Effect Size calculated (d)</th>
<th>Alpha</th>
<th>Power</th>
<th>Total N required to be significant at this effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Object Familiarisation</td>
<td>6.25 (1.48)</td>
<td>6.61 (1.24)</td>
<td>-0.81 0.42</td>
<td>0.12</td>
<td>0.26</td>
<td>0.05</td>
<td>0.8</td>
<td>358</td>
</tr>
<tr>
<td>Object Recall</td>
<td>14.50 (1.36)</td>
<td>14.94 (1.16)</td>
<td>-1.08 0.29</td>
<td>0.09</td>
<td>0.35</td>
<td>0.05</td>
<td>0.8</td>
<td>206</td>
</tr>
<tr>
<td>Location Recall</td>
<td>13.95 (1.85)</td>
<td>13.89 (1.83)</td>
<td>0.12 0.91</td>
<td>0.02</td>
<td>0.04</td>
<td>0.05</td>
<td>0.8</td>
<td>16262</td>
</tr>
<tr>
<td>Object/location Recall</td>
<td>11.30 (2.06)</td>
<td>12.72 (2.05)</td>
<td>-2.13 0.04</td>
<td>0.36</td>
<td>0.66</td>
<td>0.05</td>
<td>0.8</td>
<td>60</td>
</tr>
</tbody>
</table>
### Effect Size Calculations for Significant and Non-significant Differences in Spatial Place Coding Task (Mean Error Responses Across the Eight True Response Locations).

<table>
<thead>
<tr>
<th>True Response Location</th>
<th>Asperger Group Mean</th>
<th>Control Group Mean</th>
<th>Group Difference t(36) p</th>
<th>Observed Power</th>
<th>Effect Size calculated (d)</th>
<th>Alpha</th>
<th>Power</th>
<th>Total N required to be significant at this effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position 1</td>
<td>21.59</td>
<td>39.72</td>
<td>-1.14 0.26</td>
<td>0.29</td>
<td>0.47</td>
<td>0.05</td>
<td>0.8</td>
<td>114</td>
</tr>
<tr>
<td>Position 2</td>
<td>26.46</td>
<td>10.80</td>
<td>2.73 0.11</td>
<td>0.36</td>
<td>0.54</td>
<td>0.05</td>
<td>0.8</td>
<td>88</td>
</tr>
<tr>
<td>Position 3</td>
<td>-5.30</td>
<td>-2.43</td>
<td>0.06 0.81</td>
<td>0.06</td>
<td>0.08</td>
<td>0.05</td>
<td>0.8</td>
<td>3866</td>
</tr>
<tr>
<td>Position 4</td>
<td>2.45</td>
<td>-22.44</td>
<td>5.39 0.03</td>
<td>0.62</td>
<td>0.73</td>
<td>0.05</td>
<td>0.8</td>
<td>48</td>
</tr>
<tr>
<td>Position 5</td>
<td>9.76</td>
<td>2.56</td>
<td>0.25 0.62</td>
<td>0.08</td>
<td>0.17</td>
<td>0.05</td>
<td>0.8</td>
<td>858</td>
</tr>
<tr>
<td>Position 6</td>
<td>-8.25</td>
<td>0.20</td>
<td>0.47 0.50</td>
<td>0.10</td>
<td>0.23</td>
<td>0.05</td>
<td>0.8</td>
<td>470</td>
</tr>
<tr>
<td>Position 7</td>
<td>-12.92</td>
<td>-19.19</td>
<td>0.37 0.55</td>
<td>0.09</td>
<td>0.21</td>
<td>0.05</td>
<td>0.8</td>
<td>564</td>
</tr>
<tr>
<td>Position 8</td>
<td>-15.04</td>
<td>-47.87</td>
<td>-1.68 0.10</td>
<td>0.69</td>
<td>0.78</td>
<td>0.05</td>
<td>0.8</td>
<td>44</td>
</tr>
</tbody>
</table>

### Effect Size Calculations for Significant and Non-significant Differences in Spatial Response Learning Task (Mean Error Responses Across the Eight True Response Locations).

<table>
<thead>
<tr>
<th>True Response Location</th>
<th>Asperger Group Mean</th>
<th>Control Group Mean</th>
<th>Group Difference t(36) p</th>
<th>Observed Power</th>
<th>Effect Size calculated (d)</th>
<th>Alpha</th>
<th>Power</th>
<th>Total N required to be significant at this effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position 1</td>
<td>15.89</td>
<td>17.50</td>
<td>0.02 0.90</td>
<td>0.05</td>
<td>0.04</td>
<td>0.05</td>
<td>0.8</td>
<td>15458</td>
</tr>
<tr>
<td>Position 2</td>
<td>34.33</td>
<td>4.78</td>
<td>2.63 0.11</td>
<td>0.35</td>
<td>0.53</td>
<td>0.05</td>
<td>0.8</td>
<td>90</td>
</tr>
<tr>
<td>Position 3</td>
<td>29.78</td>
<td>14.39</td>
<td>0.92 0.35</td>
<td>0.15</td>
<td>0.32</td>
<td>0.05</td>
<td>0.8</td>
<td>244</td>
</tr>
<tr>
<td>Position 4</td>
<td>-4.38</td>
<td>14.50</td>
<td>1.19 0.28</td>
<td>0.19</td>
<td>0.36</td>
<td>0.05</td>
<td>0.8</td>
<td>194</td>
</tr>
<tr>
<td>Position 5</td>
<td>41.28</td>
<td>12.33</td>
<td>1.78 0.19</td>
<td>0.25</td>
<td>0.44</td>
<td>0.05</td>
<td>0.8</td>
<td>130</td>
</tr>
<tr>
<td>Position 6</td>
<td>36.67</td>
<td>39.50</td>
<td>0.04 0.84</td>
<td>0.05</td>
<td>0.07</td>
<td>0.05</td>
<td>0.8</td>
<td>5050</td>
</tr>
<tr>
<td>Position 7</td>
<td>14.83</td>
<td>18.94</td>
<td>0.06 0.81</td>
<td>0.06</td>
<td>0.08</td>
<td>0.05</td>
<td>0.8</td>
<td>3866</td>
</tr>
<tr>
<td>Position 8</td>
<td>-0.56</td>
<td>-4.94</td>
<td>0.14 0.72</td>
<td>0.07</td>
<td>0.12</td>
<td>0.05</td>
<td>0.8</td>
<td>1720</td>
</tr>
</tbody>
</table>
Appendix G: Confirmatory Analysis for Between Group and Within Group Differences on Reference and Working Memory Components of the NBMT.

**Between Group Differences**

<table>
<thead>
<tr>
<th></th>
<th>Asperger Group Mean (SD)</th>
<th>Control Group Mean (SD)</th>
<th>Group Differences t(36) ( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nine Box Maze – Reference Memory</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference object recall (max. 8)</td>
<td>7.30 (0.73)</td>
<td>7.44 (0.73)</td>
<td>-0.56</td>
</tr>
<tr>
<td>Reference location recall (max. 8)</td>
<td>6.90 (0.79)</td>
<td>7.28 (0.75)</td>
<td>-1.51</td>
</tr>
<tr>
<td><strong>Nine Box Maze – Working Memory</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working object recall (max. 8) †</td>
<td>7.20 (0.77)</td>
<td>7.50 (0.92)</td>
<td>1.56</td>
</tr>
<tr>
<td>Working location recall (max. 8)</td>
<td>7.05 (1.28)</td>
<td>6.61 (1.20)</td>
<td>1.09</td>
</tr>
</tbody>
</table>

† Between group difference calculated using nonparametric Mann Whitney-U

**Within Group Differences**

<table>
<thead>
<tr>
<th></th>
<th>Reference Memory</th>
<th>Working Memory</th>
<th>Within Group Differences t(17) ( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asperger Group</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Object recall</td>
<td>7.30 (0.73)</td>
<td>7.20 (0.77)</td>
<td>0.70</td>
</tr>
<tr>
<td>Location recall</td>
<td>6.90 (0.79)</td>
<td>7.05 (1.28)</td>
<td>-0.65</td>
</tr>
<tr>
<td><strong>Control Group</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Object recall †</td>
<td>7.44 (0.73)</td>
<td>7.50 (0.92)</td>
<td>-0.18</td>
</tr>
<tr>
<td>Location recall</td>
<td>7.28 (0.75)</td>
<td>6.61 (1.20)</td>
<td>1.76</td>
</tr>
</tbody>
</table>

† Within group difference calculated using Wilcoxon Matched Pair Signed Ranks Test difference
# LOG OF RESEARCH EXPERIENCE

<table>
<thead>
<tr>
<th>Research Skill/Experience</th>
<th>Description of how research skill/experience acquired</th>
<th>Date research skill/experience acquired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduct a literature search</td>
<td>Conducted computerised literature search for the Service Related Research Project topic of ‘Comparing Neuropsychological Reports with other Neurological Reports’ using the BIDS (PsychINFO) and OVID (and Medline) online databases. Used keywords “neuropsychology”, “report writing”. The search obtained 28 related references, of which 10 were directly relevant to the research project being conducted. Conducted computerised literature search for the Qualitative Research Project topic “The influence of first impressions on rapport building: A qualitative investigation into the views of trainee psychologists’ using the BIDS online database (PsychINFO). Used keywords ‘first impressions”, “psychotherapeutic processes”, “patient/counsellor characteristics”. The search obtained 29 related references, of which 3 were directly relevant to the research project being conducted. More key references were derived via the references accompanying the three relevant articles. Conducted several computerised literature search for the Major Research Project topic of ‘Investigating spatial reasoning skills among individuals diagnosed with Asperger syndrome’ using the BIDS (PsychINFO), OVID (and Medline, PsycARTICLE), and Cochrane Library online databases. Used many keywords including “neuropsychology”, “spatial”, “Asperger”, “right cerebral hemisphere”, “hippocampus”, “neuroimaging”. The search obtained 28 related references, of which 10 were directly relevant to the research project being conducted.</td>
<td>12/2001 03/2003 05/2003 – 11/2003</td>
</tr>
<tr>
<td>Critically review the literature</td>
<td>The literature for right cerebral hemisphere functioning, spatial reasoning, and Asperger syndrome was critically reviewed for the Introduction of the major research project.</td>
<td>01/2004</td>
</tr>
<tr>
<td>Formulate a specific research question</td>
<td>A broad research topic was identified for the major research project in consultation with the research supervisor. A review of the current and past literature, along with further discussions with supervisors refined the topic to specific research questions.</td>
<td>06/2003 – 12/2003</td>
</tr>
<tr>
<td>Task</td>
<td>Description</td>
<td>Date</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Write a brief research proposal</td>
<td>A brief research proposal was prepared to do an audit on the length of neuropsychological reports compared with other related disciplines (i.e. neurology). The report was submitted to the university research/clinical tutors whose suggestions to incorporate additional demographic and admission details as variables helped to enrich the original audit questions.</td>
<td>01/2002</td>
</tr>
<tr>
<td>Write a detailed proposal/protocol</td>
<td>A research protocol was written for the major research project and was submitted to the university research/clinical tutors. This protocol was developed further for formal submission for the Research and Development department and Ethics committee at the NHS hospital trust where the project was being conducted.</td>
<td>09/2003</td>
</tr>
<tr>
<td>Obtain appropriate supervision/collaboration for research</td>
<td>Supervision for the service-related research project was obtained from university course team member and staff working in the clinical setting where the research was conducted. Supervision for the major research project was obtained from the university course team. Several members of the team were approached for discussion and development of research ideas. University supervision for the major research project was obtained from liaising outside clinical course team with an academic psychologist and field supervisor with expert knowledge in the area under investigation.</td>
<td>03/2002</td>
</tr>
<tr>
<td>Write a participant information sheet and consent form</td>
<td>As participants in this project were under the age to give independent consent, an information sheet and consent form was developed for parents of participants. However, a participant information sheet was also developed for older children taking part in the research.</td>
<td>10/2003</td>
</tr>
<tr>
<td>Judge ethical issues in research and amend plans accordingly</td>
<td>Service-Related Research Project: Reviewed current criteria of clinical audit and how it differs from research, with reference to the course handbook and Barker, Pistrang &amp; Elliott (1994). Although the project did not require official ethics approval, consideration was given to how a review of clinical practices may impact on clinicians themselves. Steps to ensure clinician’s identities remained anonymous were taken. (Barker, C., Pistrang, N., &amp; Elliott, E. (1994). Research Methods in Clinical and Counselling Psychology. New York: John Wiley &amp; Son) Major Research Project: A broad scope of ethical issues was considered as part of obtaining ethics approval for the project. Minor adjustments were made to the participant information sheets following feedback for the hospital trust ethics committee.</td>
<td>03/2002</td>
</tr>
<tr>
<td><strong>Obtain approval from a research ethics committee</strong></td>
<td>Service-Related Research Project: Audit proposal was submitted to the Local Research and Ethics Committee to request formal approval of the project as an audit. This approval was granted and received in writing on the 12th April, 2002. Consequently, research ethics approval was not required. Major Research Project: Ethics approval was obtained from the hospital trust ethics committee and the university ethics committee.</td>
<td>04/2002</td>
</tr>
<tr>
<td><strong>Collect data from research participants</strong></td>
<td>Data was collected from research participants for the major research project using hospital and CAMHS outpatient population (clinical research group) and from local mainstream schools (control group).</td>
<td>02/2004 – 06/2004</td>
</tr>
<tr>
<td><strong>Set up a data file</strong></td>
<td>A data file was set up for the service-related research project and major research project using SPSS (Version 11) software package.</td>
<td>05/2002 04/2002</td>
</tr>
<tr>
<td><strong>Analyse quantitative data</strong></td>
<td>Service-Related Research Project: A two/three-factor mixed factorial ANOVA was planned but was deemed inappropriate on the grounds that the assumptions of normal distribution and covariance for the primary variables were violated. Small sample size excluded possibility of transformations and the decision was made to employ non-parametric test for analysis. Wilcoxon signed rank test was used for variables with matched pairs (i.e. within-measure factors); Kruskal-Wallis ANOVA and Mann-Whitney U Tests was used for evaluating differences for between-measure (categorical) factors; Spearman rank-order correlations was used for evaluating the association between between-measure (continuous) factors. Major Research Project: ANOVA was planned to compare experimental and control group on the spatial reasoning tasks. Assumptions for parametric statistical analysis were satisfied.</td>
<td>07/2002 05/2004</td>
</tr>
<tr>
<td><strong>Analyse qualitative data</strong></td>
<td>Qualitative data for the qualitative research project was obtained through interviewing trainee clinical/counselling psychologists. Data was analysed as part of group project using an Interpretive Phenomenological Analysis approach.</td>
<td>05/2003</td>
</tr>
<tr>
<td><strong>Summarise results in figures/graphs</strong></td>
<td>Results were summarised in tables, graphs, and figures for both the service-related research project and the major research project.</td>
<td>07/2002 06/2004</td>
</tr>
<tr>
<td>Interpret results from data analysis</td>
<td>Results from data analysis were interpreted for both the service-related research project and the major research project, and included consultation with the respective research supervisors and research tutors.</td>
<td>07/2002</td>
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<tr>
<td>Present research findings/plans to an audience</td>
<td>Research findings for the service-related research project were fed back to the psychology service where the project was conducted. Audience included Head of Department, several A/B grade clinical psychologists and an assistant psychologist.</td>
<td>03/2003</td>
</tr>
<tr>
<td>Produce a written report on a research project</td>
<td>A written report for the service-related research project and major research project were submitted as part of course requirements. A report outlining the findings of the major research project was compiled and sent to the families and schools of those boys who participated in the research.</td>
<td>07/2002</td>
</tr>
<tr>
<td>Defend research project at an oral examination</td>
<td>The major research project was defended at a viva voce presentation.</td>
<td>09/2004</td>
</tr>
<tr>
<td>Submit research report for publication in a journal/book</td>
<td>The major research project is in preparation for publication.</td>
<td>07/2004</td>
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</tbody>
</table>
References: