Anxiety in Adolescents with High Functioning Autism

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Abstract

The theoretical basis of psychological and emotional distress such as anxiety in individuals with autism is under researched. The present study draws upon a mainstream information processing model of childhood anxiety along with theoretical accounts of autism to investigate some of the possible factors associated with the development and maintenance of anxiety in this population. Adolescents with high functioning autism were compared to two comparison control groups on measures of anxiety and social worries. Comparison groups were children with expressive language disorder and typically developing children. There were 15 children in each group aged between 11-16 years and matched across groups for age and gender. Children with autism were found to be more anxious than typically developing children. There were no significant differences between groups in levels of social worries as reported by the children themselves. Parent ratings showed that children with autism were perceived to have considerably more social worries than both comparison groups. The groups were compared on measures of the recognition and expression of emotion, theory of mind and/or central coherence abilities, social and communication abilities and social competence with peers. The children with autism performed significantly worse than both comparison groups on the measure of social ability. They also perceived themselves to be less socially competence with peers. On the measure of emotional recognition and theory of mind/central coherence, the children with autism performed at a similar level to children with an expressive language disorder. Children with expressive language disorder showed poorer performance than children with autism and typically developing children on the measure of communication. The pattern of between group differences for self perceived social competence with peers was the same as the pattern of difference for anxiety. Social ability was found to correlate negatively with anxiety for the autism group. Therefore social competence with peers and impairments in social ability were highlighted as possible factors associated with anxiety in adolescents with high functioning autism. A simple schematic model of how such factors may be associated with the experience of anxiety in adolescents with high functioning autism is presented, from an information processing perspective. Impaired social ability is considered in relation to the response access or construction stage of the information processing sequence. It is suggested that adolescents with high functioning autism may lack the social skills required for adaptive coping responses to anxiety provoking situations, showing greater reliance on responses directed at escape or avoidance. The selection of escape/avoidant responses at the response selection stage of the information processing sequence is considered in relation to the possible lack of perceived competence and low estimation of coping ability for children with autism. The implications of these findings for clinical practice are discussed and recommendations for future research are made.
Contents

Acknowledgements

Abstract

1 INTRODUCTION

1.1 Core features of autism
1.2 Children and adolescents with high functioning autism
1.3 Diagnostic differentiation between high functioning autism and Asperger Syndrome
1.4 Clinical features of high functioning autism
1.5 Theoretical accounts of autism
1.5.1 Theory of mind hypothesis
1.5.2 Criticisms of the theory of mind hypothesis
1.5.3 Social-affective hypothesis
1.5.4 Criticisms of the social-affective hypothesis
1.5.5 Weak central coherence hypothesis
1.5.6 Criticism of the weak central coherence hypothesis
1.5.7 Executive dysfunction hypothesis
1.5.8 Criticisms of the executive dysfunction hypothesis
1.5.9 Summary of theoretical accounts of autism
1.6 Anxiety in children
1.6.1 Development and maintenance of anxiety in children
1.6.2 Cognitive-behavioural theory of childhood anxiety
1.6.3 Development of an anxious cognitive style in children
1.6.4 Information-processing and childhood anxiety
1.6.5 Summary of an information processing account of childhood anxiety
1.7 Anxiety in Adolescents with autism
1.8 Anxiety in adults with autism
1.9 Development and maintenance of anxiety in children with high functioning autism
1.9.1 Using an information processing model to understand anxiety in children with autism: summary
1.10 Methodological issues
1.10.1 Measures
1.10.2 Comparison groups
1.11 Conclusions from the literature review
1.12 Hypotheses

2.0 METHOD

2.1 Design
2.2 Sample
2.3 Measures
2.4 Procedure
2.5 Methods of analysis
3.0 RESULTS
3.1 Between group differences 99
3.2 Within group differences 121

4.0 DISCUSSION
4.1 Main findings 128
4.2 Possible factors associated with anxiety in adolescents with high functioning autism 137
4.3 Problems with the research design 155
4.3.1 Sample size 155
4.3.2 Participants 156
4.3.3 Unmeasured variables 158
4.3.4 Measures 159
4.3.5 Limitations of the model 161
4.4 Theoretical Implications 162
4.4.1 Primary socialisation deficit and anxiety in autism 163
4.4.2 Low perceived self-competence and anxiety in autism 165
4.4.3 Parent perceived low social competence and anxiety in autism 166
4.4.4 A simplistic schematic model of anxiety and autism – a cautionary note 167
4.5 Clinical implications
4.5.1 Assessment
4.5.2 Formulation of problems and targets for clinical intervention
4.6 Future research 172
4.7 Conclusions 176

References
Appendices
List of Tables

Table 1. Mean age for each group 77
Table 2. Scoring categories for the Experience Emotions Task 85
Table 3. Mean scores, standard deviation and median scores on the SCAS for each group 99
Table 4. Mean scores and standard deviations for SCAS subscales for each group 101
Table 5. Mean scores, standard deviation and median scores for the Social Worries Questionnaire for each group 102
Table 6. Mean scores, standard deviations and median scores for the three groups on the Experience of Emotions task, Social Stories task and the Adaptive Behaviour Scale – Socialisation and Language Development Domains 106
Table 7. Percentage of correct answers for each emotion on the experience of Emotions task for each group 108
Table 8. Percentage of errors in the three dimensions across all emotions on the Experience of Emotions task for each group 109
Table 9. Mean scores, standard deviations and median scores on the Social Competence with Peers Questionnaire for each group 118
Table 10. Spearman’s RHO correlations between all measures for the Autism group 123
Table 11. Spearman’s RHO correlations between all measures for the Language Disorder Group 125
Table 12. Spearman’s RHO correlations between all measures for the Typically Developing Group 127
List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Boxplot for the Spence Children’s Anxiety Scale</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Boxplot for the Social Worries Questionnaire - Pupil</td>
<td>103</td>
</tr>
<tr>
<td>3</td>
<td>Boxplot for the Social Worries Questionnaire – Parent</td>
<td>104</td>
</tr>
<tr>
<td>4</td>
<td>Boxplot for the Experience of Emotions Task</td>
<td>107</td>
</tr>
<tr>
<td>5</td>
<td>Boxplot for the Strange Stories Task</td>
<td>113</td>
</tr>
<tr>
<td>6</td>
<td>Boxplot for the Socialisation Domain standard scores of the Adaptive Behaviour Scales</td>
<td>115</td>
</tr>
<tr>
<td>7</td>
<td>Boxplot for the Language Development standard scores of the Adaptive Behaviour Scales</td>
<td>116</td>
</tr>
<tr>
<td>8</td>
<td>Boxplot for the Social Competence with Peers Questionnaire – Pupil</td>
<td>118</td>
</tr>
<tr>
<td>9</td>
<td>Boxplot for the Social Competence with Peers Questionnaire – Parent</td>
<td>120</td>
</tr>
<tr>
<td>10</td>
<td>A simplified Schematic Model of how Social and Cognitive Factors may be associated with the experience of anxiety in adolescents with high functioning autism</td>
<td>164</td>
</tr>
</tbody>
</table>
Appendices

Appendix 1. The Spence Children’s Anxiety Scale
Appendix 2. The Social Worries Questionnaire – Pupil version
Appendix 3. The Social Worries Questionnaire – Parent Version
Appendix 4. Prompting Stories for the Experience of Emotions Task
Appendix 5. Record Form for the Experience of Emotions Task
Appendix 6. Strange Stories
Appendix 7. Strange Stories record form
Appendix 8. Social Competence with Peers Questionnaire – Pupil
Appendix 9. Social Worries Questionnaire – Parent
Appendix 10. Letter of ethical approval
Appendix 11. Children’s Information Sheet
             Parent’s Information Sheet
             Consent form
1 INTRODUCTION

The title of this thesis refers to autism and anxiety - both of which are constructs associated with large bodies of research. As it would be impossible to review all of the associated literature within this introduction, this review focuses on issues most pertinent to the current research. Where space prevents a full review of some issues, references to recent published reviews are given.

The aim of this study is to investigate the nature of anxiety in adolescents with autism, considering also the possible factors associated with it. After an introduction to the core features of autism and what it means to have 'high functioning' autism the literature relating to theoretical accounts of autism will be addressed. The development and maintenance of anxiety in the general child and adolescent population will then be considered, including cognitive-behavioural theory and an information processing account of childhood anxiety. Due to the relative lack of studies specific to the area of anxiety in children with autism, previous research focusing on adults with high functioning autism will be drawn upon. Anxiety in adolescents with high functioning autism will then be considered in light of an information processing account, drawing upon theoretical accounts of autism to explore the possible processes involved.

1.1 Core Features of Autism

Autism is identified by a triad of impairments in the areas of socialisation, communication and imagination (Wing & Gould, 1979). The disorder was originally described by Kanner (1943) who considered it to represent a distinct cluster of psychological and behavioural features. However, over the course of time there have
been major changes in ideas about the nature of autistic conditions. Autism is now considered to exist on a ‘spectrum’, reflecting the fact that within the three fundamental areas of deficit the range of problems can be highly variable (Wing, 1988, 1996; Wing & Gould, 1979).

The socialisation impairment shows itself in individuals with autism through the marked abnormalities in their capacity for reciprocal social interaction. In its most profound form individuals are aloof and indifferent to people. At the opposite end of the spectrum individuals are motivated to seek social contact but are odd or inappropriate in their social approaches. With regards to the communication impairment, it is estimated that around half of all children with autism fail to develop functional speech (Lord & Rutter, 1994). For those who do develop spoken language, the tone, pitch, and modulation of speech can seem very odd and a range of different semantic and syntactic errors, such as neologisms and pronoun reversal, can occur. Autistic children’s use and understanding of non-verbal communication is also odd (Wing, 1996). The impairment of imagination is manifest in the inability to develop normal imaginative patterns of play. For example, the play of children with autism is typically dominated by fascination with the mere presence of objects and their immediate sensory features or what they offer for manipulation rather than their cultural or symbolic meaning (Trevarthen et al., 1996). The inability to pretend and to share pretence with others is associated more broadly with problems generalising and manipulating abstract and symbolic information. In addition to the triad of impairments other features of autism include ritualistic and stereotyped interests and behaviours, such as a resistance to change and obsessive interests and engagement in repetitive activities (Howlin, 1998; Wing, 1996).
1.2 Children and Adolescents with High Functioning Autism

In the field of autism research has tended to concentrate on individuals who have some degree of learning disability, that is, those who have an IQ score of approximately 70-75 or below according to general intelligence testing and substantial limitations in adaptive skill areas. This existing research has related to issues such as aetiology (Frith, 1989; Gillberg, 1998) characteristics of autism (Wing, 1988; 1993), intervention (Howlin, 1998; Howlin & Rutter, 1987) and outcomes (Howlin, 1997; Nordin & Gillberg, 1998).

Until recently, little research has concentrated on the needs of those who are not intellectually impaired, despite the impact of difficulties with communication, social interaction and obsessional or ritualistic behaviours for this group (Szatmari et al., 1989). These children are often referred to as having ‘high functioning autism’ (Ghaziuddin, 2002). There are currently no explicit diagnostic guidelines for high functioning autism. Authors have deemed it appropriate to diagnose this condition in cases for which autistic disorder (American Psychiatric Association, 1994)/ childhood autism (World Health Organisation, 1993) criteria apply, along with a minimum cognitive level as determined by a valid and individually administered IQ test. Different cognitive levels have been used by investigators in the field of autism research. Bartak and Rutter (1976) reported that autistic children with Performance IQs above 70 exhibited different behaviours and patterns of skills on cognitive tests when compared with those with IQs below 70. Since then investigators in the field have chosen Performance IQs above 70 (Freeman, Lucas, Forness & Ritvo, 1985), Full Scale IQs above 80 (Rumsey et al., 1985) Full Scale IQs above 70 (Asarnow et al., 1987) Full Scale IQs above 65 (Gillberg, Steffenberg & Jakobsson, 1987) or Full Scale IQs above 60 (Gaffney & Tsai, 1987) as the cognitive criterion for high-functioning autism. Whilst research findings do lend some support to the validity of subtyping autism based on
cognitive level (Bartak & Rutter, 1976), some authors have commented on the lack of diagnostic criteria referring to other aspects of human functioning, such as social and communicative functioning (Tsai, 1992).

1.3 Diagnostic Differentiation Between High Functioning Autism and Asperger’s Syndrome

As has already been suggested, the term high-functioning autism draws attention to the challenge of diagnostic clarity in the autism field, a problem with which has existed almost since the disorder was first described (Manjiviona & Prior, 1995). One issue in this area relates to the diagnostic differentiation between autism and Asperger’s Syndrome, specifically whether the two can be distinguished from each other by any valid and reliable criteria (Szatmari, 2000; Eisenmajer et al., 1996). While Asperger Syndrome, first described by Asperger in 1944, is now included in the latest revisions of DSM-IV (American Psychiatric Association, 1994) and ICD-10 (World Health Organisation, 1992) as a specific developmental disorder, it is still not clear how this disorder differs from high functioning autism, that is, autism without accompanying intellectual impairment.

In discussing the differentiation between autism and Asperger Syndrome, Kugler (1998) re-examined the similarities and differences with reference both to the history of Asperger Syndrome and to current research. The similarities between the two disorders are perhaps easier to determine. From the historical perspective, both Kanner and Asperger considered the most important aspect of autism and Asperger Syndrome to be the social impairment, and both described common features such as poor eye contact,
stereotypical behaviour, resistance to change and circumscribed interests (Kugler, 1998). In addition, both believed that their disorder was organic and present from the child’s earliest years. However it is in the area of differential diagnosis where the historical perspectives and current research appear to diverge. Recognising that the two disorders are related by core social impairments, current debate has tended to focus on whether the differences between the disorders are such that they warrant distinction.

Several research studies have been conducted to test the evidence for possibly differential diagnostic features in the context of motor skills, language abilities and cognitive functioning. For example, Gillberg (1991, pp. 122-146) has noted that for children with a diagnosis of Asperger’s Syndrome there is a lack of any persistent or significant delay in formal language acquisition, although they still struggle with comprehension and the pragmatic functions of language, including the non-verbal aspects of communication. In considering expressive language skills, it has been suggested that children diagnosed with high-functioning autism exhibit more deviance in language and communication, for example, in terms of reported early behaviours such as babble, echolalia, pronoun reversal and repetitive speech, and in terms of deficits in areas such as articulation and vocabulary, than those with a diagnosis of Asperger’s Syndrome (Kerbeshian et al., 1990; Szatmari et al., 1989). Marked verbosity, including lengthy speech or incessant monologues has been suggested as characteristic of Asperger Syndrome but not high functioning autism (Kerbeshian et al., 1990, Klin, 1994). Other differences between the two groups have been suggested in relation to conversational skills and communicative strategies (Fine et al., 1991; Fine et al., 1994), such as the use of intonation and referencing.
Evidence for possible differential diagnosis based upon motor skills has been mixed. For example, Gillberg (1989) reported motor clumsiness as a distinctive feature of Asperger Syndrome and Klin et al., (1995) reported significantly greater deficits in both fine and gross motor skills in Asperger Syndrome than in high functioning autism. However, other researchers have reported marked impairment in gross and fine motor functioning in both Asperger and high functioning autism groups (Ghaziuddin et al., 1994; Manjiviona & Prior, 1995). The conclusions which may be drawn from many of these studies are constrained by methodological issues such as studies being poorly controlled in terms of the rationale underlying diagnostic assignment, level of intellectual functioning and chronological age and involving only small samples of participants (Kugler, 1998).

Distinctions between high functioning autism and Asperger Syndrome have also been considered in relation to cognitive functioning. Both ICD-10 and DSM-IV imply a lack of significant delays in cognitive development for Asperger Syndrome. However, the diagnosis of childhood autism can be made at all levels of functioning given the lack of specific criteria relating to general levels of intelligence. Such basic differences in diagnostic systems might suggest that autism and Asperger Syndrome are distinct. Furthermore, certain studies have shown differences between the two disorders in relation to neuropsychological profiles. For example, it has been suggested that children with Asperger Syndrome and high-functioning autism display significantly different patterns of verbal and non-verbal abilities. Certain findings have suggested higher verbal than performance IQ in Asperger Syndrome, a pattern that is considered by certain authors to be the opposite from that in children with autism (Klin et al., 1995; Ozonoff et al., 1991; Volkmar et al., 1994). In contrast, Szatmari et al. (1990) found no
significant group differences on neurocognitive measures, with both Asperger Syndrome and autism groups showing similar impairments on the verbal and performance subtests of the Wechsler scales. Such inconsistent research findings may be due to the different diagnostic criteria used in these studies (Ghaziuddin et al., 1992; Szatmari, 1992). Moreover, some children who have been diagnosed with autism in childhood are diagnosed with Asperger Syndrome when they are older (Ozonoff et al., 1991, Wing, 1981, 1988), a factor that further complicates comparisons of concurrent neurocognitive profiles and cognitive functioning.

Due to the mixed picture of evidence it has been difficult to draw any definitive conclusions about differential diagnostic features related to motor skills, language abilities and cognitive functioning between children with high functioning autism and Asperger Syndrome. Clearly methodological issues such as subject selection including diagnostic, age and IQ matching problems have frequently confounded results and leave a paucity of reliable research findings. Different authors therefore have arrived at different conclusions as to the utility of differentiating between subgroups in autism. Wing (1981) has considered the term Asperger Syndrome useful for parents and professionals who cannot believe in a diagnosis of autism, where the child is relatively able. Conversely, Miller and Ozonoff (1997) have strongly discouraged use of the term Asperger Syndrome and in fact argued that even Asperger’s original cases did not have a distinct syndrome. Perhaps as a result of these conflicting views and findings, a spectrum approach to autism is currently favoured (Wing, 1996). This approach is advocated here and thus the term ‘high functioning autism’ will be used to describe the children in this study. Therefore the term Asperger Syndrome will only be used when describing previous research which has used this term.
1.4 Clinical Features of High Functioning Autism

In the high functioning group of children with autism the triad of impairments involving deficits in socialisation, communication and imagination are still present but may be manifest in different ways (Wing & Gould, 1979). For example, children with high functioning autism show an interest in social interaction not generally observed in the ‘classically’ autistic child, who is usually described as socially withdrawn or ‘aloof’ (Wing, 1981). However, the nature and quality of their interactions often appear ‘odd’ or socially and emotionally inappropriate.

Children with high functioning autism have been described as lacking appreciation of social cues and may inadvertently say or do things which offend or annoy other people. They have difficulty in using non-verbal behaviours to regulate social interaction (Koning & Magill-Evans, 2001) and as a result may use facial expression, tone of voice, gesture, gaze and posture inappropriately (Kerbeshian, Burd & Fisher, 1990; Tantam, 1988). They have also been found to have problems with comprehending others’ facial expressions (Wing, 1981), sensing the feelings of others (Szatmari et al., 1989) and making adjustments to fit different social contexts or the needs of different listeners (Tantam, 1988).

Whilst children with high functioning autism have good linguistic ability, they have more subtle language difficulties (Loveland & Tunali-Kotoski, 1997; Tsai, 1992). Conversation often lacks socio-emotional reciprocity, can be one-sided and dominated by topics linked to their own idiosyncratic interests (Gillberg & Gillberg, 1989; Kerbeshian et al., 1990). Although the acquisition of phonology and syntax follows the
same pattern as for typically developing children, difficulties are primarily in the specific
areas of pragmatics and semantics for children with autism (Rapin & Dunn, 1997).
Whilst semantics refers to language meaning in its literal context-independent usage,
pragmatics is arguably a more complex concept, necessary to explain how meaning is
derived from the social context (Martin & McDonald, 2003). For example, whilst
individuals with high functioning autism may often display fluent and articulate speech,
the nature of pragmatic deficits means that they often fail to engage in interactional
conversation, are overly literal and tangential, and may talk at great length on socially
inappropriate, or obscure topics (Ozonoff & Miller, 1996). The tendency to take things
literally is also demonstrated in pedantic, over exact, comprehension and production.
Children with high functioning autism have been shown to be significantly poorer than
normal children at distinguishing between inappropriate and appropriate utterances (i.e.
utterances that avoid redundancy, are informative, truthful, relevant and polite),
suggesting that they have a poor knowledge about the social constraints of appropriate
communication and the function of language as it is used to convey information in a
communicative sense (Surian, Baron-Cohen & Van der Lely, 1996). With regards to the
impairment of imagination, children with high functioning autism can use objects,
including miniature toys, for their obvious purpose, such as moving a train along a track,
but do not expand upon this play sequence to act out creative stories (Wing, 1996).
These deficits affect all aspects of communication and social functioning, making it very
difficult for these children to relate to others and to develop peer relationships.

As well as the triad of impairments, the associated features of autism are present from
the high functioning group. However, their ritualistic behaviours may be more
sophisticated and elaborate, for example, recounting dialogue from radio or television or
repetitively writing or drawing numbers, words or maps (Howlin, 1998; Shea & Mesibov, 1985). More able children often involve others in their routines, such as engaging them in set dialogue or repeatedly asking the same questions (Howlin, 1998). Although evidence from follow-up studies suggests that individuals with high functioning autism cope well in terms of adaptive abilities (Howlin, 1997; Rumsey, Rapoport & Sceery, 1985) compared to those who are less able, the impact of difficulties in communication, socialisation and with obsessive and ritualistic behaviours remains profound as this group progress through middle and late childhood, adolescence and into adulthood (Howlin, 1997). Other authors have commented on the struggles individuals with high functioning autism experience during the transitional stage of adolescence (Gillberg, 1984; Komoto, Usui & Hirata, 1984).

As has previously been suggested, the intellectual ability of children with high functioning autism is, by definition, usually within the average range (i.e. Full Scale IQ > 70; Kanner & Eisenberg, 1956; Klin et al., 1995; Ozonoff, Rogers & Pennington, 1991; Tsai, 1992). However, a number of authors have commented upon the unusually uneven scores on tests of intellectual functioning (Green, Fein, Joy & Waterhouse, 1995; Lincoln, Allen & Kilman, 1995). In their main study of the intellectual abilities of thirty-three high-functioning people with autism, mean age of 17 years 6 months, Lincoln et al. (1988) found a significant difference between Verbal (VIQ) and Performance IQ (PIQ) scores with 27 of the participants exhibiting higher Performance IQ scores, as measured by the Wechsler Intelligence Scale for Children-Revised (WISC-R, 1974) or the Wechsler Adult Intelligence Scale-Revised (WAIS-R, 1981). In order to assess the validity of this apparent dichotomy between the more verbal subtests and the more visual-motor subtests the authors performed a principal component analysis which
produced three factors distinguishing poor verbal and nonverbal comprehension of social and context-relevant information (Factors 1 and 3) from the nonverbal processing of asocial and noncontextual information (Factor 2). However, their second study comparing the intellectual abilities of 13 8-12 year old children with autism to age matched groups of children with receptive developmental language disorder, dysthymic disorder or oppositional disorder, suggested that there may not be such a clear cut PIQ-VIQ differential in the pattern of intellectual abilities for children with autism. These results showed that it was the significantly impaired performance of the children with autism on the Comprehension subtest of the WISC-R that best discriminated the groups of children studied, not simply the significant difference between Verbal and Performance IQ. On the basis of these findings the authors cautioned against discussing individual intellectual abilities or patterns of ability in terms of the strength of one skill over the other, as has tended to be the case when considering the intellectual profile of individuals with autism (e.g. Bartak et al., 1975; Hoffman & Prior, 1982; Lockyer & Rutter, 1970). This is because many of the abilities measured through Wechsler subtests actually covary or share some degree of common function (Lincoln et al., 1988). Due to this it is difficult to judge on the basis of the relative magnitude of subtest scores, the common and specific functions they measure (Lincoln et al., 1988).

1.5 Theoretical Accounts of Autism

Many theorists have tried to account for the deficits seen in the disorder and ideas about the nature of autistic conditions have seen major changes over the course of time. In the light of research into normal child development and language disorders, new understandings on the nature of autistic spectrum disorders have emerged. The dominant psychological theoretical approaches include the ‘theory of mind’ hypothesis (Baron-
Cohen, Leslie & Frith, 1985), the 'social affective' hypothesis (Yirmiya & Sigman, 1991), the weak central coherence theory (Frith, 1989) and executive dysfunction theory (Ozonoff, 1997 pp. 179-211; Pennington & Ozonoff, 1996).

1.5.1 Theory of Mind Hypothesis

The theory of mind (ToM) hypothesis aims to explain the triad of impairments in autism in terms of a single underlying cognitive deficit – a failure or delay in mentalising, that is, the ability to 'think about thinking' (Baron-Cohen, Leslie & Frith, 1985; Happé, 1994d). The main feature of the disorder is said to be an inability to attribute beliefs to others by being unable to form a mental image of what can go on in other people’s heads (Trevarthen et al., 1996). This is thought to stem from a failure in thinking about the person’s own mental states (e.g. thoughts, intentions, emotions) or the mental states of others.

‘Normal’ theory of mind is considered to be an innate cognitive capacity which first appears in the second year of life, accounting for the development of children’s symbolic pretend play at this age (Baron-Cohen et al., 1985; Leslie, 1987). By age four this capacity has developed into an understanding that other people have thoughts, knowledge, beliefs and desires that will influence their behaviour.

The theory of mind hypothesis has been translated into many different experimental paradigms and researched thoroughly. Happé (1995) has produced a thorough review of this literature. Research paradigms are conceptualised in terms of first and second order ToM tasks. A commonly used first order ToM task is called the Smarties test (Perner et al., 1987). This is an example of a deceptive box paradigm. A child is shown a Smarties
tube and asked what is in it. They usually reply ‘Smarties’ or ‘sweets’. The experimenter then opens the lid and reveals to the child that the tube contains a pencil. The tube is then closed with the pencil inside. The child is asked to predict what another person, who has not seen the tube, would think it contained. Perner et al. (1989) presented this task to children with autism and found that the majority of children wrongly judged what another child would think was in the tube. They also failed to acknowledge their own prior false belief. Typically developing children age 5 years however were able to answer this question correctly. Baron-Cohen (1989c) conducted a second order ToM test with autistic children. This test was designed to assess whether children understand that people hold beliefs not just about reality, as with first order ToM tasks, but also about other people’s beliefs. The scenario was presented as a story known as the Ice-Cream van test. The story involves John and Mary at the park with the ice-cream man. The ice-ream man says he will be in the park all afternoon and John returns home to get some money to buy an ice-cream. When he has gone the ice-cream man tells Mary that he is going to sell ice-creams outside the library. Mary stays in the park and the ice-cream man goes to the library. On the way to the library the ice-cream man passes John and tells him where he is going. Later that afternoon Mary goes to call for John at his house, but his mother answers and tells Mary that John has gone to buy an ice-cream. At the end of the story the child is asked where Mary thinks John has gone to buy an ice-cream. The correct answer and one that indicates that the child has passed the second order test is that Mary thinks John has gone to the park because she is unaware that the ice-cream man told John he would be outside the library. Baron-Cohen (1989c) found that most children over 7 years of age correctly answered such second order false belief questions. However, children with autism, even those who are able to answer first order false belief questions correctly, were unable to pass second order ToM tasks.
More recently, Happé (1994) has developed what she considered to be an ‘advanced’ test of ToM with a set of stories which require a child to answer questions regarding story characters’ thoughts and feelings, known as the Strange Stories test (Happé, 1994a). These stories or vignettes concern everyday situations where people say things they do not mean literally, tapping the different motivations that can lie behind everyday utterances. The aim of these tasks, according to Happé (1994a) was to extend the range of tasks involving theory of mind to provide what she considered to be a more contextually embedded and realistic test of theory of mind and mentalising ability in everyday life. In this study, eighteen children with high functioning autism six of whom had failed both a first and second order ToM task, six of whom had passed a first order ToM task and six who had passed first and second order ToM tasks were presented with the Strange Stories task. Although the autism group were equivalent to the control groups (typically developing and learning disabled children) in the number of mental state justifications used, what distinguished the autism group on this condition was the failure to use the appropriate mental state terms for the story’s context. Thus the children with autism struggled to use the context to infer the speakers meaning, giving answers that fitted the utterance in isolation but not in the story context given. This difficulty has since become known as a ‘lack of central drive for coherence’. According to this theory, individuals with autism have a specific impairment in extracting meaning in context and a preference for processing local versus global information (Frith, 1989).

A more recent study by Joliffe and Baron-Cohen (1999) has retested the Strange Stories task in an attempt at independent replication. Two groups of individuals, one with high-functioning autism, and the other with Asperger Syndrome, were found to perform less well on the task, compared to typically developing controls matched for IQ and age. A
control task was also administered. This task consisted of 6 ‘physical’ stories which did not involve mental states, nor were they social in nature. However they did require participants to make global inferences that went beyond what was explicitly mentioned in the text. The performance of both the high functioning autism and Asperger Syndrome group was not impaired on the control task. Thus the findings of Joliffe and Baron-Cohen (1999) did replicate the main findings of Happé (1994). That is, on the mentalistic stories the clinical groups were equivalent to the control group in the number of mental state justifications used. What distinguished the clinical participants was not a failure to use mental state terms but a failure to use the appropriate mental state for the story’s context. In comparison to the typically developing control group the clinical groups made significantly more context-inappropriate mental state justifications and significantly fewer context-appropriate mental state justifications. The authors proposed two possible sources of difficulty for children with autism and Asperger Syndrome on the Strange Stories task. One is the requirement to infer the speaker’s intended meaning from the context within which it is embedded as opposed to from their utterance itself. The other is that they have a difficulty in appreciating the mental states used in the stories. From this perspective, although the Strange Stories test clearly identifies deficits in individuals on the autistic spectrum, the test is compromised in that these deficits could arise from theory of mind problems or weak central coherence, or both. The weak central coherence theory will be discussed more fully in a later section (see pages 24-29).

1.5.2 Criticisms of the Theory of Mind Hypothesis

Despite the weight of evidence for ‘theory of mind’ difficulties in autism, some authors have contested the theory of mind hypothesis as an explanatory framework for autism (Frith, Happé & Siddons, 1994). One reason is because the deficit is not unique to
autism. For example, Yirmiya et al. (1998) carried out a meta-analysis of 17 independent theory of mind studies comparing individuals with autism, individuals who were intellectually impaired and had no diagnosis of autism and typically developing individuals. They found that intellectually impaired individuals performed worse than the typically developing individuals, although this difference was found to be smaller than the difference between individuals with autism and typically developing individuals. Peterson and Siegal (1995) studied the theory of mind abilities of deaf children and found rates of failure on theory of mind tasks comparable to those found in autism. Buitelaar et al. (1999) found no differences in theory of mind performance between a Pervasive Developmental Disorder group (including autism and 'lesser variants') and a control of children with diagnoses of ADHD, conduct disorder, and dysthymia.

A second criticism of the hypothesis draws upon research evidence suggesting that around twenty percent of children with autism actually manage to pass both first and second order ToM tasks (Happe, 1994b, Rutter, 1999). Baron-Cohen (1989a) has attempted to account for this by suggesting that rather than a complete deficit, children with autism experience a specific developmental delay in the acquisition of ability to represent mental states (Happe, 1991, 1993).

Thirdly, some studies have found a positive link between cognitive abilities (mainly verbal IQ or verbal mental age) and performance on theory of mind tasks (Dissanayake, Sigman & Kasari, 1996; Happe, 1994a, 1995; Yirmiya et al., 1996) suggesting that individuals with high functioning autism and better intellectual abilities may display a 'theory of mind'. However, Frith, Happe & Siddons (1994), have suggested that these
individuals may be using a non-theory of mind strategy, something like problem-solving, to compensate for their lack of innate mentalizing ability (Frith, Morton & Leslie, 1991).

Further controversy has arisen from studies which have shown that even if they pass all theory of mind tests, individuals with autism show a marked lack of understanding of other people in real-life situations. For example, Ozonoff and Miller (1995) successfully taught able children with autism the mental state concept of theory of mind. This was done in the form of a training programme in which participants were taught not only specific interactional and conversational skills but also received explicit and systematic instructions regarding the underlying social-cognitive principles necessary to infer the mental states of others (i.e. theory of mind). Although there was demonstrated improvement in performance on false belief tests, there was little improvement in the children's more global performance in social skills.

Other studies have found similar effects (Bowler, 1992; Happé, 1994b, 1994c; Ozonoff & McEvoy, 1994). Frith, Happé & Siddons (1994) compared theory of mind performance to real life adaptive behaviour, as measured by the Socialization, Communication and Daily Living Domains of the Vineland Adaptive Behaviour Scales (Sparrow, Balla & Cicchetti, 1984). They also supplemented the Vineland Scales with items which they considered would distinguish social behaviour that necessitates theory of mind (termed 'Interactive') and behaviour which could be learned ('Active'). Children with autism scored lower on all three Domains than typically developing and learning disabled controls. The control groups were found to have greater theory of mind abilities in real life compared to children with autism, regardless of theory of mind performance. That is, they scored higher on the Interactive measure than children from
the autism group, irrespective of their passing or failing theory of mind tasks. In contrast, for the autism group, only those who passed theory of mind tasks showed insightful Interactive behaviours. These children were also found to have higher within-group Communication scores. Such results have been used to suggest that the ability to pass theory of mind tasks does not necessarily always demonstrate theory of mind ability in everyday life (Fombonne et al., 1994; Frith, Happé & Siddons, 1994).

A final criticism of the theory of mind account is that it struggles to explain some aspects of autistic behaviour such as restricted, repetitive and stereotyped patterns of behaviour, interests and activities. A study by Turner (1996) showed that the degree of repetitive behaviour is not related to theory of mind ability nor to IQ. Indeed, some types of repetitive behaviour (e.g. tics and motor problems) were more severe in those with high verbal ability, many of whom pass theory of mind tasks. Happé and Frith (1996) argued that these problems could not be dismissed as merely secondary to other cognitive problems, for example, as a coping response, and that such aspects of autism require explanation in their own right.

1.5.3 Social-Affective Hypothesis

In response to these difficulties with the theory of mind account, an alternative account of impairment in autism has been proposed, known as the social-affective theory. While not denying that children with autism may have difficulties in mentalising, proponents of this theory suggest that this cognitive deficit is secondary to a primary affective deficit. This deficit was first described by Kanner (1943) when he noted in autism "an innate inability to form the usual, biologically provided affective contact with people" (p. 250). Since Kanner, one of the main authors in this field has been Hobson (1986a,b, 1993a)
who suggests an 'emotion perception deficit' in autism. Hobson's theory proposed that typically developing children are 'prewired' to be sensitive to and comprehend another person's emotions, an assumption based upon mother-infant interaction studies (see Murray & Trevarthen, 1985). Their ability to do this, Hobson argued, is 'beyond cognition'. He argued that other people's mental states do not need to be inferred but are perceived 'directly' in their bodily expressions (Hobson, 1986a,b, 1993a). He proposed that in autism this biological prewiring for understanding emotional states in others is non-functional. Furthermore he suggested that an infant's affective relationships with others are fundamental to the development of symbolic capacity and conceptual role taking ability. He claimed that through this innate ability to interact emotionally with others, the infant learns to appreciate another person's way of conceiving and seeing an object and that this provides the infant with the notion of symbolic interpretation and other people's conceptual view points (Hobson, 1986a,b, 1993a).

Although not as widely studied as cognitive accounts, support for the social-affective theory stems from research which indicates that children with autism have problems in recognising and interpreting or understanding emotions (Hobson, 1986a, 1986b; Hobson, Ouston & Lee, 1988; Sigman & Capps, 1997) and using emotions in a communicative fashion (Bartak, Rutter & Cox, 1975). Hobson tested the possibility that autistic children may lack the basic capacity to interpret emotions in a number of emotion-perception studies (Hobson, 1986a, 1986b, 1989). In one study he portrayed the emotions of happiness, sadness, anger and fear by means of a video film and asked children to match signs of emotion across different modes of presentation. For example, the child had to say which of four faces went with which of four sound recordings expressing these emotions. Other tasks involved matching faces with situations in a video sequence and
again with body postures. The children with autism were all adolescents, with a mean mental age of ten years on tests of nonverbal ability. Two thirds of these children were poor at emotion matching. In contrast, control groups of normal and learning disabled children of the same nonverbal mental age nearly all performed without errors. In their review of work in this area Ozonoff, Pennington and Rogers (1990) pointed out that significant deficits in emotion perception only emerge relative to controls matched on non-verbal IQ. Happé, (1994) has suggested that uneven IQ profile and superior performance scores of most individuals with autism make such matching procedures unreliable. However, Ozonoff et al.'s (1991a) own work with individuals with high functioning autism has found emotion-perception impairments even relative to a control group matched for age and verbal IQ.

Some authors have attempted to establish causal priority for emotional deficits over a primary cognitive deficit by suggesting that children with autism show behavioural abnormalities before the age at which metarepresentational abilities emerge in normal children (Happe, 1994). Mundy and Sigman (1989) for example, have argued that because children with autism do not show joint attention behaviours, which develop prior to pretence in the normal child, that autism must involve a deficit other than an inability to metarepresent. In favour of an affective theory, Mundy, Sigman and Kasari (1993) suggest that joint attention involves an affective component, the capacity to share and compare own and others' emotional expressions viv-a-vis a third reference. Such an argument about primacy then is in part based upon the failure of Theory of Mind accounts of autism to consider the affective aspects of representing mental states (Happe, 1994).
Some research in this field focusing on children with high functioning autism, has suggested an impairment in understanding and expressing emotion, rather than a complete deficit (Sigman, Arbelle & Dissanayake, 1995). Several studies have demonstrated appropriate labelling, understanding and expression of emotion in able children with autism (Bormann-Kischkel, Vilsmeier & Baude, 1995; Capps, Yirmiya & Sigman, 1992; Yirmiya et al., 1992). However this does not suggest that all children with autism are able to express their emotions (Sigman, Arbelle & Dissanayake, 1995).

For example, Yirmiya et al. (1992) found that non learning-disabled children with autism were less able to identify and explain feelings presented to them in videotaped vignettes than typically developing controls. As well as identifying the feelings of the Story’s protagonist, children were asked their own response to the vignette. They found that children with autism had greater difficulty empathising with the protagonists than typically developing controls.

More evidence suggesting that individuals with high functioning autism have problems talking about their own emotional experiences can be found in the work undertaken by Capps, Yirmiya and Sigman (1992). They carried out an investigation of simple and complex emotions, comparing children with high functioning autism to typically developing children, matched on gender, Full Scale IQ and chronological age. Participants were asked to report experiences of four emotions. Their descriptions were then coded for appropriate reference to locus (whether the emotion arose from external events or internal processes), controllability, and the presence or absence of an audience. In comparison to typically developing children, the children with autism were found to be able to express simple feelings, such as happiness and sadness, but had particular difficulty with defining and expressing the more complex emotions of embarrassment.
and pride. An important difference highlighted by the authors was that unlike the comparison group, the autism group lacked reference to the role of audience in the experience of embarrassment. They also found that in their correct identification and expression of some emotions, the children with autism took longer to come up with the answers. Thus, Capps, Yirmiya and Sigman (1992) argued that relaying past emotional experiences presented as a 'problem-solving exercise' to the children with autism, compared to the spontaneity of their typically developing peers. This problem solving technique has also been reported in other studies (e.g. Bormann-Kischkel, Vilsmeier & Baude, 1995) and has led Sigman, Arbelle and Dissanayake (1995) to conclude that 'social understanding therefore seems to be arrived at logically, without much recourse to gut feelings and impressions' (p. 292). This explanation appears to relate to the notion of autism as a 'logico-affective state' proposed by Hermelin and O'Connor (1985). They suggested that high functioning children with autism may overcome part of their problems by using cognitive or intellectual routes to process emotions. However, because these strategies are sub-optimal, they cannot fully compensate for the deficit (Bormann-Kischkel et al., 1995). For example, in their study of the understanding of simple and complex emotions in children with high functioning autism, Capps et al. (1992) found that the children with autism used phrases such as 'I think' more frequently than typically developing children in talking about their emotions. They suggested that the use of mental state verbs in autistic children responses might suggest that they generated responses on the basis of rules or learned associations, rather than their subjective experiences.
1.5.4 Criticisms of the Social Affective Hypothesis

Aspects of Hobson’s theory have been criticised at a number of different levels. For example, his own emotion-perception studies have been queried because his tasks required intermodal recognition of emotions, incorporating gestures, vocalisations, contexts and facial expressions, leaving it unclear which specific component may have caused the failure of autistic children on these tasks. By comparison, in a study by Langdell (1981) where only facial expression was tested, the performance of the autism group was still impaired but was above chance. Likewise, 17 of the 23 children with autism in Hobson’s (1986a) study could match schematic facial expressions with videotaped facial expressions after some teaching. Some have argued therefore that such results cannot lead to a definitive conclusion about autistic children’s inability to recognise facial expressions, rather they suggest a difficulty in matching facial, vocal and gestural emotional expressions simultaneously (Baron-Cohen, 1988).

Secondly, Baron-Cohen (1988) has queried why Hobson’s model predicts that conceptual role-taking should be impaired in autism when difficulty in understanding emotions does not necessarily imply difficulty in understanding beliefs. He also commented that the model struggles to account for some unimpaired aspects of functioning in perceptual role taking (Baron-Cohen, 1985) or in self-recognition (Dawson & McKissick, 1984; Baron-Cohen, 1985). In addition, whilst an inability to abstract and symbolise is theorised by Hobson to result from the lack of innate ability to perceive people’s emotional states, his affective theory does not appear to specify exactly how or why emotional and symbolic development are linked. It is difficult therefore to consider the mechanisms by which this theory can account for the deficits in
pretend play seen in autism (Baron-Cohen, 1987a; Ungerer & Sigman, 1981) and in abstract imitation and in language.

Finally, the social-affective hypothesis could well be subsumed within an impaired theory of mind explanation of autism. For example, social emotions, such as guilt and embarrassment, require appraisal of others’ views of oneself. Theory of mind therefore may be essential to children’s understanding of such social emotions that rely on an audience. The challenges autistic children face in understanding social emotions therefore could be linked to their difficulties with reasoning about other people’s thoughts and feelings (Baron-Cohen, Leslie & Frith, 1985; Frith, 2003).

1.5.5 Weak Central Coherence Hypothesis

The weak central coherence theory posits that the impairments related to autism can be understood in terms of a pervasive inability to use context to drive meaning. Frith (1989) has argued that such difficulty reflects impairments in the normal cognitive process by which high-level meaning is derived through the weaving together of otherwise piecemeal information. The result is that individuals with autism attend to small pieces of information rather than large, globally coherent patterns of information (Martin & McDonald, 2003). For example, testing immediate serial recall of sentences versus word strings, Hermelin and O’Connor (1967) found that, unlike learning disabled controls, participants with autism did not benefit significantly from the effect of meaning. More recently Tager-Flasberg (1991) showed that in free recall, participants with autism were not significantly better at remembering lists of related versus unrelated
nouns, whilst controls of typically developing and learning disabled children matched for chronological age and gender benefited significantly from the semantic relation.

The idea that people with autism make relatively less use of context and pay preferential attention to parts rather than wholes, can go some way to explaining the assets seen in autism as well as the deficits (Happe & Frith, 1996). For example, Shah and Frith (1993) explored the well established block design skill in autism and found that the enhanced performance of children with autism on this task was largely due to an advantage in segmenting the original design and approaching it in terms of its constituent blocks. They found that presenting the pre-segmented designs to typically developing and learning disabled children significantly improved their performance and removed the autism group's advantage while not aiding them in the task. Similarly, individuals with autism have been shown to be faster than control groups of learning disabled and typically developing controls matched for gender and chronological age at the Embedded Figures Test, in which individual's shapes have to found within a larger pattern (Joliffe & Baron-Cohen, 1997; Shah & Frith, 1983, Ozonoff et al., 1991).

Other phenomena that have been ascribed to weak central coherence in autism include a failure to disambiguate homographs using surrounding word context (Frith & Snowling, 1983; Happé, 1997). In Happé's study, 16 able participants with autism who varied in their theory of mind task performance, were tested with a homograph reading task in which pronunciation of target words is determined by integration of whole sentence context (e.g. pronouncing tear 'In her eye/dress there was a big tear'.) The results found that compared to typically developing children matched on age and ability, the autism group made relatively little use of preceding sentence context in pronouncing the
homographs, irrespective of their performance on a theory of mind task. Such findings were taken as indication that individuals with autism at all levels of theory of mind performance showed a relative failure to process information for context-dependent meaning in this task (Happe, 1997). On the basis of such evidence some authors have suggested that this cognitive style may be an additional and independent feature of autism, quite apart from theory of mind deficits.

Other studies suggest that weak coherence may be a persisting feature of individuals with autism. Lack of cohesion appears to characterise the narratives of children with autism, compared with other groups with learning difficulties (Loveland, McEvoy & Tunali, 1990). Bruner and Feldman (1993) also reported how adolescents with high functioning autism gave relatively fragmented narratives in a story telling task. For example, when asked to retell stories about trickery and deceit in their own words, subjects appeared to understand the meaning of the story and recognised the psychological motivations behind it, but when retelling their story did not organise it around the salient episode. The authors concluded that the individuals with autism had a specific problem with constructing narratives and a more general failure to search for meaning, with their theory of mind problems being just one expression of this.

1.5.6 Criticisms of the Weak Central Coherence Hypothesis

The weak central coherence hypothesis has been questioned on the basis of some conflictual experimental findings (Mottron, Burack, Sauder & Robaey, 1999; Mottron, Peretz & Menard, 2000; Mottron, Burack, Iarocci, Belleville & Enns, 2003).
These conflictual findings generally come from a research approach which entails the use of experimental tasks involving hierarchical stimuli (e.g. large shapes or letters composed of smaller shapes or letters) to probe the perceptual processes associated with seeing the details versus the larger configuration. Global processing measures on these tasks are thus viewed as an index of central coherence, whereas local processing measures are seen as antithetical to efficient coherence processing. Mottron et al., (1999) administered two tasks of visual perception to a group of children with high functioning autism and a group of typically developing children matched for chronological age, IQ, gender and laterality. Efficiency in and interference between the processing of local and global information was examined with a visual hierarchisation task and the ability to parse whole stimuli into parts was assessed with a mental synthesis task. They found that individuals with autism displayed a global advantage in a paradigm in which the performance of the individuals without autism did not differ according to visual hierarchical level. They also found that the persons with autism demonstrated normal processing of holistic properties on a mental synthesis task. The authors suggested that such findings provided evidence of intact global processing among individuals with high functioning autism that is inconsistent with expectations based on a theory of weak central coherence. However, the discrepancy between traditional theories of global deficit and this study may be due to the differences in the nature of the tasks used in previous studies. Previous studies have used tasks entailing temporal measures of performance in the range of minutes, for example, block design, hidden figure tasks and visual illusions (Happe, 1996). In contrast, the tasks used by Mottron et al. (1999) were measured in terms of reaction times that were typically less than 1 second. Thus the discrepancies between the two groups of studies may reflect differences in processing not necessarily linked specifically to global-local processing.
The tasks with long-term response times are indicative of higher-order tasks that entail the use of higher-order perceptually categorised information, whereas the tasks with shorter response times involve precategorical processing.

Further evidence against the weak central coherence theory comes from an earlier study undertaken by Frith and Snowling (1986) who applied the methodology followed by Happé (1997) but also investigated the effect of ability level on performance by incorporating a learning disabled control group. Their findings suggested that an inability to use context to disambiguate homograph was a feature of low ability generally as opposed to being associated with a diagnosis of autism specifically. Contradictory evidence also comes from a study by Ropar and Mitchell (1999) who used an extended methodology to test out Happé’s (1996) findings with regard to judgements about visual illusions. They found no differences between groups of children with autism, children with Asperger’s Syndrome, children with learning disabilities and typically developing children in terms of errors of judgement about illusions. The autism group showed no advantage on the task which required them to manipulate the size of elements in the display about which they had to make judgements.

Finally, most recently Mottron et al. (2003) examined global and local visual processing in persons with autism compared to a typically developing group matched on age, gender and IQ, using a traditional task of hierarchical processing, three tasks of configural processing and a disembedding task that involved rapid perceptual processing. Their predictions were that if individual with autism are simply impaired in the ability to form mental representations of the global level structure, as implied by the original description of the theory (Frith, 1989; Frith & Happé, 1994) then the autism group should show
impairments in detecting global targets in both hierarchical letter detection tasks and the configural grouping task. Disembedding performance should be enhanced for individuals with autism because of their insensitivity to the global level of structure. However, their failure to find differences between adolescents with high functioning autism and their typically developing peers on several, though not all, of these commonly used measures of hierarchical processing, suggested some constraints on interpretation of the weak central coherence theory, particularly where the construct of coherence was equated with the global processing of visual and auditory paradigms.

In conclusion, such inconsistent findings may suggest that the constructs of global and local processing do not map as directly onto the weak central coherence theory as researchers initially assumed.

1.5.7 Executive Dysfunction Hypothesis

Apart from the triad of impairments in socialisation, communication and imagination, a feature that all diagnostic criteria of autism include is restricted, repetitive and stereotyped patterns of behaviour. The parallel, in terms of perseverative and repetitive behaviour, seen with patients who have suffered frontal lobe injury, has given rise to another major cognitive theory of autism (Happé & Frith, 1996). Executive dysfunction theory draws on the link between brain and behaviour established from neuropsychological studies (for a review of stereotyped behaviour and neuropsychological disorders, see Ridley, 1994).
Executive function is an umbrella term covering a wide array of higher cognitive processes that underlie flexible goal directed behaviour; the ability to disengage from context, inhibition of inappropriate responses, planning sequences of willed actions, staying on task, monitoring performance and using feedback, and shifting attentional set (Duncan, 1995). These operations are typically associated with the frontal lobes, an area implicated in one of the first neurological models of autism (Alvisatos & Milner, 1989). Although there is little evidence of frontal damage in autism (Reichler & Lee, 1987) several studies have shown that children and adults with high functioning autism are impaired on tests of executive function. For example, there is evidence of significant perseveration on the Wisconsin Card Sort Test (WCST) (Ozonoff, Pennington & Rogers, 1991; Rumsey & Hamburger, 1988) and significant difficulty on the task testing planning ability, The Tower of Hanoi (Ozonoff, Pennington & Rogers, 1991).

The predicted consequences of executive dysfunction include a marked difficulty in novel or ambiguous situations coupled with intact performance on routine or well-learned tasks (Hughes, 2001).

It is evident that the scope of the term executive functions can be quite broad and different researchers have different notions regarding the focus of the executive dysfunction hypothesis. Pennnington et al. (1997) in more clearly defining the executive dysfunction hypothesis, proposed that in individuals with autism there is a severe, early disruption in the planning of complex behaviour, due to a severe deficit in working memory. As this deficit occurs very early in development, it disrupts not only the planning of behaviour but also the acquisition and use of concepts that require the integration of information within a context and across time. They proposed that several concepts that are fundamental to social understanding require such integration. These
concepts include recognition of intentions in one's self and others and their congruence or conflict. Such 'interintentionality' as Stern (1987) proposes, is a cornerstone for theory of mind. The child's earliest experiences of inter-intentionality occur, for example, in imitative exchanges during the first months of life. Pennington et al. (1997) suggest that a severe deficit in working memory would impair both the ability to imitate and the understanding of intentionality that arises from early imitative exchanges. They suggested that this hypothesis could account for some of the real-life social and communicative impairments of autism such as deficits in imitation, joint attention, theory of mind and symbolic play, which builds on both imitation and an understanding of goal-directed behaviour (Pennington et al., 1997). They have also suggested that it could explain the motor stereotypies and behavioural rituals as practised, propotent reactions that are not inhibited by a working memory representation of a more abstract goal for behaviour.

1.5.8 Criticisms of the Executive Dysfunction Hypothesis

As with other theoretical accounts within the field there are several areas around which the executive dysfunction hypothesis may be challenged. An early criticism of executive function accounts of autism was that executive impairments have little discriminative validity because they appear in several developmental disorders with quite different symptomatologies, including attention deficit hyperactivity disorder (ADHD) (Grodzinsky & Diamond, 1992); Tourette Syndrome (Baron-Cohen, Cross, Crowson & Robertson, 1994) and Conduct Disorder (Chelune, Ferguson, Koon & Dickey, 1986). Such findings prompted the argument that any kind of brain neurological dysfunction can produce secondary impairments of executive control. However, drawing upon
comparisons based on specific rather than global measures of performance has established both qualitative and quantitative distinctions between executive function impairments in different clinical groups (Ozonoff, 1997). For example, it has been hypothesised that the executive function impairments associated with ADHD are characterised as reflecting low-level problems of motor inhibition (Barkley, 1997; Douglas, 1983) while those associated with autism are characteristically high-level (i.e. cognitive) including specifically impairments in flexibility (Hughes et al., 1994; Minshew, Goldstein & Siegal, 1997; Ozonoff & Jensen, 1999).

A second criticism relates to the difficulties in identifying specific characteristics of executive dysfunction that are universal in autism. Attempts to establish the exact nature of executive dysfunction in autism have been hindered for several reasons. Firstly it seems that since the overall concept of executive function is so broad, separate research groups have adopted rather different theoretical frameworks in which different aspects of executive function are emphasised (Hughes, 2001). Secondly, developmental studies of executive function have only recently begun to be undertaken and are hindered by methodological issues, such as a lack of sensitive and reliable measures of executive function in young children. Related to this, it has also been difficult to investigate whether impairments in executive control exist in the larger population of less able individuals with autism, due to a lack of simplified executive function tasks (Hughes, 1994).

In addition, attempts to identify universal characteristics may be limited by inherent heterogeneity among individuals, for example related to age, ability and symptomatology. For example, as Turner (1997) argued, low-ability and high
functioning individuals with autism show contrasting types of repetitive stereotypies coupled with distinct patterns of executive function impairments. In particular, repetitive motor stereotypies were associated with perseveration in set-shifting; these difficulties were especially characteristic of low-functioning individuals with autism. In contrast, restricted interests were associated with impoverished generativity ability; these difficulties were more characteristic of the high-functioning group. From this perspective, heterogeneity in the nature of executive function impairments may therefore actually prove valuable in accounting for specific symptoms associated with autism, rather than just inconveniently limiting the generalizability of findings (Hughes, 2001).

Such difficulties relating to the specificity and universality of the executive dysfunction hypothesis suggest that the account needs further refinement. However, convergent findings across a number of studies highlight the potential utility of such an hypothesis. For example, a pattern of difficulty with perseveration, cognitive shifting ability (Bennetto et al., 1996; Ozonoff & McEvoy, 1994; Ozonoff et al., 1991) and working memory (Bennetto et al., 1996; Hughes et al., 1994) has been consistently reported. Other studies have suggested that inhibition is a relatively spared component of executive function in individuals with autism (Ozonoff & Strayer, 1997; Ozonoff et al., 1994; Burack & Iarocci, 1995) This uneven profile of intact and impaired abilities may provide a first step toward elucidating the causes of executive dysfunction in autism (Hughes, 2001).

1.5.9 Summary of Theoretical Accounts of Autism

In summary, the four theories presented here are the most widely researched within the literature and all provide plausible accounts with reasonable evidence in their support.
Each account is appealing for different reasons. The theory of mind account is plausible because many problems in social interaction and in communication can be understood as a consequence of the inability to realise fully what it means to be able to think, know, believe and feel differently from others. The social-affective theory makes sense of the difficulties individuals with autism have in emotional recognition. The central coherence hypothesis makes it possible to understand a broader cognitive phenotype that is not characterized by a deficit. The executive function hypothesis is helpful in understanding repetitive behaviour and may suggest ways of managing the everyday problems of people with autism.

Some researchers have considered the ways in which these psychological explanations may be related. For example, there has been some discussion as to whether executive deficits might be a fundamental cause of theory-of-mind problems in autism, or vice versa (Carruthers, 1996; Ozonoff et al., 1991; Russell, 1996). Potential links between theory-of-mind deficits and central coherence bias have also been considered (Frith, 1989b; Happé, 1994b; Jarrold et al., 2000). For example, Pennington et al. (1997) has investigated whether executive dysfunction theory can be subsumed by the central coherence theory (Happé 1994b; Yirmiya et al., 1992). Clearly the complexity and heterogeneity of autism poses a significant challenge for theoretical models. Given the variability of the many different features that together make up the syndrome of autism it is unlikely that there is a single underlying psychological deficit.

1.6 Anxiety in Children and Adolescents

Fear is the natural response to a stimulus which is perceived as posing a threat to well-being, safety or security. This response includes cognitive, affective, physiological,
behavioural and relational aspects. A distinction may be made between normal adaptive fears, which are premised on an accurate appraisal of the potential threat posed by a stimulus or situation and maladaptive fears, which are based on an inaccurate appraisal of the threat to well-being.

From infancy through childhood into adolescence, the types of stimulus which elicit fear change, and these changes parallel developments in the individual's cognitive and social competencies and concerns (Klein, 1994; Ollendick, King & Yule, 1994). The Piagetian model of cognitive development has been used to explain this course of age related changes in anxiety provoking situations (Bauer, 1980; Klein, 1994; Silverman & Rabian, 1994). As children's cognitive abilities develop, the stimuli that elicit normal fear and abnormal anxiety change from the predominantly concrete, such as a fear of animals, the dark or separation from caregivers in infancy and early childhood to the more abstract in adolescence, such as fear of negative evaluation by others. Ollendick, Yule and Ollier (1991), posited that these fears develop as the child is increasingly able to perceive potential dangers in different situations but has not advanced to the stage of understanding the situation fully or to being able to exercise control over the situation. Therefore, from this perspective, the fears are adaptive and reasonable because they constitute protective responses to stimuli that are neither comprehensible or controllable (Ollendick, Yule & Ollier, 1991). Given this understanding it is clear that transitory fears throughout childhood and adolescence are an adaptive part of normal development and that a substantial number of children will suffer from some degree of anxiety at any one time (Bauer, 1980).
For a number of children and adolescents however, fears that would normally subside as the child develops, continue long after their survival value has declined. A variety of causes, such as reinforcement patterns from significant others, may be involved (Craske, 1997). When this occurs the degree of anxiety experienced can be of a level that is considered clinically significant and can become debilitating to daily functioning. From a clinical perspective, children are typically referred for treatment of an anxiety problem when it prevents them from completing developmentally appropriate tasks such as going to school or socialising with friends (Carr, 1999).

Prevalence studies have highlighted anxiety problems to be one of the most common psychological problems among the general child and adolescent population (Bell-Dolan & Brazeal, 1993; Craske, 1997). Studies have suggested a point prevalence of around 5-10%, and lifetime prevalence around 20%, with estimates varying according to the population, level of impairment and measures used to determine the presence of a disorder (Essau, Conradt, & Petermann, 2000; Fergusson, Horwood, & Lynskey, 1993; Lewinsohn et al., 1993; Shaffer et al., 1996).

Alongside cognitive developmental understandings of anxiety disorders, psychoanalytic, cognitive, behavioural and family systems theories have been developed to explain how various anxiety problems evolve and how they can best be treated. Research and clinical accounts arising from these theories point to the complex, multidetermined nature of anxiety disorders in children and adolescents. Biological factors such as genetics and temperament, and psychosocial factors such as parental psychopathology and patterns of reinforcement have been considered in the aetiology of anxiety disorders in this population (Carr, 1999; King & Ollendick, 1997). In particular, childhood anxiety
researchers have begun to document the importance of cognitive factors in understanding and treating childhood anxiety (Kendall, 1994; Vasey & Daleiden, 1996). However, the level of complexity apparent in adult models (see Matthews & MacLeod, 1994) remains lacking in the child domain. The limited information and lack of empirical data on diagnostic groups presently available precludes separate consideration or a fine-grained analysis of the cognitive processes associated with specific childhood anxiety disorders. In addition, heterogeneity is likely to exist both within and across specific diagnostic categories (Daleiden & Vasey, 1997). Furthermore, there is considerable controversy about the DSM system of classification of childhood disorders with some mental health professionals arguing instead that childhood disorders are best described along multiple continua (Achenbach & Edelbrock, 1978; Quay, 1977). Although a thorough review of this debate is beyond the scope of this chapter, it is noteworthy that some researchers have argued that the significant overlap of symptoms among the childhood disorders raises questions regarding the discriminative validity and clinical utility of the disorders classified in the categorical system of DSM. An alternative to a categorical system is an empirically derived dimensional system of classification, such as that developed by Achenbach and colleagues (Achenbach, 1991, 1993; Achenbach & Edelbrock, 1983). From a multivariate standpoint, Achenbach and colleagues (Achenbach, 1991; Achenbach & McConaughy, 1992) developed the Child Behaviour Checklist (CBCL) and identified four specific narrowband syndromes in clinic referred children and adolescents of various ages who present with internalising problems. Research in this area has contributed to the delineations represented in the fourth edition of DSM. DSM-IV is based on the prototypical approach to classification, which combines features of both the categorical and dimensional approach by identifying essential symptoms of a disorder, while allowing for nonessential symptoms to occur (Barlow, 1992).
Nevertheless, although considerable improvement has been made over various DSM versions, problems remain and the classification of psychopathology in children and adolescents and some aspects of DSM remain controversial (Albano et al., 1996). For such reasons, attempts to discuss cognitive processes in specific diagnostic groups are almost certainly premature and this discussion shall focus broadly on cognitive processes relevant to the development and maintenance of childhood anxiety in general. Cognitive theoretical approaches and cognitive variables thought to be involved in the development and maintenance of anxiety and its disorders will now be discussed.

1.6.1 Development and Maintenance of Anxiety in Childhood and Adolescence

The recent cognition and childhood anxiety literature is informed by several more or less elaborated cognitive hypotheses or models including cognitive behavioural theory and the distortion-deficiency distinction (e.g. Kendall, 1993), the information processing perspective (e.g. Dalgleish et al., 1997), the content-specificity hypothesis (e.g. Ambrose & Rholes, 1993) and the State of Mind model (e.g. Schwartz & Garamoni, 1989). Much of the empirical research on childhood cognition and anxiety to date is aimed at testing these models. However, as the majority of research on cognition and childhood anxiety has been based on the cognitive-behavioural theory and the information processing perspective, only these approaches will be discussed here. These approaches essentially understand anxiety as resulting from heightened perceived threat and a decreased estimation of coping ability. An emphasis is placed on threat-related thoughts and biases in cognitive processes such attention, memory, thinking and making judgements.
1.6.2 Cognitive-Behavioural Theory and Childhood Anxiety

The cognitive-behavioural theory of childhood anxiety highlights the role played by negative or maladaptive belief systems in the onset and course of anxiety problems. Four elements of cognition are distinguished for the purpose of understanding the development of childhood anxiety, any one of which may become dysfunctional and precipitate the expression of anxiety problems (Prins, 2001).

First are cognitive schemas, which are organised bodies of information in memory derived through early experiences and parenting thought to guide the processing of information. New information and experiences are assessed against these schemas and information that reinforces and maintains them is selected and filtered. The second element relates to cognitive content, which is the information that is stored in schemas. Anxiety related schemata (or schemas) are typically organised around themes of threat and danger. These provide the basis for biased interpretations of external events by disproportionately focussing processing resources upon threat-relevant information (Kendall & Ronan, 1990).

The third element refers to cognitive operations, which transform environmental input and infer meaning from it. Distorted cognitive operations refer to processes of biased interpretation of external events. Common distorted cognitive operations in anxiety include catastrophizing, that is, anticipating the worst possible outcome for an event or overgeneralising, that is taking one single event as representative of all others. Finally, the fourth element of cognition is the cognitive products, such as conscious thoughts and
images (Prins, 2001). Negative thoughts or self-talk represent the outcomes of cognitive processes.

An important distinction to be made in the cognitive-behavioural theory of child anxiety is between ‘cognitive deficits’ and ‘cognitive distortions’ (Kendall, 1985, 1991, 2000). Deficits in cognitive processes signify the lack of or insufficient use of an adaptive cognitive skill or activity. For example, some authors have argued that children with social phobia present with social skill deficits such as lack of planning or verbal mediation (Spence, Donovan & Brechman-Toussaint, 1999). Alternatively, cognitive distortions occur not in the lack of information processing but in the presence of maladaptive thinking. Distortions refers to cognitive processes that are biased or erroneous and therefore yield dysfunctional and maladaptive thoughts and images.

Kendall (2000) suggested that making such a deficiency-distortion distinction is useful therapeutically in that it allows clinicians to target the specific nature of the dysfunction. For example, addressing deficiencies might entail working toward more thoughtful and meaningful problem solving by eliminating impulsive acting without thinking. Alternatively, cognitive distortions may need first to be identified, recognised as problematic and subsequently corrected.

1.6.3 Development of an Anxious Cognitive Style in Children

From the perspective of cognitive behavioural theories, dysfunctional schemas are formed in early childhood. Specific patterns of parent-child interactions have been implicated in the development of a certain ‘anxious cognitive style’ in children and the
overestimation of threat and danger. For example, Barrett et al., (1996) studied the extent to which family interactions influenced children's interpretations of ambiguous situations and their coping behaviour. Parental negative feedback about possible physical and social threat and dangers was found to be associated with high anxiety in children. Such research lends support to the notion that the socialisation of anxiety is in part, based on the transmission of information processing styles in the children's early environment.

Central to much of the research investigating family variables in childhood anxiety is the notion of 'control' or perceived control' (Chorpita, Brown & Barlow, 1998; Ginsburg et al., 1995). Essentially, such control refers to the extent to which children believe that their behaviour can influence events and outcomes. Low perceived control has been suggested as the core feature of anxiety (Barlow, 1988). Adults with anxiety disorders have described having family environments that were more likely to have limited experiences with control over various events, with parental overprotection and discouragement of autonomy being related to subsequent anxiety (Parker, 1983). Early experiences with uncontrollability are therefore seen as an important factor in the development of childhood anxiety with parents playing a crucial role in this developmental process. Chorpita, Albano and Barlow (1996) have suggested that there are three parenting mechanisms which may play a role in influencing the degree of cognitive biases in children. The first two concern the influences of modelling and the parent's rewarding of anxious cognition in their child. Thirdly, parents may 'prime' the activation of cognitive structures related to threat by exposing the child to their anxious ideas. In the adult literature, factors such as state anxiety, stress and other transient variables have been suggested as moderators of the relation of trait anxiety to cognitive
biases (Prins, 2001). Based upon this evidence Prins (2001) has suggested that transitory influences from parents might similarly affect processing phenomena in children. For example, cognitive structures related to threat may be more easily or more continuously activated in anxious individuals when primed by previous exposure to threatening words.

In considering more closely the mechanisms by which parents convey a cognitive vulnerability to their children, Kortlander, Kendall and Panichelli-Mindel (1997) suggested that parental cognitive factors, such as maternal expectations, may be linked to the development of anxiety in their children through parenting behaviours such as overprotection and excessive control. Such parental behaviour would contribute to the child's development of a perception of danger and low coping, either through an internalisation of parental fears about what might happen or through a process of parental modelling of anxious behaviour. Similarly Kortlander et al., (1997) found that mothers' expectations of their anxious child's coping were more negative than the expectations of mothers of normal children. Thus lowered expectations for coping may relate to protective parenting which may maintain anxious behaviour and cognition in children. Clearly parental beliefs and behaviour are important forces in the development of children's own beliefs (Kortlander et al., 1997).

1.6.4 Information-Processing and Childhood Anxiety

In an attempt to elaborate upon theories of childhood anxiety, Daleiden and Vasey (1997) attempted to integrate Kendall's cognitive theory of childhood anxiety with the information processing perspective, specifically the social information-processing model of Dodge (1991; Crick & Dodge, 1994). Daleiden and Vasey's information processing
perspective divides cognitive processing into a sequence of steps providing a framework for organising predictions regarding cognitive factors in childhood anxiety.

Consideration of the cognitive operations active during each stage in the sequence facilitates elaboration of the types of deficits and distortions Kendall considered to be characteristic of anxious children. It is Daleiden and Vasey's information processing perspective on childhood anxiety which shall be used in this study as it provides a useful framework for modelling the diverse cognitive biases and distortions that appear to operate in childhood anxiety (Daleiden & Vasey, 1997; Gotlib & MacLeod, 1997; Vasey & Daleiden, 1996).

This model consists of six stages that describe the flow of information through the processing system (Crick & Dodge, 1994). These six stages shall be described below:

*Encoding*

During the encoding stage information is selected, either automatically or consciously, for further processing while other information is ignored. Attention, a term used to describe the assignment of processing resources among various cues is the most important process at this stage. The model emphasizes two primary dimensions of attention. Attentional selectivity denotes the degree to which attentional resources are allocated to some cues at the expense of relatively ignoring others. Attentional intensity refers to the amount of processing resources allocated to the encoding of cues, as opposed to other stages of processing. Kendall's theory highlights the potential for cognitive distortions to arise from biased processing at this early stage of the information processing sequence. For example, anxious children have been found to selectively attend to emotionally threatening information, possibly because their chronically active
threat schemas enhance their processing of threat-relevant stimuli (Kendall & Ronan, 1990). Several recent studies have shown that such attentional biases are operative among children with a fear of spiders (Martin et al., 1992) and high levels of test anxiety (Vasey et al., 1996).

In addition to the biases of selective attention, the potential importance of intensity of attention in anxious children has also been noted. Although studies of attentional intensity have yet to be conducted with samples of anxious children, Daleiden and Vasey (1997) have suggested that in processing threat-relevant information anxious children may be acutely vigilant for signals of potential threat, which may readily trigger subsequent processing and consequently anxious responding. From this perspective, cognitive distortions arise when very minor threat cues are encoded and interpreted quickly leading to a conclusion that the situation is dangerous even though the search for further information would show that it is not.

**Interpretation**

The interpretation stage involves attaching meaning to the information that is encoded. Three types of interpretive dimensions have been considered – the appraisal of the meaning of ambiguous information, attributing causation or intent and generating outcome expectation (Daleiden & Vasey, 1997). Based upon Kendall’s theory there is potential for anxiety-relevant biases for each of these interpretative dimensions. Firstly, anxious children are thought to interpret ambiguous information as threatening and to perceive a disproportionate number of stimuli as threatening (Barrett, Rapee & Dadds, 1996; Chorpito, Albano & Barlow, 1996). Secondly, in terms of causal interpretations anxious children are thought to assign higher probability and likelihood estimates to
threatening interpretations, such as attributing threatening intentions to others (Kendall & Ronan, 1990). In addition, children with anxiety problems have been found to make significantly more internal, stable and global attributions for negative events than their non-anxious peers (Bell-Dolan & Last, 1990). This type of negative attributional style may decrease children’s sensitivity to potentially corrective information and therefore decrease the influence of external controls on anxious responding.

**Goal clarification**

The goal clarification or construction stage is when a new goal may be activated or constructed to meet the perceived demands of the situation or the current goal may remain active. Goals are viewed as ‘focussed arousal states that function as orientation towards producing particular outcomes’ (Crick & Dodge, 1994, p.76). In relation to childhood anxiety, Daleiden and Vasey (1997) suggest that the goal stage processes may constitute the mechanism underlying the shift from cognitive approach toward threatening information to behavioural avoidance of anxiety-provoking stimuli. For example, if anxious children adopt a general goal oriented toward personal safety and security as noted by Beck and Emery (1985), then they may enter situations with a specific goal oriented toward early detection of threatening information. In order to maintain their safety once threatening information is encoded and interpreted, anxious children may change their specific goals toward escaping and avoiding the situation and threat cues (Daleiden & Vasey, 1997).

**Response Access or Construction**

The remaining stages of the information processing sequence are primarily concerned with the production of cognitive and behavioural responses to anxiety-provoking
situations and stimuli. In the response access or construction stage, children retrieve possible responses from memory or generate new responses based on the available social cues. Compared to less anxious peers, high-anxious children in general show a greater reliance on responses directed toward avoidance and distraction (Vasey & Daleiden, 1996). This tendency may stem from a bias in one or all of the final three stages of processing. With regard to response access or construction, drawing upon Kendall’s theory of childhood anxiety (Kendall & Ronan, 1990) specifically the idea of cognitive deficits, anxious children may be deficient in their knowledge of potential responses to anxiety-provoking situations or may be deficient in their ability to access their knowledge during such a situation (Vasey & Daleiden, 1994, 1996). For example, they may not access or generate as many problem-focussed responses as their less anxious peers because their developmental history was deficient in opportunities to acquire such skills (Vasey, 1996). Alternatively, anxious children may be deficient in accessing or constructing these responses because this stage of processing is disrupted through anxiety-related interference (Vasey & Daleiden, 1996).

Response selection

In the response selection stage possible responses are evaluated in terms of self-efficacy expectations and response appropriateness and the most positively evaluated response is selected for enactment. Several studies have indicated that anxious children do tend to disproportionately select avoidant responses (Dadds, Barrett, Rapee & Ryan, 1996; Vasey, Daleiden & Williams, 1992). There are a number of factors which may influence this bias towards selecting escape-avoidant responses. For example, it may be due to deficient knowledge of which responses are most likely to be effective given the demands of the situation (Vasey & Daleiden, 1996). Alternatively, a failure to encode
subtle contextual cues, perhaps due to the allocation of attentional resources to processing threat cues, may prevent the matching of responses to situational factors. Thus, anxious children may select responses based on their emotional state or the operation of threat schemas rather than on specific situational determinants. In addition, anxious children may not select particular responses because their self-efficacy beliefs or outcome expectations for those responses are low compared to escape-avoidant responses.

*Enactment*

Finally, the enactment stage involves the production of the selected response. Anxiety-related enactment deficits may arise from different sources. For example, due to increases in negative affect and the processing demands required to support other information-processing biases, such as attentional biases toward threat cues, the ability of anxious individuals to enact various responses may be impaired because there are insufficient processing resources available to support effective behaviour. As well as such enactment or performance deficits which stem from cognitive interference, anxiety relevant problems in the enactment stage may involve deficits in various skill domains. For example, in avoiding situations in which children normally develop and refine important skills, it is possible that anxious children develop skill deficits that may further foster their anxiety by preventing effective coping responses, increasing the likelihood of further anxiety-provoking failures (Vasey, 1996).
1.6.5 Summary of an Information Processing Account of Childhood Anxiety

Crossing Kendall's theory of childhood anxiety with Dodge's model of information processing has provided a useful framework for considering anxiety-related distortions and deficits at each stage of the information-processing sequence. Specifically, it has highlighted how the chronic overactivity of threat related schemas in anxious children contributes to encoding processes characterised by selective attention to and narrow focus upon threatening information. Anxious children may interpret ambiguous information as threatening, adopt a negative attributional style, expect negative outcomes and ascribe low probability for coping successfully with threat and anxious emotion itself. Such early anxiety-related biases in attention and interpretation may prompt children to adopt a goal of maintaining personal safety through avoiding and escaping threat cues. As a result, anxious children may engage in more escape/avoidant than proactive problem-focused coping. These enactment deficits may result from difficulty retrieving proactive responses during anxiety-provoking situations, evaluations of responses based on negative self-efficacy, outcome and consequence expectations, or deficits in skills required to successfully implement proactive, non avoidant coping responses.

1.7 Anxiety in Adolescents with High Functioning Autism

The nature and prevalence of psychological difficulties including anxiety in the general child and adolescent population are beginning to be well documented (e.g. Kendall & Chansky, 1991; Kendall & Ronan, 1990; Vasey, 1993; Vasey & Daleiden, 1996). However, only a few studies have considered in any depth the experience of emotional
or psychological distress among children and adolescents with high functioning autism – these studies shall now be considered. Given the earlier discussion outlining the difficulties in diagnostic differentiation between high functioning autism and Asperger Syndrome (see pages 4-7), research relating to both subgroups of autism shall be reviewed, using the diagnostic categories employed by the authors.

Identifying the paucity of research in this area and recognising the potential clinical utility of such work, Gillott, Furniss and Walters (2001) investigated the nature and extent of anxiety in children with high functioning autism, aged 8-12. They administered measures of anxiety and social worries and used two comparison control groups consisting of children with expressive language disorder and typically developing children. Despite some problems with the research design due to within group variability in terms of diagnosis and intellectual ability, the study yielded some informative results. Children with autism were found to be more anxious than both control groups, particularly on the scale of separation anxiety.

Kim et al. (2000) investigated the prevalence of anxiety and mood problems among children with autism. The results of their study confirmed that compared with a sample of community children, children with autism exhibited greater rates of anxiety and depression problems at the mean age of 12, as measured by parent questionnaires. Moreover, a substantial proportion of the high functioning cohort scored at ‘clinically relevant’ levels on scales including generalised anxiety. These emotional problems were also having an important impact on the parents and children’s lives. For example, children with anxiety and mood problems were more aggressive, limited their parents’ social activities and had poorer relationships with teachers, peers and family members.
Use of typically developing children as a comparison group enabled demonstration that increased anxiety and mood problems were specific to the autism group rather than being typical of children more generally.

In a similar study, Green et al. (2000) compared the social and emotional functioning of adolescents with Asperger Syndrome with adolescents with behavioural difficulties. They found that all but one of the Asperger Syndrome individuals had a number of psychological difficulties in addition to the symptoms attributable to their core disorder. Specifically, they found that the Asperger Syndrome group were experiencing significantly greater anxiety, such as worrying, hypochondriasis, panic or specific fears. This study had to its advantage the use of a clinical comparison group, which enabled authors to rule out the general effects of increased anxiety problems being caused simply by membership of a clinical population. Similarly, a high representation of internalising symptoms were found in Szatmari et al.'s (1989) study of Asperger Syndrome at mean age 14.

In summary, data from recent research would suggest that a proportion of children with high functioning autism and Asperger Syndrome experience anxiety, sometimes at clinically significant levels. For this group, adolescence appears to be a particularly anxiety provoking time. Several authors and clinicians have commented upon this heightened experience of anxiety and panic at puberty (e.g. Gillberg, 1984; Komoto, Usui & Hirata, 1984). Thus, the study of anxiety during this transitional stage for high functioning individuals would be of great value and interest. There is also evidence from studies of adults with autism to suggest that such anxiety problems persist through into adulthood. This evidence will now be discussed.
1.8 Anxiety in Adults with Autism

The majority of studies which have considered psychological difficulties in autism are interested in the prognosis for children and consequently take the form of follow-up outcome studies (Howlin, 1997; Rumsey, Rapoport & Sceery, 1985; Szatmari et al., 1989). The results of these studies suggest that despite good prognosis for adults with high functioning autism in terms of social functioning, education and employment (Szatmari et al., 1989), emotional difficulties, for example anxiety, in adults with autism are not uncommon (Lainhart & Folstein, 1994; Tantam, 1991; Tsai, 1996; Wing, 1981). Consideration will now be given to these outcome studies, particularly those that discuss the prevalence of anxiety problems in adults with high functioning autism, commenting upon methodological issues in the process.

In her seminal paper considering Asperger Syndrome, Wing (1981) identified problems with anxiety and depression in many clients, especially those in late adolescence and early adulthood. Amongst other emotional difficulties, Frith (1991) reported an overall prevalence rate of 7% for clinically significant anxiety in her sample of adults with autism. Tantam’s (1991) clinical study of 85 adults with Asperger Syndrome found four of the sample presenting with anxiety problems and two with anxiety and depression, giving an overall rate of clinically significant anxiety of 9%.

In Rumsey, Rapoport and Sceery’s (1985) follow up study of the emotional, social and behavioural outcomes in 14 males with high functioning autism, half of the sample were found to have chronic generalised anxiety problems – significantly more than comparison groups of lower functioning adults. Of particular interest in Rumsey et al.’s
study is that in addition to the more typical measures of structured clinical interviews, including carer and self-report, they also undertook behavioural observations of each individual within a ward and laboratory setting. This additional measure entailed a five-day period of admission allowing for the extensive study of behaviour within the context of the ward. This process has to its merit that it allowed for the collation of additional information not necessarily gleaned from clinical interview situations but has as its drawback the fact that such information cannot be reliably assumed to be representative of the individual’s behaviour in a naturalistic setting.

In a design similar to Rumsey et al. (1985), Szatmari et al. (1989) found anxiety problems in seven out of 16 adults, suggesting slightly better outcome than for Rumsey et al.’s sample. However, differences in design and sampling procedures may account for these differing results (Szatmari et al., 1989). For example, Szatmari et al. sampled only non-learning disabled autistic individuals whereas Rumsey et al.’s sample included a sub-group of lower functioning adults. Szatmari et al.’s study also had a greater length of follow-up, between 11 and 27 years, and it is thought by certain authors that improvement in general functioning in individuals with high functioning autism occurs with age (Howlin, 1998). Furthermore, the sampling for Szatmari et al.’s study was undertaken systematically, by recruiting children from the same year of birth at a centre specialising in the treatment of high functioning autistic children, thereby going some way to ensure that improved cases did not drop out of follow up. Rumsey et al., however, recruited through a National Society for Autistic Citizens Letter, provoking speculation that the parents who continued to receive this letter had children who were less able or a child whose outcome was not likely to be as good.
Ghaziuddin, Wedmer-Mekhail and Ghaziuddin (1998) investigated psychological difficulties in individuals with Asperger Syndrome. At the 2-year follow up they found that whilst problems with anxiety were present in twenty-three out of the thirty five subjects, only one displayed difficulties that were of a clinically significant level. These results however, like most of the studies presented here, were based upon a relatively small sample (n=35) with a wide age range of 8 to 51 years.

There are a number of methodological constraints in the generalisation of findings from these studies. For example, Rumsey et al. (1985) themselves acknowledge that their high functioning sub group was drawn from among the 5-15% of those with best clinical outcomes and therefore they cannot be assumed to represent the high functioning group more broadly. Alternatively, other studies, such as Wing (1981) acknowledge that their samples were biased in that individuals had been drawn from adult mental health services. This is also the case for Ghazziudin, Wedmer-Mekhail and Ghaziuddin (1998) whose sample was drawn from consecutive referrals to a specialist service. The authors themselves argued the need for large-scale population based studies to offer accurate incidence rates and to clarify the occurrence of psychological and emotional difficulties in people with high functioning autism (Wing, 1981). It is possible too that higher rates of anxiety are more easily recognised in those with high functioning autism because they have enough speech to convey their symptoms. Individuals with lower functioning autism may experience equal levels of anxiety but their limited communicative ability makes it more difficult to identify and measure.

In summary, researchers are now beginning to recognise an association between high functioning autism, Asperger Syndrome and anxiety (Lainhart & Folstein, 1994;
Tantam, 1991; Tsai, 1996; Wing, 1981). Despite the limitations of design and methodology, such studies indicate that problems with anxiety may be a risk for people with autism as they progress through adolescence into adulthood.

1.9 Development and Maintenance of Anxiety in Children and Adolescents with High Functioning Autism

Despite the evidence to suggest that individuals with high functioning autism present with increased levels of psychological and emotional distress such as anxiety relative to the general population, the theoretical basis of anxiety in this population remains under researched. This is probably due to the heterogeneous nature of high functioning autism and the problems it encompasses making it a challenging area to study.

Given the limited research base it is possible that drawing upon both a mainstream cognitive model of anxiety in childhood and theoretical accounts of autism may help in understanding factors possibly associated with the development and maintenance of anxiety in children with high functioning autism. The information processing perspective, specifically Daleiden and Vasey’s (1997) information processing model of childhood anxiety, discussed in earlier in some detail (see pages 42-47) seems appropriate in trying to understand the experience of anxiety in adolescents with autism. This model was chosen because the division of cognitive processing into a logical sequence of steps provides a coherent framework for hypothesising about the potential diverse effects of cognitive factors and impairments associated with autism upon the experience of anxiety in this population. The following discussion shall form the basis for generating this study’s hypotheses relating to the possible factors associated with anxiety in adolescents with autism.
The first element of cognitive theory postulates that through early experiences and parenting, anxious children develop schemas around themes of threat and danger. In general terms, they develop a view of the world as a place that is threatening and of themselves as vulnerable, lacking the self-efficacy to deal with threat. They may also view the future as unpredictable and full of danger (Blackburn & Davidson, 1990). It is likely that danger and threat related schemata in children with autism are laid down in much a similar way to typically developing children; that is, through adverse or stressful life events such as peer rejection and victimisation, early experiences of uncontrollability (Barlow, 1988) and parent-child interaction such as high levels of parental criticism and overcontrol (Whaley, Pinto & Sigman, 1999). Such core, generalised beliefs provide the basis then for biased interpretation of external events. However, there are certain characteristics of autism which may make them more likely to process and interpret information in a biased way, to make certain cognitive distortions and to engage in behavioural avoidance. These characteristics shall be discussed at different stages of the information processing sequence.

**Encoding**

According to the social-affective hypothesis, individuals with autism have a deficit in the ability to recognise and understand emotion in themselves and others (Capps, Yirmiya & Sigman, 1992; Hobson, 1986a,b). In making realistic appraisals about situations it is likely that typically developing children draw upon a number of social cues including their innate ability to perceive and respond emotionally to others from direct observation of their facial expression. From this perspective, if the individual with autism is impaired in their ability to recognise affect in others they will overlook important information for the accurate appraisal of situations from social cues such as body language, facial
expression and tone of voice at the encoding stage of the information processing sequence. Without such information they may deploy attention based upon their threat-related knowledge structures making them more likely to detect and attend to minor threat cues.

Further, the ability to accurately label and monitor one’s ongoing affective state is crucial for affective self-regulation such as coping with anxiety. Being able to do so is central to cognitive-behavioural therapy for emotional distress (Kendall, 2000). For example, the child is required to recognise signs of overwhelming anxious arousal and to let these signs serve as cues for the use of anxiety management strategies. From this perspective, if individuals with autism have difficulty distinguishing different emotions, the physical symptoms of anxiety may not be encoded or recognised as such and their uncomfortable aroused state may be interpreted somewhat idiosyncratically. Misinterpretation of somatic arousal is likely in turn to undermine the ability to generate appropriate coping responses in anxiety provoking situations, such as the application of effective self-distraction skills, later at the response access or construction stage of the information processing sequence. Thus for children with autism anxiety-related attentional biases at the encoding stage of the information-processing sequence may be associated with difficulties recognising and understating emotions in themselves and others.

Secondly, executive function deficits may be associated with selective attentional processes at the encoding stage of the information processing sequence. Although research has suggested that individuals with autism can demonstrate different types of executive dysfunction, studies have highlighted specific difficulties in planning and set-
shifting (Hughes, Russell & Robbins, 1994). In correcting cognitive distortions in anxiety, children are taught about their selective attentional processes and their tendency to attend to signals of threat. They are encouraged to consciously compensate for this habit by broadening the information to which they attend. If individuals with autism are impaired in their ability to either shift attention away from a given cue or in transferring attention towards another cue this is likely to impact upon their ability to move away from a threat-biased subset and to seek out all relevant information before making an interpretation. Having made a biased or distorted interpretation their difficulty in shifting mental set may then make it more difficult to challenge these distortions with more adaptive alternatives.

Interpretation

Theoretical accounts of autism, specifically difficulties associated with theory of mind, may be associated with anxiety related cognitive biases at the interpretation stage of the information processing sequence. In making realistic appraisals about novel situations it is likely that typically developing children draw upon rich social cognitive schemata involving the intentions and plans of other people. These will have been shaped in part by their innate ability to infer other people’s mental states and to appreciate the world from another’s perspective, using this information to interpret what others say, make sense of their behaviour and predict what they will do next (Howlin, Baron-Cohen & Hadwin, 1999). Without this innate ability, it is possible that children with autism are more likely to draw the wrong conclusions about situations and make anxiety-related biases and interpretations, based upon their threat-related knowledge structures. For example, confusion stemming from not being able to apply mental states to understand the complexities of social interaction and social rules means that in the face of negative
events the individual with autism may be more likely to feel vulnerable and assign
threatening interpretations, such as attributing threatening intentions, to others.

Alternatively, if individuals with autism possess an underdeveloped or unsophisticated
theory of mind as opposed to a complete deficit as some authors would suggest (Baron-
Cohen, 1989a; Bowler, 1992) it is possible that they become proficient in working out
meanings of communicative utterances but only through relying on typical schemata or
rigid rules in familiar situations where the intentions are predictable. However, there is
still potential for confusion in novel situations which call for more flexible
interpretations to fully explain the behaviours or intentions of others, such as when faced
with unusual reactions or new figures of speech. From this perspective the effect of
depending upon a limited number of rules or schemata for understanding social
interaction may be feelings of vulnerability and private self-consciousness for the
individual with autism. Private self-consciousness is understood in models of anxiety to
represent a tendency for self-focussed processing which reduces the attention available
for processing new information that is incompatible with beliefs (Wells, 1997). It is
possible, therefore that anxiety in autism is associated with deficits or impairment in
theory of mind increasing the potential for perseverative self-focused processing and
anxiety-relevant biases at the interpretation stage of the information processing
sequence.

Another theoretical account of autism which may be associated with biases in cognitive
processing at the interpretation stage relates to a lack of strong drive for central
coherence, posited by Frith and Happé (1994) to be the underlying problem in autism.
This theory suggests that individuals with autism fail to process information for meaning
in context. If individuals with autism miss what others would regard as salient
information for making judgements about a situation they are likely to be compromised in their ability to construct comprehensive interpretations based upon the more global context. Since social functioning depends heavily upon the integration of information and the application of meaning to stimuli, it gives a reasonable explanation for the social impairment of people with autism. Weak central coherence can lead to a focus on seemingly insignificant details of the environment and a failure to take the wider context or meaning of a situation into account. Rather than being driven to encode and process stimuli for meaning and relevance, the individual with autism may deploy attention according to their threat-related knowledge structures, making them more likely to detect and attend to even minor threat cues. Drawing upon the context of the speaker’s mental state to extract meaning is particularly important for the effective understanding and interpretation of ambiguous linguistic material such as the intentions behind irony, metaphor and figures of speech. Indeed these utterances taken literally and without reference to context could be quite disturbing and open to threat-relevant interpretations. Thus, anxiety-related biases at the interpretation stage of the information-processing sequence may be associated with weak central coherence in individuals with autism.

Response access or construction

As well as anxiety associated with attentional biases and cognitive distortions occurring at the encoding and interpretative stages of the information processing sequence, the childhood anxiety literature has also considered the role of cognitive or behavioural deficits in the development and maintenance of anxiety. For example, Spence, Donavan and Brechman-Toussaint (1999) found that compared to nonanxious children, children with social phobia manifest relatively poor social skills and social competence as
measured by parent and child reports and direct behavioural observation at school and during role play.

In the context of such literature, some researchers have proposed that anxious children are deficient in their knowledge of potential responses to anxiety provoking situations (Daleiden & Vasey, 1997) and that they may not access or generate as many problem-focused responses because their developmental history was deficient in opportunities to acquire such skills (Vasey, 1996). As a result, these children show a greater reliance on responses directed towards avoidance and distraction at the response access or construction stage of the information processing sequence.

Communication and socialisation difficulties are implicit with a diagnosis of autism yet adaptive skills in these areas are important for generating and selecting constructive coping responses when dealing with anxiety-provoking situations (Spence et al., 1999). It is possible therefore that anxiety in individuals with autism is associated with actual social or language skill deficits at the response access or construction stage of the information processing sequence. That is, individuals with autism may have skill deficits in areas associated with constructive cognitive and behavioural responses to anxiety-provoking situation and stimuli. For example, they may lack the skills necessary to elicit empathy or helpful behaviours from others. This in turn, may lead to expectancies of poor outcomes and negative thoughts relating to future situations in which evaluation by others is likely. Such negative thoughts and expectancies generate affective and physiological response of anxiety and avoidance behaviour. Similarly this avoidance of anxiety provoking situations may reduce their opportunities for learning or developing adaptive skills, further contributing to the perpetuation of the anxiety cycle.
Response selection

An alternative perspective would be that rather than having skill deficits or being deficient in their knowledge of other strategies, children with autism access escape/avoidant coping responses to anxiety-provoking situations at the response selection stage because they lack the confidence in their ability to effectively engage in more constructive coping. Indeed, perceived self-efficacy is thought to play a role at the response selection stage of information processing sequence (Daleiden & Vasey, 1997). For example, researchers have suggested whilst anxious children have appropriate knowledge of problem-focussed, nonavoidant responses they do not select these because their self-efficacy beliefs or outcome expectations for these responses are low compared to escape/avoidant responses (Spence et al., 1999). Consideration of children’s self-efficacy may be particularly relevant given that anxious children seem to be biased toward ascribing high probabilities to negative outcomes and undervaluing their own abilities (Chorpita et al., 1996; Leitenberg et al., 1986).

Although few researchers have empirically considered the perceived self-efficacy of individuals with autism it has been suggested by Sigman and Capps (1997) that during adolescence those who are more intellectually able are acutely aware of their lack of social competence. One of the few studies to consider the perceived self-competence of individuals with high functioning autism compared to typically developing adolescents, found that the autism group perceived themselves to be less competent than other children their age in all but the cognitive domain (Capps, Sigman & Yirmiya, 1995). That is they perceived themselves to be less competent socially and physically and reported lower estimates of their overall self-worth than did adolescents in the comparison group.
It is possible therefore that for children with autism selection of escape/avoidance responses at the response selection stage of the information processing sequence is associated with a lack of perceived social competence and low estimations of their coping ability. To stay within an anxiety-provoking situation, children need to repeatedly evaluate the efficacy of their responses in regulating their emotion, the effect their behaviour is having on the situation and others in the situation and the success of their performance. In the face of such ongoing evaluations, children place themselves at risk for worrying, catastrophising and denigrating themselves which may feedback to increased anxiety and decreased problem-solving efficacy (Vasey & Daleiden, 1996). Thus for children with autism, selecting strategies for escaping from anxiety-provoking situations may be negatively reinforced through the removal of perceived environmental threats but also through the removal of demands to continue processing potentially negative outcomes of the situation and the possibility of poor performance.

1.9.1 Using an Information Processing Model in Understanding Anxiety in Children with High Functioning Autism: Summary

This section has attempted to consider the experience of anxiety in children with autism from the perspective of a mainstream model of psychological distress, namely Daleiden and Vasey’s information processing perspective of childhood anxiety (1997).

Theoretical accounts of autism have been drawn upon to highlight how individuals with autism may be susceptible to anxiety related biases at different stages of the information processing sequence. The social affective hypothesis has highlighted how an impaired ability to recognise and understand emotions in themselves or others means they may
overlook important social cues in the accurate appraisal of situations at the encoding stage. Executive function deficits have also been discussed as a contributory factor to selective attentional processes at the encoding stage. Difficulties related to theory of mind have been associated with possible cognitive biases at the interpretation stage of the information processing sequence. For example, without an innate ability to infer other people’s mental states the individuals with autism may be more likely to feel vulnerable and assign threatening interpretations in the face of negative events. Weak central coherence has also been drawn upon to highlight how their difficulty in processing information for meaning may result in individuals with autism overlooking salient information for constructing comprehensive interpretations based upon the more global context. The social or language skill deficits of children with autism have been considered in relation to the response access or construction stage of the information processing sequence. From this perspective individuals with autism may lack the skills associated with constructive behavioural responses to anxiety provoking situations. Finally, the selection of escape/avoidance responses at the response selection stage of the information processing sequence has been considered in relation to possible lack of perceived competence and low estimation of coping ability for children with autism.

1.10 Methodological Issues

The aim of this study is to investigate the level of anxiety in adolescents with high functioning autism. The possible factors associated with anxiety in this group will also be considered in the light of Daleiden and Vasey’s information processing perspective of childhood anxiety and theoretical accounts of autism. Methodological issues and design
considerations from the literature reviewed will now be drawn upon to inform the design of this study.

1.10.1 Measures

Most studies investigating anxiety within the general child population have several components to their design, employing clinical interview and parent and teacher report, as well as using child self-report questionnaires. The use of self-report measures within the general child literature has highlighted that children provide an invaluable insight into their subjective feelings of distress (Greig & Taylor, 1999; Yule, 1997). Some studies have suggested that parents may be less reliable reporters of internalising problems than children themselves (e.g. Herjanic & Reich, 1982). In particular, the literature indicates that self-report is an important method of assessing adolescent anxiety, given that many aspects of anxiety represent subjective cognitive and emotional experiences that are not open to observation by others. Commonly used measures include the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978), the State-Trait Anxiety Inventory for Children (Spielberger, 1973) and the Fear Survey Schedule for Children-Revised (Ollendick, 1983). The content of such self-report anxiety measures employed in the literature have focussed on the general aspects of trait or state anxiety or specific fears.

Spence, Barratt and Turner (in press), have commented upon the utility of such self-report measures but also noted that traditional child and adolescent self-report measures of anxiety, as used in some of the literature discussed, represent downward extensions of adult anxiety scales, and include items that may be of less relevance to anxiety in younger populations.
In response to such limitations, clinical researchers have sought to develop specific instruments for child and adolescent populations. Specifically, the Spence Children’s Anxiety Scale (Spence, 1998) has been shown to have good test-retest reliability and internal consistency for use with children and adolescents (Muris et al., 1998; Muris et al., 1999).

The studies of adults with autism have also employed a similar range of methodologies including clinical interviews, behavioural observations, and measures of social-adaptive functioning, cognitive assessment, carer report and some self-report to address anxiety or emotional distress more broadly. However as research into anxiety problems in children with high functioning autism is only just beginning to be undertaken and methodologies are more restricted.

In their follow up study of anxiety and mood problems among children with autism and Asperger’s Syndrome, Kim et al. (2000) used a parent questionnaire to measure children’s emotional and behavioural states over the past 6 months. This was a revision of the Child Behaviour Checklist (Achenbach, 1978) with added questions to measure DSM-III-R problems, including anxiety disorders. They also undertook a full psychometric evaluation to measure aspects of cognitive functioning. However, the authors of the study themselves acknowledged that a better assessment of psychological difficulties would have been possible had they also interviewed the children themselves, stating that by not doing so they may have underestimated the prevalence of these problems (Kim et al., 2000).
Green *et al.* (2000) in their study of the social and psychological functioning of adolescents with Asperger's Syndrome did consult the children themselves by employing a semi-structured general clinical interview designed for use with children or adolescents. They also used a social and emotional functioning interview with parents to elicit information on difficulties in day-to-day functioning. Green *et al.* found that adolescent self-reports corresponded well with parental reports highlighting that individuals with autism could accurately report on their symptoms in a way which related to others' description of their emotional states.

In their methodology, Gillott, Furniss and Walters (2001) used standardised self-report instruments such as the Spence Children's Anxiety Scale (1997a) and Spence Social Worries Questionnaire (1995a) to consider the occurrence of anxiety in children with autism. Significantly, this research highlighted that children with high functioning autism do have the cognitive ability to report feelings and emotions. Self-report measures have also been successfully used to assess the extent of psychological difficulties in adults with autism (Hare, 1997). Although the writings of individuals with autism have not been considered here evidence from autobiographical accounts also implies that individuals with autism are able to introspect and report upon their own feelings. Indeed, the writings of individuals with autism have been considered advantageous over other subjective methods such as self-rating questionnaires as they are amenable to an analysis of both how the individual expresses themselves and what they do not express (Happe, 1991). However, there are a number of difficulties with drawing conclusions from the writings of this group and Happe (1991) has stressed the need for care in how the contents of such autobiographies are applied (see Happe, 1991 for a critique). For such reasons self-report measures will be employed in this preliminary
study as a method for measuring anxiety in adolescents with high functioning autism. However, interpretation of the results from measures such as the SCAS is problematic. Firstly, subscale scores relate to subscales developed on a priori basis to correspond to DSM diagnostic categories. As discussed earlier, rates of dual diagnosis in epidemiological studies question the validity of these categories. When such measures are used with people with autism this difficulty is compounded by the possibility that the nature and structure of psychological distress in people with autism may differ from that in the general population. In the absence of studies of the factor structure of measures such as the SCAS when used with people with autism, it would appear wise to focus primarily on overall scale total scores, rather than subscale scores, when such measures are used with people with autism. Additionally, given the difficulties which people with autism may have in recounting subjective experience in socially conventional ways (Happe, 1991), use of structured self-report measures such as the SCAS should probably always be supplemented by measures using some element of carer report.

1.10.2 Comparison Groups

The importance of a control group for experimental study is widely recognised. However, there are many methodological problems around the issue of comparison groups and matching procedures in autism-related research (for discussion of these issues see Jarrold & Brock, 2004). With regards to an appropriate control group for this population, most reported studies have compared individuals with autism to typically developing children (Capps, Yirmiya & Sigman, 1992; Capps, Sigman & Yirmiya, 1995; Yirmiya et al., 1992). The use of typically developing children as a comparison group has primarily been to demonstrate that any effect is due to being a member of this clinical population rather than children more broadly. In addition to typically developing
children, some studies have employed a third comparison group, such as individuals with learning disabilities (Happe, 1994a) or individuals with attention difficulties (Perrin & Last, 1997). Green et al. (2000) used a comparison group of adolescents with behavioural problems who, like their Asperger’s Syndrome group, also showed difficulties in the area of social adaptation but of a different presumed aetiology. They hoped that this group would control for the potentially confounding variables of language or intellectual impairment (Cox, 1991; Tantam, 1988) and help to establish that any differences in later psychosocial adjustment was specifically due to autistic social impairments. The general purpose therefore of using a clinical comparison group is to rule out experimental effect occurring simply by being a member of a clinical population, such as having a disability or emotional difficulties.

Previous studies have also used children with specific language impairment as a comparison group (Leslie & Frith, 1988; Ziatas, Durkin & Pratt, 1998). Specific language delays are subclassified as expressive delays, which are the most common, and mixed receptive-expressive delays, which are the most debilitating. Speech and language disorders have been found to be associated with emotional and behavioural difficulties, particularly in childhood (Baker & Cantwell, 1987; Beitchman et al., 1996). Baker and Cantwell (1987) screened 600 children with speech and language problems for psychological difficulties. Fifty per cent of the sample displaying clinically significant levels of psychological difficulties. In particular, articulation problems, abnormalities of language processing, language comprehension and language expression were significantly more frequent in children found to have psychological difficulties. The authors suggested two possible reasons for the increased rates of emotional problems in this population of children. They suggested that common antecedents such
as intellectual impairment, brain damage, physical disorders, family factors and developmental disorders may be responsible; or that having a speech or language impairment in itself could cause psychological difficulties. Similarly, a seven year follow-up study by Beitchman et al. (1996) found that children with speech and language impairment who had psychological difficulties at age 5 years were more likely to have the same problems at twelve years, compared to normal controls.

It is recognised however, that there are specific problems in utilising children with language disorder as a comparison group. Chapman (1991), for example, has argued that children with language disorder can be variable in their language skills; and in fact, although Conti-Ramsden et al. (1997) found psychometrically robust subgroups of specific language impairment, they found that individual children’s difficulties do change over time in their later study (Conti-Ramsden and Botting, 1999).

Therefore the purpose of this comparison group for this study is, in a very broad sense, to separate out language difficulties from other components of autism. Given the high levels of psychological difficulties reported in children with language disorder, any differences found in the present study between the expressive language disorder group and autism group could be argued to relate to autism, rather than language difficulties more broadly.

1.11 Conclusions from the Literature Review

Research from the general child and adolescent population indicates that most children experience anxiety and fear as a part of normal development. For a proportion of children these anxieties can persist, causing significant distress and warranting clinical
intervention (Craske, 1997). The literature reviewed here suggests that people with autism may experience more anxiety than the general population. However, the theoretical and research basis for this has been limited. In the mainstream literature, Daleiden and Vasey (1997) have attempted to expand cognitive theory of childhood anxiety by taking an information processing perspective. Consideration of the cognitive operations active during each stage of the information processing sequence has allowed elaboration upon the types of deficient or distorted cognitive processes and products characteristic of anxious children. Based upon this understanding, this review has considered in what ways factors such as lack of theory of mind/weak central coherence, difficulty recognising and expressing emotion, poor adaptive skills and lack of perceived social competence may be associated with the experience of anxiety for children with autism, by increasing the potential for making anxiety related cognitive distortions or biases at different stages of the information processing sequence.

1.12 Hypotheses

Hypotheses 1 and 2

Previous research has suggested that children and adults with high functioning autism have more problems with anxiety than the general population (e.g. Kim et al., 2000). Other studies have found that they experience more anxiety than different clinical populations (e.g. Green et al., 2000). Specifically, Gillott et al. (2001) found that children with high functioning autism demonstrated worries about social situations. Adolescence has been described as a particular problematic and anxiety provoking transitional stage for the individual with high functioning autism (e.g. Gillberg, 1984).
Thus the main hypotheses for this study addressing the extent of anxiety in adolescents with high functioning autism are:

1. Adolescents with high functioning autism will report higher levels of anxiety than two comparison control groups consisting of adolescents with expressive language disorder and typically developing adolescents.

2. Adolescents with high functioning autism will report more social worries than two comparison control groups consisting of adolescents with expressive language disorder and typically developing adolescents.

If the above hypotheses are supported, the following subsidiary hypotheses relate to the possible factors associated with anxiety in adolescents with high functioning autism in the context of information processing sequence.

_Hypothesis 3_

From an information processing perspective on childhood anxiety, cognitive operations during encoding involve the perception and selection of some subset of the currently available information for subsequent processing (Daleiden & Vasey, 1997). Daleiden and Vasey (1996) have suggested that a tendency for anxious children to devote processing resources to threat cues at the expense of other information may prevent the perception of contextual cues that are important for guiding generation, selection and enactment of appropriate coping responses. According to the social affective hypothesis of autism, individuals with autism are impaired in their ability to recognise affect in others (Capps, Yirmiya & Sigman, 1992). If this is the case, they may overlook
important contextual information for the accurate appraisal of situations from social cues such as body language facial expression and tone of voice at the encoding stage of the information processing sequence. Without such information, in the face of negative events they may deploy attention based upon threat related knowledge structures and be more likely to detect and attend to minor threat cues, potentially leading to increased anxiety.

3. If problems at the encoding stage of the information processing sequence are associated with increased anxiety and social worries for adolescents with high functioning autism then this group will show poorer ability in recognising and expressing emotions than two comparison control groups consisting of adolescents with expressive language disorder and typically developing adolescents.

Hypothesis 4

The interpretation stage of the information processing sequence is when encoded information is evaluated in terms of its meaning, the reason for its occurrence and its probable outcome (Crick & Dodge, 1994). Anxious children have been found to interpret ambiguous information as threatening (Barrett, Rapee, Dadds & Ryan, 1996) and assign higher probability and likelihood estimates to threatening interpretations such as attributing threatening intentions to others (Foa & Kozak, 1986; 1991; Kendall & Ronan, 1990). For children with high functioning autism difficulties associated with theory of mind (Baron-Cohen, Leslie & Frith, 1985) may increase the possibility of making such anxiety related cognitive biases. For example, if limited in their ability to apply mental states to understand social interactions and social rules, in the face of
negative events the individual with autism may be more likely to feel vulnerable and assign threatening interpretations.

Weak central coherence (Happe & Frith, 1989) could equally account for anxiety-related interpretations. If individuals with autism miss what others would regard as salient information for making judgements about a situation they are likely to be compromised in their ability to construct comprehensive interpretations based upon the more global context.

4. If problems at the interpretation stage of information processing sequence are associated with increased anxiety and social worries for adolescents with high functioning autism then this group will show poorer performance on a task requiring theory of mind and central coherence abilities than two comparison control groups consisting of adolescents with expressive language disorder and typically developing adolescents.

Hypothesis 5

The response access or construction stage of the information processing sequence is concerned with the production of cognitive and behavioural responses to anxiety-provoking situations and stimuli (Daleiden & Vasey, 1997). Research has indicated that during this stage anxious children access or construct more escape-avoidant responses (Vasey et al., 1992; Barrett et al., 1996). Escape-avoidant coping perpetuates the anxiety cycle (Spence, Donavan & Brechman-Toussaint, 1999). For children with autism their communication and socialisation difficulties may mean that they are deficient in their knowledge of more problem-focussed responses, such as seeking help or eliciting
empathy from others and that they show a greater reliance on responses directed at escape and avoidance.

5. If problems at the response access or construction stage are associated with increased anxiety and social worries in adolescents with high functioning autism then this group will show greater impairments in social ability or communication ability than two comparison control groups consisting of adolescents with expressive language disorder and typically developing adolescents.

Hypothesis 6
Some authors have suggested that anxious children select escape-avoidant responses at the response selection stage of the information processing sequence, not because they lack knowledge of more proactive, nonavoidant responses but because their self-efficacy beliefs or outcome expectations for those responses are low (Daleiden & Vasey, 1997; Garber et al., 1991). In considering the perceived self competence of children with high functioning autism Sigman and Capps (1997) found that children with autism perceived themselves to be socially less competent that typically developing adolescents. Therefore, for children with high functioning autism selection of escape/avoidant responses may be associated with a lack of perceived social competence and low estimation of their coping ability.

6. If problems at the response selection stage of the information processing sequence are associated with increased anxiety and social worries in adolescents with high functioning autism then this group will perceive themselves to be less
socially competent with peers than two comparison control groups consisting of adolescents with expressive language disorder and typically developing adolescents.
2.0 METHOD

2.1 Design

The study involved a comparison control group design with three groups: a high functioning autism group and two comparison groups. The two comparison groups consisted of a group of children with expressive language disorder and a typically developing group. The language disorder group were selected in order to explore the implications of language difficulties for anxiety. Participants were allocated to groups on the basis of diagnosis for the high functioning autism and expressive language disorder groups and being free of any diagnosis for the typically developing group. The independent variable in this study was the allocated group and the primary dependent variable was the level of anxiety. Previous research into anxiety and autism has utilised a similar research design (Gillott et al., 1999). This study successfully identified differences between clinical and control groups using anxiety measures.

2.2 Sample

The sample consisted of 15 children with high functioning autism, 15 children with an Expressive Language Disorder and 15 typically developing children. All participants (n=45) were male adolescents aged 11-16 years. Table 1 shows the mean age (and range and standard deviation of ages) for each group. Children were matched for chronological age and gender. Therefore, as one child was recruited to the autism group, a child of the same age and gender was recruited to the two comparison groups.
Table 1. Mean age for each group

<table>
<thead>
<tr>
<th>Group</th>
<th>Range</th>
<th>Mean</th>
<th>(s.d.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism</td>
<td>11.05-16.02</td>
<td>13.13</td>
<td>(1.57)</td>
</tr>
<tr>
<td>Language</td>
<td>11.02-16.00</td>
<td>13.33</td>
<td>(1.62)</td>
</tr>
<tr>
<td>Typical</td>
<td>11.00-16.00</td>
<td>13.08</td>
<td>(1.58)</td>
</tr>
</tbody>
</table>

**High Functioning Autism Group**

Children from the autism group were selected in consultation with the Clinical Psychologist from a multi-disciplinary team at a communication clinic attached to a local child and adolescent mental health team. The children had undergone full developmental assessments including psychometric assessments (British Picture Vocabulary Scale; BPVS, Dunn et al., 1982; Wechsler Individual Achievement Tests; WORD, Rust, 1995a) by a Psychologist, observation (in at least two settings), parental report (semi-structured interview) medical assessments by a Paediatrician and assessments by a Speech and Language Therapist. The children had been discussed at a multidisciplinary case conference with the conclusion that they displayed symptoms of autism consistent with ICD-10 guidelines (WHO, 1992). Inclusion criteria included average intellectual and reading abilities according to assessment by the Clinical Psychologist. Constraints on time prevented formal assessment of these abilities. However, WISC-III (Wechsler Intelligence Scale for Children- Third Edition, Wechsler, 1991) results were available for 9 out of the 15 children with autism. Testing had been undertaken within the last 18 months. All 9 children had verbal IQ, Performance IQ and Full Scale IQ scores of 80 or higher. Full scale IQ scores ranged from 80 to 118 (mean
score = 102). All children needed to be attending local mainstream comprehensive schools and were not actively receiving treatment for learning, emotional, behavioural or medical problems.

Expressive Language Disorder Group

The participants for this group were recruited by the Speech and Language Therapist and the Special Educational Needs Coordinator (SENCO) from the Speech and Language resource bases attached to two local mainstream comprehensive schools. The Speech and Language base provides extra support to children who are not intellectually impaired but who require occasional additional support in accessing certain mainstream classes due to their expressive language difficulties. To be selected for the study each child had to meet the following inclusion criteria. In addition to assessment by a generic speech and language therapist, these were that they had received a prior diagnosis of Expressive Language Disorder from a specialist Speech and Language Therapist from a specific language impairment team. Diagnostic assessments included linguistic assessments (Clinical Evaluation of Language Fundamentals; CELF, Semel, Wiig & Secord, 1995; RENFREW, Renfrew, 1988), observation, review of medical records and parental report. Children with additional language impairments (such as receptive language problems or semantic or pragmatic difficulties) or children who had at any time been considered to be on the autistic spectrum were excluded. Each child was considered to be of average reading abilities according to the SENCO and their head of year teacher and were not considered to be intellectually impaired. Constraints on time prevented formal assessment of these abilities. However, BPVS British Picture Vocabulary Scale (Dunn et al., 1982) test results were available for 7 of the children in this group. Testing had been undertaken within the last 18 months. The BPVS is designed to measure
receptive vocabulary for standard English. These 7 children had a mean BPVS age equivalent score of 11 years and 10 months (range 9.2 to 15.7). Although performance on a vocabulary test should not be equated with innate or fixed ability, validity studies show that it correlates well with other vocabulary tests and individual intelligence tests (Robertson & Eisenberg, 1981). Children were excluded from the study if their teacher or parent reported that they had learning, emotional, behavioural or medical problems.

Typically Developing Group

The participants for this group were recruited from three mainstream comprehensive secondary schools within the community. Children were selected by the schools’ deputy head teachers as ‘typical’ children who were not intellectually impaired and reading abilities. As this group had no previous contact with professionals, no standardised data pertaining to such abilities was available. Time restrictions prevented the administration of formal psychometric assessments to ascertain levels of ability. Therefore for these participants intellectual and reading abilities were estimated by the deputy head teacher on the basis of teachers’ reports and the childrens’ performance on routine national standardised attainment tests, taken on completion of Key Stage 3 within the National Curriculum. All participants were working towards GCSE’s with predicted grade C’s or above in five or more subjects. Children were excluded from the study if their teacher or parent reported that they had learning, emotional, behavioural or medical problems.

Socioeconomic and ethnic background

All children were recruited from the same town in the Midlands, which is a predominantly working and middle class area. All of the participants were of white British origin. This is typical of the area from which the participants were recruited.
Whilst the limited range of ethnic diversity within the groups may reduce the
generalizability of findings to other populations, the lack of difference between the
groups ensures that ethnicity is not a confounding variable for subsequent acceptance or
rejection of the hypotheses.

2.3 Measures

*The Spence Children's Anxiety Scale (Spence 1997a)*

The Spence Children’s Anxiety Scale was selected to answer the main research question
of whether children with high functioning autism report higher levels of anxiety than
comparison groups. The measure is a self-report questionnaire consisting of 38 anxiety-
related items, six filler items and one open-ended, non-scored item (presented in
Appendix 1). It provides an overall measure of anxiety together with scores on six sub-
scales each tapping a specific aspect of child anxiety; panic attack and agoraphobia,
separation anxiety, physical injury fears, social phobia, obsessive-compulsive disorder
and generalized anxiety disorder or overanxious disorder.

*Scoring*

The responder is asked to rate how often each item happens to them based on a four
point scale of frequency - ‘never’, ‘sometimes’, ‘often’ or ‘always’. There is no set
period of time over which the judgment has to be made. Each response is scored on a 4-
point scale (from 0 to 3), giving a maximum possible score of 114 for total anxiety.
Sub-scale scores can also be computed.
Interpretation

The SCAS was initially standardised on boys and girls aged 8-12 years. It was found to discriminate at a group level between a group of clinically anxious children (mean score 42.48) and a matched group of non-clinical controls (mean score 25.04). It has since been standardized on boys and girls aged 13 and 14 years. In general, scores were found to decline with age.

Psychometric Properties

The psychometric properties of the SCAS have recently been examined through standardisation trials with adolescents aged 13 and 14 years (Spence, in press). Internal reliability was found to be high (co-efficient alpha of .92 and a Guttman split half reliability of .90). The internal consistency of the sub-scales was also acceptable, with coefficient alphas of .80 (panic-agoraphobia); .71 (separation anxiety); .72 (social phobia); .60 (physical injury fears); .75 (obsessive-compulsive); and .77 (generalized anxiety).

Social Worries Questionnaire (Spence, 1995a)

The Social Worries Questionnaire was selected to answer the second research question of whether children with high functioning autism report higher levels of social worries than comparison groups. The measure was developed to assess symptoms of social anxiety in young people. Each question asks whether the young person experiences worry about or tries to avoid specific social situations in which social evaluation or scrutiny by others is likely to occur. Items were selected for inclusion in the questionnaire on the basis of being situations which are commonly feared by socially anxious or socially phobic individuals as reported within the research and clinical
literatures and standardised interview assessment for social phobia or social anxiety in
children (Silverman, 1991; Spence, 1995).

There are three versions of the Social Worries Questionnaire: Pupil, Parent and Teacher.
For the purpose of this study the Pupil and Parent Versions were administered.

*Pupil Questionnaire (SWQ-Pupil)*

The pupil version of the Social Worries Questionnaire (Appendix 2) contains 13 items
relating to worries about and avoidance of social-evaluative situations at both home and
school.

*Parent Questionnaire - (SWQ-Parent)*

The parent version of the Social Worries Questionnaire (Appendix 3) contains 10 items
relating to fear and avoidance of social-evaluative situations. This version asks the
parent to assess situations in which they have had direct contact, such as their child
going to the shop alone. These items directly reflect items measured in the Pupil version
of the Questionnaire.

*Scoring*

Scoring for both the child and parent versions of the questionnaire are the same. Each
response uses a three point Likert-type rating scale ranging from 0 (‘Not true’) to 1
(‘Sometimes true’) to 2 (‘Mostly true’). In the pupil questionnaire, children are asked to
select the rating which best describes themselves over the past four weeks. In the parent
questionnaire, parents are asked to select the rating which best describes their son or
daughter over the past four weeks. Thus for the Pupil version, the maximum score
obtainable is 26 and for the Parent version of the Questionnaire, the maximum score obtainable is 20.

Interpretation

Normative data for the SWQ-Parent and SWQ-Pupil were established by Spence (1995) from her standardization trials from a sample of children and adolescents aged 8-17 years. No effects of age or gender were found for scores on either version of the questionnaire. The mean total score for the Parent version was 6.42 (s.d. = 6.17) and for the Pupil version the mean score was 8.44 (s.d. = 5.3).

Psychometric Properties

The psychometric properties of the Social Worries Questionnaire are reported by Spence (1995). The internal reliability of the pupil version was found to be good with a Guttman split-half reliability of 0.77 and coefficient alpha of 0.84. Factor analysis confirmed that a single factor accounted for 35 percent of the variance in test responses. All items loaded on this factor with loadings greater than 0.45.

The internal reliability of the parent version was found to be very high, with a Guttman split-half reliability coefficient of 0.93 and coefficient alpha of 0.94. All item correlations exceeded 0.64. Factor analysis revealed a single factor accounting for 66 percent of the variance in test scores, confirming that the scale was measuring a single dimension. Correlations between the parent report on the SWQ and the child’s response was significant but weak (r=0.29).
Understanding and Experience of Emotions Task (Capps, Yirmiya & Sigman, 1992)

This measure was chosen to consider possible factors associated with higher levels of anxiety in children with autism, specifically to consider the possible role of difficulty in recognising and labelling emotions. It was originally developed by Seidner, Stipeck and Fashcah (1988) and later adapted by Capps, Yirmiya and Sigman (1992) to measure the understanding of simple and complex emotions in children with high functioning autism. Participants' understanding and experience of happiness, sadness, pride and embarrassment are measured. For the purpose of this study the emotions 'worry' and 'fear' were added (as originally suggested by Gillott, 1999) because they were thought to be particularly relevant to the study.

Administration

Participants were given a list of the six emotions and asked to read them aloud one at a time. After each word they were asked to tell about a time in which they had felt that emotion. Their response was recorded verbatim. When a participant had difficulty in providing an example the experimenter related a time when they had felt that emotion, using standardized stories (see Appendix 4) and proceeded through the list before returning to the source of difficulty. The same prompting stories were used for each child. If a child responded that they had never felt that emotion or could not recall the corresponding situation, no further questions were asked regarding that emotion and the next emotion on the list was addressed. The record form used in the present study is presented in Appendix 5.
Scoring

The reported experience of emotions were coded and scored according to three dimensions, as defined by Capps, Yirmiya and Sigman (1992).

These were:

(1) affect - whether the emotion was positive or negative
(2) locus - whether the event was internal to and controllable by the participant....or
(3) the presence or absence of an audience who observed the emotion-laden event.

Table 2 displays the affect, locus and presence of an audience for each of the six categories which were used in evaluating participants’ responses. To be credited with a score, participants had to provide a response which was correct on all three of the dimensions. This yielded a maximum possible score of 6.

Table 2. Scoring categories for the Experience of Emotions Task

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Affect</th>
<th>Locus and Controllability</th>
<th>Audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happiness</td>
<td>Positive</td>
<td>External</td>
<td>Uncontrollable</td>
</tr>
<tr>
<td>Sadness</td>
<td>Negative</td>
<td>External</td>
<td>Uncontrollable</td>
</tr>
<tr>
<td>Embarrassment</td>
<td>Negative</td>
<td>Internal</td>
<td>Controllable</td>
</tr>
<tr>
<td>Pride</td>
<td>Positive</td>
<td>Internal</td>
<td>Controllable</td>
</tr>
<tr>
<td>Worry</td>
<td>Negative</td>
<td>Internal</td>
<td>Controllable</td>
</tr>
<tr>
<td>Fear</td>
<td>Negative</td>
<td>External</td>
<td>Uncontrollable</td>
</tr>
</tbody>
</table>
Inter Rater Agreement

There is no published standardized data for the Experience of Emotions Task. Therefore, the data was independently scored by two raters, the experimenter and a Clinical Psychologist unaware of group status, to evaluate the reliability of scoring. Inter rater agreement was calculated using Kappa. Kappa for all emotions across all three groups was found to be 0.75. Raters discussed those scores which did not agree until a consensus was reached.

Strange Stories Test (Happe, 1994a)

The Strange Stories were originally designed as an advanced test of theory of mind to be used with children with high functioning autism. It has however been argued earlier that performance on the Strange Stories task may also be influenced by drive for central coherence in processing (see pages 14-15). Here, therefore, the ‘Strange Stories’ are used as a general measure of possible difficulties in processing and interpreting complex social information. Happe (1994) found a high degree of concordance (ranging from 92 to 100%) between two raters on this measure. She also reported that the measure discriminated between children and adults with high functioning autism who pass first and even second order ToM tests.

The measure consists of 12 short stories concerning the different motivations that can lie behind everyday utterances which are not literally true, for example, sarcasm, pretence and lying. The 12 story types comprise Lie, White Lie, Pretend, Joke, Idiom, Misunderstanding, Double Bluff, Sarcasm, Persuasion, Contrary Emotion, Appearance/Reality and Forgetting. In each story a character says something which they
do not mean literally and the participant is asked to explain why the character said it (see Appendix 6).

Administration

The set of stories was introduced as follows “Here are some stories and some questions. I’d like you to listen carefully and answer the two questions at the end of each story”. Each story with their questions was presented on an A4 white sheet one at a time on the table in front of the participant. Each sheet also included a small black and white line drawing of the significant characters mentioned in the story. These line drawings were simple but showed emotional expressions and illustrated the contextual setting. Each story was read aloud by the experimenter or, if preferred, the child themselves read the story out loud. At the end of each story the participant was asked two test questions. The first question was a test of comprehension “Was it true what X said?”. If they were wrong in their response to the first question, this was noted but the story was read out again until the participant gave a correct answer or appeared to understand. The second question, a justification question “Why did X say that?” was then asked and the response of the participant recorded verbatim.

In order to minimize demands upon memory the story remained in front of the child throughout reading and questioning. The participants were given as long as necessary to provide their answer. The record form used in the present study is presented in Appendix 7.
**Scoring**

Participants were scored only on the “Why?” or justification questions. Justifications could be either correct or incorrect. In this study, justifications were only rated as correct if the story characters’ utterances were explained correctly in terms of mental states. One point was given for a correct mental state explanation in each story, yielding a maximum possible score of 12. Participants were given credit for their best answer. Thus if a participant gave a correct and incorrect justification they were scored on their correct justification. Mental state answers included all those that referred to thoughts, feelings, desires, traits and dispositions (Joliffe & Baron-Cohen, 1999).

**Inter-rater Agreement**

As only limited information is available on the psychometric properties of the Strange Stories task the data for this study was independently coded by two raters, the experimenter and a Clinical Psychologist, who was not aware of group status. Inter rater agreement was examined using Kappa coefficients. Kappa for all stories across all three groups was found to be 0.78, representing ‘excellent’ (Robson, 1993) agreement between raters. Raters discussed those scores which did not agree until a consensus was reached.


The AAMR Adaptive Behaviour Scale is a measure of adaptive functioning in children from aged 3 through 17 years. The ABS was used to evaluate children’s social and language abilities relevant to the response access stage of the information processing sequence.
The scales are administered to a respondent, such as a parent or caregiver, who is familiar with the daily activities of the individual being assessed.

Nine adaptive behaviour domains are measured: independent functioning, physical development, economic activity, language development, numbers and time, prevocational/vocational activity, self-direction, responsibility and socialization. Only the language development and socialization domains were administered as these were thought to be most pertinent to this study.

The language development domain assesses how children utilize receptive and expressive abilities to effectively deal with others in social situations. It comprises three subdomains: expression, verbal comprehension and social language development. The socialization domain examines the child's ability to interact with others and explores social aspects of behaviours. It is not separated into subdomains but comprises seven items measuring cooperation, consideration for others, awareness of others, interaction with others, participation in group activities, selfishness and social maturity.

Scoring
The scale consists of two types of items. The first requires that the respondent select the highest level of behaviours exhibited by the child being rated. The higher the level of behaviour exhibited the more points will be credited for each response.

The second type of item requires the respondent to read each statement and rate 'Yes' or 'No' according to whether the child can accomplish the task. Points are credited for
those tasks viewed as strength. All item scores are added together to reach a total domain score.

Each domain of the Adaptive Behaviour Scale produces standard scores, percentiles and age equivalents. In this instance, standard scores for the socialization and language development domains were utilized. Standard scores relate the individual’s score to the mean score for individuals of the same age. The ABS-S domain standard scores are based on a distribution having a mean of 10 and a standard deviation of 3 and range from 1 to 20.

**Psychometric Details**

The ABS-S: 2 has been standardized in the US on a population aged 3-17 years. Numerous studies examining the reliability and validity of the scale have been conducted and its psychometric properties are well established. (Lambert, Nihira & Leland, 1993).

**Social Competence with Peers Questionnaire (Spence, 1995b)**

This measure was used to answer the final research question relating to possible factors associated with anxiety, investigating whether children with high functioning autism perceive themselves to be less socially competent than comparison groups, and might therefore tend to prefer avoidant responses at the response selection stage of the Daleiden and Vasey model of childhood anxiety. The questionnaire was designed to focus on social competence with peers, as reflected by the consequences and outcomes of social interaction.
There are three versions of the Social Competence with Peers Questionnaire: Pupil, Parent and Teacher. The situations covered in the three versions of the questionnaires differ slightly from each other. The Pupil and Parent questionnaires were used in this study.

_Pupil Questionnaire (SCPQ-Pupil)_

The Pupil version of the Social Competence with Peers Questionnaire (Appendix 8) contains 10 items relating to the quality and quantity aspects of social outcomes with peers, covering both home and school based social competence.

_Parent Questionnaire (SCPQ-Parent)_

The Parent version of the Social Competence with Peers Questionnaire (Appendix 9) contains 9 items relating to the quality and quantity aspects of social outcomes with peers, emphasizing home-based social competence. These items directly reflect those of the Pupil version of the Questionnaire.

**Scoring**

Scoring for the Pupil and Parent versions of the SCPQ is the same as scoring for the SWQ versions. Thus for the Pupil version of the SCPQ, the maximum score obtainable is 20 and for the Parent version the maximum score obtainable is 18.

**Interpretation**

Standardisation trials with children and adolescents aged 8 to 17 years established normative data for SCPQ-Pupil and SCPQ-Parent. Data revealed that there were no significant differences in mean total scores across the ages or between the sexes for
either version of the questionnaire. The mean total score found for the Pupil version was 15.53 (s.d. = 3.17) with a mean of 14.82 (s.d. = 3.12) for the Parent version.

Psychometric Details

The psychometric properties for the Social Competence with Peers Questionnaire are reported by Spence (1995). For the SCPQ-Pupil version, the internal reliability was found to be adequate with a Guttman split-half reliability of 0.77 and coefficient alpha of 0.75. All item-total correlations exceeded 0.40. Factor analysis revealed a single factor accounting for 32 per cent of the variance in test responses.

For the Parent version of the SCPQ the internal reliability of the scale showed a Guttman split-half reliability coefficient of 0.87 and coefficient alpha of 0.81. All item-total correlation coefficients exceeded 0.40. Factor analysis revealed a single factor accounting for 42 percent of the variance in responses. The correlation between the parent and child responses on the SCPQ was significant (r = 0.54).

2.4 Procedure

Ethical approval

The study had ethical approval from the local NHS trust ethics board (see Appendix 10 for copy of letter). No amendments to the original design of the study needed to be made. Slight amendments to the participants letters were required. Once these amendments had been made full ethical approval was granted. The study design ensured provision of adequate information concerning the study, participants consent prior to participating and the maintenance of confidentiality.
**Pilot study**

Before the study commenced, four children and their parents piloted the procedure. The pilot study focused on applicability of measures with the client group, the timing of the procedure and the researchers knowledge and skill in coherently administering the measures. Participants for the pilot study consisted of two boys with high functioning autism and two boys with expressive language disorder. The children’s ages ranged from 11 years 9 months to 14 years 2 months.

During the pilot study, the Spence Children’s Anxiety Scale, the Spence Social Worries Questionnaire (Pupil), the Social Competence with Peers Questionnaire (Pupil) and the Experience of Emotions Task were administered. This was in order to assess the language complexity of these measures and the suitably of the terminology used. The participants in the pilot study were able to answer the questions in these measures with no difficulty and thus, they were utilised in the final design.

The Strange Stories were administered in the pilot study plus two other Theory of Mind tasks. A first-order belief task, the ‘Smarties task’ (Perner, Leekam & Wimmer, 1987) and a second-order belief task, the ‘Ice Cream Van Task’ (Perner & Wimmer, 1985), were administered. This was done for two reasons. Firstly, the Strange Stories are very language based and require a high level of reading comprehension. This measure needed to be piloted, particularly with the expressive language disorder group, to ensure they were able to comprehend the Stories. Secondly, the Strange Stories are considered by some authors (Happe, 1994) to be a high level test. Research (e.g. Baron-Cohen et al., 1997; Happe, 1994b) has found that children with high functioning autism are able to pass first and second order belief tasks due to their higher level of cognitive functioning.
Therefore it was important to assess the degree of difficulty experienced during the first and second order tasks as well as the Strange Stories, particularly for the autism group. It was found that all participants passed the first and second order tasks. The Strange Stories were experienced as much more challenging (as anticipated) but neither of the groups struggled with the complexity of the language involved in the task. Therefore, the Strange Stories were used in the final design.

Procedure

A letter of introduction, a child information sheet, a parent information sheet and a consent form (see Appendix 11) were dispatched to all children who met the inclusion criteria for the autism and expressive language disorder groups. Thirty-seven children who met the inclusion criteria for the typically developing group were invited to take part. Consent from both parent(s) and child was required to take part in the study. Parents and children who agreed to further contact from the researcher returned a reply slip to the language unit or school. The researcher was then provided with the names and telephone numbers of parents who could be contacted.

Following the receipt of a list of possible participants, the researcher contacted individuals to explain more about the study. Participants were invited to attend the Clinical Psychology Department for a 90-minute interview to complete the measures. For their convenience, participants were also given the option of being visited at home or at school.

Parent(s) and child were interviewed separately by the experimenter in a quiet room.
The parent interview was conducted first. The experimental procedure was explained to each parent. This involved briefing them on the nature of the questions they and their child would be asked. Parents and children were informed that all responses were confidential. In the parent interview the Social Worries Questionnaire - Parents and the Social Competence with Peers Questionnaire - Parents were administered. Each question was read aloud to the parent and they were asked to respond with the answer which best described their child over the past four weeks, from options of ‘not true, ‘sometimes true’ or ‘mostly true’. The Language Development and Socialization domains of the Adaptive Behaviour Scales were also completed. These were administered in a semi-structured interview format.

The second interview was conducted with the child. The child was first told about the experimental procedure. The experimenter and child sat at a low table where the child was able to see and read the measures. The child was informed of where their parent was (which was in the waiting room, if the interview took place at the Psychology Department of the child and adolescent mental health team). They were informed that they would be asked questions about the types of things they might worry about, times when they had felt different feelings, such as happy and sad, and how they got on with friends. They were also told that they would be read some stories and then asked questions about what happened in each story. It was emphasized that there were no right or wrong answers to any of the questions.

All questionnaire items were read to the child in numerical order unless the child wanted to read aloud for themselves. The Spence Children’s Anxiety Scale was administered first. The child was informed that they were going to be read some questions and that
for each one they had to say whether they ‘never’, ‘sometimes’, ‘often’ or ‘always’ felt like that. After checking that they had understood, the items were then administered in numerical order.

The Strange Stories were next to be administered. The child was informed that they were going to be read a set of stories and that at the end of each one, they would be asked questions about the story. Each story was then read out to the child and they could follow each passage or look at the picture relating to it. After each story the child was asked the two questions relating to that story and their exact responses were recorded.

The Spence Social Worries Questionnaire-Pupil and the Social Competence with Peers Questionnaire-Pupil were then administered. The child was asked to state whether each item was ‘not true’, ‘sometimes true’ or ‘mostly true’ in their experience. As before, all questionnaire items were read to the child in numerical order unless the child wanted to read aloud for themselves.

The Experience of Emotions Task was last to be administered. The child was informed that they were going to be read a list of ‘feeling words’ and they had to talk about a time they felt that way. If the child had difficulty in providing an example, the examiner related a time in which s/he felt the emotion (using standard stories, see Appendix 4). The experimenter wrote down the child’s response verbatim. If a child responded that they had never felt the emotion no further questions were asked regarding that emotion and the next emotion on the list was addressed.
At the end of second interview, parent and child were brought back together and given
the opportunity to ask any questions they had about the study. Subsequently they were
thanked for their assistance. They were informed that if wished to speak to somebody in
the future regarding issues raised by the interviews, they could talk to the Clinical
Psychologist at the clinic or the SENCO or Deputy Head Teacher from their school.

*Data storage and protection*

All data collected throughout the study was anonymised. Numerical codes were used on
questionnaires rather than names and only certain demographic data such as gender and
age were recorded. All collected data was stored in a locked filing cabinet and once the
raw data had been entered onto a computer, record forms were shredded.

2.5 Methods of Analysis

Individual scores were collated and entered into an SPSS (Statistical Packages for the
Social Sciences) database. This system was also used for data analysis.

The measures used in this study generate ordinal and interval data. A one sample
Kolmogorov-Smirnov test, carried out on all measures for the total sample, confirmed
that scales on all measures except for the Experience of Emotions Task ($Z = 1.74$, $p < 0.005$) could be regarded as normally distributed.

Levene’s test for equality of variances further revealed that the data for the Spence
Children’s Anxiety Scale ($F = 4.76$, $p < 0.01$), the Strange Stories ($F = 3.76$, $p < 0.05$),
the Experience of Emotions Task ($F = 4.72$, $p < 0.01$) and the ABS Language
Development domain ($F = 3.56, p < 0.05$) did not display homogeneity of variance across groups.

Since some key measures for this study do not meet the criteria for parametric analysis, the Kruskal-Wallis one-way Analysis of Variance was used to investigate between group differences. Mann-Whitney U tests were used to make subsequent pairwise comparisons. Within subject analyses were conducted to investigate the possible factors contributing to levels of anxiety in the high functioning autism group, using Spearman Rho correlations.

Descriptive statistics will also be presented. Despite the fact that non-parametric analyses were undertaken, in order to give full representation of the data, means and standard deviations for all measures will be reported in tables, with medians and interquartile ranges illustrated in boxplots.
3.0 RESULTS

3.1 Between Group Differences

Hypothesis 1

High functioning adolescents with autism will report higher levels of anxiety than two comparison control groups consisting of adolescents with expressive language disorder and typically developing adolescents.

The Spence Children’s Anxiety Scale (SCAS) was used to test this hypothesis. Table 3 shows the means scores, standard deviations and median scores for each group on this measure.

Table 3. Mean scores, standard deviations and median scores on the SCAS for each group

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>(s.d.)</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism</td>
<td>40.87</td>
<td>(14.03)</td>
<td>38</td>
</tr>
<tr>
<td>Language Disorder</td>
<td>30.27</td>
<td>(17.97)</td>
<td>29.5</td>
</tr>
<tr>
<td>Typically Developing</td>
<td>23.67</td>
<td>(8.72)</td>
<td>25.5</td>
</tr>
</tbody>
</table>

Figure 1 shows a boxplot displaying the median and range of scores for each group. Although the autism group showed the highest levels of mean anxiety, the language-disordered group displayed the widest range of scores. Visual inspection of the data in
Table 3 and Figure 1 suggest that the autism group displayed higher levels of anxiety than the two comparison groups. Kruskal-Wallis analysis of variance confirmed that there was a significant difference between groups on the SCAS ($\chi^2 = 9.75$, d.f. = 2, $p < 0.01$).

Comparisons between pairs of groups for the Spence Children’s Anxiety Scale were made using Mann-Whitney U Tests. Pairwise comparisons showed a significant difference in levels of anxiety between the autism and typically developing groups ($U = 32.0$, $p < 0.001$, 1-tailed). Comparisons between the autism and language disordered groups showed no significant difference ($U = 72.50$, non significant). Comparisons between the language disordered and the typically developing groups also showed no significant difference ($U = 91.50$, non significant).

**Figure 1.** Boxplot for the Spence Children’s Anxiety Scale
As well as providing an overall measure of anxiety, the SCAS also generates scores on six subscales each tapping a specific aspect of child anxiety. The six sub-scales included are Separation Anxiety, Social Phobia, Obsessive Compulsive Disorder, Panic Attack and Agoraphobia, Physical Injury Fears and Generalised Anxiety Disorder/Overanxious Disorder. Table 4 outlines the raw means and standard deviations for each SCAS subscale score.

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Autism</th>
<th>Language Disordered</th>
<th>Typically Developing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Separation Anxiety</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 items</td>
<td>Mean</td>
<td>4.87</td>
<td>4.86</td>
</tr>
<tr>
<td></td>
<td>(s.d.)</td>
<td>(2.99)</td>
<td>(3.77)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.80</td>
<td>(1.52)</td>
</tr>
<tr>
<td><strong>Social Phobia</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 items</td>
<td>Mean</td>
<td>7.80</td>
<td>5.33</td>
</tr>
<tr>
<td></td>
<td>(s.d.)</td>
<td>(3.10)</td>
<td>(3.33)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.33</td>
<td>(2.44)</td>
</tr>
<tr>
<td><strong>Obsessive Compulsive</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 items</td>
<td>Mean</td>
<td>6.53</td>
<td>5.66</td>
</tr>
<tr>
<td></td>
<td>(s.d.)</td>
<td>(3.20)</td>
<td>(3.37)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.46</td>
<td>(2.36)</td>
</tr>
<tr>
<td><strong>Panic/Agoraphobia</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 items</td>
<td>Mean</td>
<td>6.26</td>
<td>5.66</td>
</tr>
<tr>
<td></td>
<td>(s.d.)</td>
<td>(5.46)</td>
<td>(5.17)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.80</td>
<td>(1.52)</td>
</tr>
<tr>
<td><strong>Physical Injury Fears</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 items</td>
<td>Mean</td>
<td>3.66</td>
<td>3.26</td>
</tr>
<tr>
<td></td>
<td>(s.d.)</td>
<td>(2.50)</td>
<td>(3.17)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.40</td>
<td>(2.16)</td>
</tr>
<tr>
<td><strong>Generalised Anxiety/Overanxious</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 items</td>
<td>Mean</td>
<td>7.13</td>
<td>5.66</td>
</tr>
<tr>
<td></td>
<td>s.d.</td>
<td>(2.03)</td>
<td>(3.04)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.27</td>
<td>(1.71)</td>
</tr>
</tbody>
</table>
Table 4 shows that the high functioning autism group had slightly higher mean scores on all of the sub-scales than both comparison groups. However, Kruskal-Wallis analysis of variance undertaken for each sub-scale found that none of these differences between groups on the SCAS sub-scales were significant.

Hypothesis Two

High functioning adolescents with autism will report more social worries than two comparison control groups comprising of adolescents with expressive language disorder and typically developing adolescents.

The Social Worries Questionnaires- Pupil and Parent versions were used to test this hypothesis. Table 5 shows the means, standard deviations and medians for the three groups on the Social Worries Questionnaire, pupil and parent versions. Figure 2 shows a boxplot of the median and range of scores for the pupil version of this measure. It shows that the ranges of scores were quite similar for the three groups and that the autism group scores were only slightly higher in general than comparison groups.

Table 5. Means scores, standard deviations and median scores for the Social Worries Questionnaire, for the three groups

<table>
<thead>
<tr>
<th>Group</th>
<th>SWQ – Pupil 13 items</th>
<th>SWQ – Parent 10 items</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>(s.d.)</td>
</tr>
<tr>
<td>Autism</td>
<td>9.93</td>
<td>4.35</td>
</tr>
<tr>
<td>Language Disorder</td>
<td>8.6</td>
<td>4.48</td>
</tr>
<tr>
<td>Typically Developing</td>
<td>7.13</td>
<td>3.40</td>
</tr>
</tbody>
</table>
Kruskal-Wallis analysis of variance on data from the Pupil version of the Social Worries Questionnaire found that there was no significant difference in levels of social worries between the three comparison groups ($\chi^2 = 3.01, \text{d.f.} = 2, \text{non significant}$).

Table 5 also shows the mean levels of social worries between the three groups, as measured by the parent version of the Social Worries Questionnaire. These means suggest that children in the high functioning autism group experience more social worries than comparison groups, as rated by parents. Figure 3 is a boxplot showing the median and range of scores on the Social Worries Questionnaire – Parent. It shows that the autism group displayed a higher median score as rated by their parents than the two comparison groups.
Figure 3. Boxplot for the Social Worries Questionnaire - Parent

Kruskal-Wallis analysis of variance on data from the SWQ-Parent found that there was a significant effect of group condition ($\chi^2 = 23.96$, d.f. = 2, $p < 0.001$). Comparisons between pairs of groups for the Social Worries Questionnaire - Parent were undertaken using Mann Whitney U tests. Comparison between the autism and expressive language disorder group showed a highly significant difference ($U = 12.50$, $p < 0.001$, 1-tailed). Comparison between the autism and typically developing groups, also found a significant difference ($U = 11.00$, $p < 0.001$, 1-tailed). No significant difference was found when the expressive language disorder and typically developing group were compared. ($U = 96.50$, non significant).

Comparing the Pupil and Parent versions highlights a difference in the levels of social worries reported by children with autism and their parents. Given that there are fewer items on the SWQ-Parent than the SWQ-Pupil (maximum total score of 20 on SWQ-
Parent, maximum score of 26, SWQ-Pupil) this result is even more striking. This suggests that the parents of children with autism rated their children’s social worries to be much higher than did the children themselves. This pattern was not evident when comparing child and parent measures for the comparison groups. In contrast, the parents of children with a language disorder and typically developing children, reported lower levels of social worry than the children themselves.

Possible Factors Associated with Anxiety

Analysis has shown that there were significant between group differences in levels of anxiety and in ratings of social worries as reported by parents. For the remaining hypotheses, between group differences on measures of recognition and expression of emotion, interpretation of complex social information, language development and socialisation abilities and perceived social competence with peers were undertaken to consider the possible factors associated with these differences in the context of the information processing model of childhood anxiety. This analysis will now be reported. Correlations between these measures and the anxiety measures will also be made on a within group basis.
Hypothesis 3.

If problems at the encoding stage of the information processing sequence are associated with increased anxiety and social worries for adolescents with high functioning autism then this group will show poorer ability in recognising and expressing emotions than two comparison control groups consisting of adolescents with expressive language disorder and typically developing adolescents.

The Experience of Emotions Task was used to measure ability to recognise and express emotion across the three groups. Table 6 shows the mean scores, standard deviations and median scores for the Experience of Emotions Task for the three groups. Figure 4 shows the median and range of scores for the three groups on this task.

Table 6. Mean scores, standard deviations and median scores for the three groups on the Strange Stories, Experience of Emotions Task and Adaptive Behaviour Scales - Socialization and Language Development Domains

<table>
<thead>
<tr>
<th></th>
<th>Exp. Of Emotions</th>
<th>Strange Stories</th>
<th>Socialization</th>
<th>Language Development</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Autism</strong></td>
<td>mean (s.d.)</td>
<td>4.33 (1.29)</td>
<td>5.40 (3.31)</td>
<td>5.20 (1.21)</td>
</tr>
<tr>
<td></td>
<td>median</td>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td><strong>Language Disorder</strong></td>
<td>mean (s.d.)</td>
<td>4.27 (1.44)</td>
<td>6.73 (2.49)</td>
<td>6.60 (1.06)</td>
</tr>
<tr>
<td></td>
<td>median</td>
<td>5</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td><strong>Typically Developing</strong></td>
<td>mean (s.d.)</td>
<td>5.73 (0.80)</td>
<td>9.53 (1.81)</td>
<td>9.40 (1.18)</td>
</tr>
<tr>
<td></td>
<td>median</td>
<td>6</td>
<td>10</td>
<td>9</td>
</tr>
</tbody>
</table>
To investigate between group differences on total scores for the Experience of Emotions Task, Kruskal-Wallis analysis of variance was undertaken on total scores. This found a significant effect of group membership ($\chi^2 = 13.56$, d.f. = 2, $p < 0.001$). Comparisons between the groups were again made by using Mann Whitney U tests. A significant difference was found between the autism and typically developing groups ($U=43.50$, $p <0.01$, 1-tailed) and the language disorder and typically developing groups ($U=36.50$, $p <0.001$, 1-tailed) but not between the autism and language groups ($U=112.50$, non significant).

To be credited with a correct answer on this measure, responses had to indicate appropriate affect, locus and controllability and presence of an audience. This scoring system yielded a maximum score of 6. Examples of a correct answer included, “I felt really proud of myself when the teacher announced to the class that I had come top in the
maths test” (Pride), “I felt really sad when our cat was ill and had to be put down” (Sad).

Table 7 shows the percentage of correct answers, (indicating appropriate affect, locus and controllability and presence of an audience) for each emotion for the three groups.

Table 7. Percentage of correct answers for each emotion on the Experience of Emotions Task for each group

<table>
<thead>
<tr>
<th></th>
<th>Sadness</th>
<th>Happiness</th>
<th>Embarrassment</th>
<th>Pride</th>
<th>Worry</th>
<th>Fear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism</td>
<td>93.33</td>
<td>79.99</td>
<td>53.33</td>
<td>39.99</td>
<td>79.99</td>
<td>86.66</td>
</tr>
<tr>
<td>Language Disorder</td>
<td>86.66</td>
<td>73.33</td>
<td>59.99</td>
<td>39.99</td>
<td>79.99</td>
<td>79.99</td>
</tr>
<tr>
<td>Typically Developing</td>
<td>100.0</td>
<td>100.0</td>
<td>93.33</td>
<td>93.33</td>
<td>93.33</td>
<td>93.33</td>
</tr>
</tbody>
</table>

As can be seen from Table 7, the children from the autism group and language disorder group found the greatest difficulty in recognising and/or expressing pride. Similarly, only just over half of the children in the autism group and language disorder groups were able to accurately report experiences of embarrassment. The typically developing group did not struggle to recognise or express any particular emotion, showing high accuracy of responses across the six emotions.

Table 8 shows the breakdown of incorrect answers in the form of percentage of errors across all emotions for the three groups, according to the three dimensions: affect, whether the emotion was positive or negative, locus, whether the event was internal to
and controllable by the participant and whether an audience was present in observing the emotion-laden event.

Table 8. Percentage of errors in the three dimensions across all emotions for the three groups

<table>
<thead>
<tr>
<th></th>
<th>Inappropriate Affect</th>
<th>Inappropriate Locus or Controllability</th>
<th>Inappropriate Audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism</td>
<td>13.88</td>
<td>38.88</td>
<td>47.22</td>
</tr>
<tr>
<td>Language Disorder</td>
<td>0</td>
<td>52.94</td>
<td>47.06</td>
</tr>
<tr>
<td>Typically Developing</td>
<td>0</td>
<td>80</td>
<td>20</td>
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</tbody>
</table>

Table 8 indicates that out of the 36 errors made by the autism group across all six emotions, 17 (47.22%) were accounted for by incorrectly attributing the presence or absence of an audience. Slightly fewer of the errors were due to inappropriate locus or controllability with 14 (38.88%) of incorrect responses occurring in this dimension. 5 errors (13.88%) were made by giving inappropriate affect in the autism group.

By comparison the language disorder group made a total of 34 errors across the six emotions. None of these were accounted for by giving an inappropriate affect. 18 errors (52.94%) were due to incorrect locus or controllability, suggesting that the language disordered children had difficulty in differentiating emotions in terms of locus and controllability. However, a similar number of errors, 16 (47.06%), were made in the audience dimension.
For the typically developing group, the total number of errors made across all six emotions was five. Of these, four (80%) were accounted for by inaccurate responses for the locus and controllability dimension, with one error (1.11%) being due to the audience dimension.

Reported Emotions

Sadness and Happiness
In their accounts of feeling sad a common theme across groups was the death of a relative or a pet. Other examples for the autism group included losing in a football match or on a computer game. Past experiences of being bullied were recounted for three children in the language disorder group and one child from the typically developing group. Falling out with a friend was something recalled by children in the language disorder and typically developing groups but not for the autism group.
In describing times when they were happy, a number of children in the autism group told of achieving good exam results, receiving presents on their birthday, of their sports team performing well and enjoyable holiday experiences. These themes were similar for the other two groups with additional reference to making friends at a new school.

Pride and Embarrassment
Examples of times when they felt proud mostly revolved around school achievements for the autism group. Being praised by a teacher, finishing first at work in class, receiving a school certificate and getting good exam marks were specific accounts. This pattern was also similar for the other two groups, with the typically developing group also citing pride in getting a part-time job or receiving praise from a parent when they had helped
out around the home. Three (20%) of children in the autism group and two (13%) of children in the language disorder group could not recall a time when they had last felt pride, suggesting that they found greater difficulty in recognising and expressing this emotion, compared to children in the typically developing group.

For embarrassment, some similar experiences were shared by all three groups. For example, playing badly in a game of football, tripping over in P.E., arriving late for class and reading out loud in class. The typically developing group also gave examples of being embarrassed in front of friends by members of their family and when asking somebody out on a date. One child in the autism group could not recall a time when they had felt embarrassed.

Worry and Fear

Based upon Gillot’s (1999) study, the emotions of worry and fear were added to those originally used by Capps, Yirmiya and Sigman (1992) because they were considered to be particularly relevant to the study. For all the groups, the main theme surrounding the experience of worry was related to exam preparation. Other themes common to the three groups included worry about taking the right GCSE options, worry about a sick relative or pet and worry in anticipation of starting a new school or college. Some children within the typically developing group and language disorder group expressed worries over arguing with friends and making new friends in their new school or college. For the autism group one child also expressed worry about a school trip and worry over losing a school textbook. One child in the autism group could not recall a time when they had felt worried.
The types of fears expressed by the three groups included fear of heights, injections and operations, going to the dentist, wasps and other insects. The fears described were rather consistent across the groups.

Hypothesis 4

If problems at the interpretation stage of information processing sequence are associated with increased anxiety and social worries for adolescents with high functioning autism then this group will show poorer performance on a task requiring theory of mind and central coherence abilities than two comparison control groups consisting of adolescents with expressive language disorder and typically developing adolescents.

The Strange Stories Test was used to measure ability in such interpretation. A score of one was given for each correct mental state answer, yielding a maximum possible score of 12. Mental state explanations included all those that referred to thoughts, feelings, desires, traits and dispositions (Joliffe and Baron-Cohen, 1999). Examples of correct mental state answers included, “She is only pretending” (Pretend) and “He is joking” (Joke). Other mental state justifications included terms such as think, know, hurt, happy and forgot. Examples of incorrect answers included those which referred to mental states inappropriate to the context of the story such as “He forgot where the tanks were” (Double Bluff) or “He is joking with her” (Idiom) and those which referred to physical states, “The telephone is shaped like a banana” (Pretend) and “Her hair looks silly” (Joke).
Table 6 presents the mean scores, standard deviations and median scores for each group for the Strange Stories task. Figure 5 shows the median and range of scores for the three groups on this task.

**Figure 5.** Boxplot for the Strange Stories Task

Kruskal-Wallis analysis of variance found a significant effect of group membership on Strange Stories scores ($\chi^2 = 14.37$, d.f. = 2, $p < 0.001$). Subsequent Mann Whitney pairwise comparisons between the groups showed that the typically developing children scored higher than those with autism ($U=31.00$, $p < 0.01$, 1-tailed) and those with a language disorder ($U=41.50$, $p < 0.01$, 1-tailed). The scores of the autism and language disordered children were not significantly different ($U=87.00$, non significant).
Hypothesis 5.

If problems at the response access or construction stage are associated with increased anxiety and social worries in adolescents with high functioning autism then this group will show greater impairments in social ability or communication ability than two comparison control groups consisting of adolescents with expressive language disorder and typically developing adolescents.

Social ability

Social ability was measured by the Socialization domain of the Adaptive Behaviour Scale – School Edition (Lambert, Nihira & Leland, 1993). Table 6 shows the mean scores, standard deviations and median scores for this measure. Figure 6 shows the median and range of scores for the three groups for the Socialization Domain. ABS domain standard scores are based on a distribution having a mean of 10 and a standard deviation of 3. Whilst the typical group mean score was within the average range (within one standard deviation of the mean), both the language disorder and autism group performed below the mean for children their age, with the autism group score being well below this mean. Kruskal-Wallis analysis of variance confirmed that there was a significant effect of group membership on the Socialization Domain ($\chi^2 = 30.95$, d.f. = 2, $p < 0.001$).

Pairwise comparisons for the Socialization Domain identified that there was a significant difference between the autism and language disorder groups ($U = 46.500$, $p < 0.01$, 1-tailed) as well as between the autism and typically developing groups ($U = 1.50$, $p < 0.001$, 1-tailed). A significant difference was also found between the language and typically developing groups ($U = 9.500$, $p < 0.001$, 1-tailed), suggesting that the degree of
socialization difficulty differed significantly between the three groups differed significantly.

**Figure 6.** Boxplot for the Socialization Domain standard scores of the Adaptive Behaviour Scales

![Socialization Domain Boxplot](image)

**Communication ability**

The Language Development Domain of the Adaptive Behaviour Scale was used to measure communication ability. Table 6 shows the mean scores, standard deviations and median scores of the three groups on this measure. The typically developing group mean score was within the average range on this measure (within one standard deviation of the mean) and the autism group mean score was also within one standard deviation from the mean for children of their age. The language group performed well below the mean for
children of their age. Figure 7 shows the median and range of scores for the three groups on this measure.

**Figure 7.** Boxplot for the Language Development Domain standard scores of the Adaptive Behaviour Scales

![Boxplot](image)

Differences in performance on the language development domain were compared using Kruskal-Wallis analysis of variance. This revealed a highly significant effect of group ($\chi^2 = 29.81$, d.f. = 2, $p < 0.001$). Pairwise comparisons were made using Mann Whitney U Tests. Comparisons between the autism and the typically developing groups found a significant difference ($U = 40.000$, $p < 0.01$, 1-tailed), as did comparisons between the language disordered and typically developing groups ($U = 1.00$, $p < 0.001$, 1-tailed). The difference between the autism and language disorder groups was also significant ($U = 22.00$, $p < 0.001$, 1-tailed).
Hypothesis 6.

If problems at the response selection stage of the information processing sequence are associated with increased anxiety and social worries in adolescents with high functioning autism then this group will perceive themselves to be less socially competent with peers than two comparison control groups consisting of adolescents with expressive language disorder and typically developing adolescents.

The Social Competence with Peers - Pupil (SCPQ- Pu) and Parent (SCPQ- P) version were used to test this hypothesis. For these measures a high score indicated greater perceived social competence.

Table 9 shows the mean scores, standard deviations and medians for the groups on The Social Competence with Peers Questionnaire. According to the SCPQ-Pupil version, the children in the autism group considered themselves to be less socially competent with peers on average than the children in the expressive language disorder group or typically developing group. Out of the three groups the typically developing group generally rated themselves to be most socially competent. Figure 8 displays a boxplot illustrating the median and range of scores for the three groups. It highlights how the autism group displayed the widest range of scores and the lowest median level of perceived social competence.
Table 9. Mean scores, standard deviations and median scores on the Social Competence with Peers Questionnaire, for each group

<table>
<thead>
<tr>
<th></th>
<th>SCPQ – Pupil</th>
<th>SCPQ – Parent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10 items</td>
<td>9 items</td>
</tr>
<tr>
<td>Autism</td>
<td>Mean (s.d.)</td>
<td>Median</td>
</tr>
<tr>
<td>Autism</td>
<td>9.53 (5.37)</td>
<td>9</td>
</tr>
<tr>
<td>Language Disorder</td>
<td>11.40 (3.76)</td>
<td>11</td>
</tr>
<tr>
<td>Typically Developing</td>
<td>14.0 (4.23)</td>
<td>15</td>
</tr>
</tbody>
</table>

Figure 8. Boxplot for the Social Competence with Peers Questionnaire - Pupil
The Kruskal-Wallis analysis of variance showed that there was a significant difference between groups on the Social Competence with Peers Questionnaire – Pupil version ($\chi^2 = 6.56$, d.f. = 2, $p < 0.01$). Pairs of groups were compared using Mann Whitney U tests. This analysis showed that there was a significant difference between the autism and typically developing groups ($U = 55.50$, $p < 0.01$, 1-tailed). However, comparisons between the autism and expressive language disorder group showed no significant difference ($U = 89.00$, non significant). There was no significant difference between the expressive language disorder group and the typically developing group when pairwise comparisons were made ($U = 69.50$, non significant).

Table 9 also shows the means for the parent version of the Social Competence with Peers Questionnaire. Similar to the pupil version it shows that children with autism displayed less social competence with peers than the other groups, as reported by parents. The boxplot displayed in Figure 9 shows the median and range of scores for the three groups on the parent measure. It shows the same pattern of between group differences as the pupil version but with greater definition owing to reduced variability within groups.
The Kruskal-Wallis analysis of variance on data obtained from the Social Competence with Peers Questionnaire – Parent version confirms a significant effect of group condition ($\chi^2 = 24.29$, d.f. = 2, $p < 0.001$). For the SCPQ-P, pairwise comparisons using the Mann Whitney U Tests identified a significant difference between the autism and expressive language disorder group ($U = 30.50$, $p < 0.001$, 1-tailed). There was also a significant difference between the autism and typically developing group ($U = 9.50$, $p < 0.001$, 1-tailed). Finally, comparisons between the language disorder and typically developing groups showed a significant difference ($U = 49.00$, $p < 0.01$, 1-tailed).

Although the means scores for the SC-Pupil and SC-Parent are roughly similar for the expressive language disorder group and the typically developing group, there is a discrepancy between the ratings of social competence expressed by children with autism...
and their parents. This would suggest that the parents of children with autism perceive their child to be less socially competent with peers than the children themselves.

3.2 Within Group Comparisons

To consider more carefully the possible factors contributing to levels of anxiety, within group comparisons were investigated. For each group Spearman correlations were calculated between the main measures (the Spence Children's Anxiety Scale, the Social Worries Questionnaire – Pupil and Parent versions) and the Experience of Emotions Task, Strange Stories Task, Adaptive Behaviour Scales Language Development and Socialisation Domains and the Social Competence with Peers Questionnaire – Pupil and Parent Versions. As these analyses required multiple comparisons and therefore increased the risk of making a Type 1 error, a Bonferroni adjustment was applied to the probability level. This brought the adjusted probability level to 0.001. Only correlations found to be significant at the adjusted level will be discussed.

High Functioning Autism Group

Table 10 presents the Spearman's RHO correlations between all the measures for the Autism Group. The correlation between SCAS score and Strange Stories performance was not found to be significant ($\rho = -.281$, non significant). The correlation between SCAS score and the performance on the Experience of Emotions Task was also not significant ($\rho = .305$, non significant). With regards to the Adaptive Behaviour Scales, there was a highly significant negative correlation between SCAS score and the Socialization Domain ($\rho = -.917$, $p < 0.001$). No significant correlation was found between the SCAS and the Language Development Domain ($\rho = -.045$, non significant).
SCAS score did not correlate significantly with the Pupil version of the SCPQ ($\rho = -0.149$, non significant) or the Parent version ($\rho = 0.117$, non significant).

Correlations were also made using the SWQ. A significant correlation was found between SCAS score and the Pupil version of the SWQ ($\rho = 0.785$, $p < 0.001$). However, correlations between the SCAS and the Parent Version of the SWQ did not show a significant correlation ($\rho = -0.049$, non significant). No other measures correlated with scores on the Pupil or Parent Versions of the Social Worries Questionnaires.
Table 10. Spearman’s RHO correlations between all measures for the Autism Group

<table>
<thead>
<tr>
<th></th>
<th>SCAS</th>
<th>SWQ Pupil</th>
<th>SWQ Parent</th>
<th>SCPQ Pupil</th>
<th>SCPQ Parent</th>
<th>Str. Stories</th>
<th>Exp. Em.</th>
<th>ABS Social</th>
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<td>.135</td>
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</table>

N = 15

* Correlation is significant after Bonferroni adjustment at the .001 level (1-tailed).
Expressive Language Disorder Group

Table 11 presents the Spearman’s Rho Correlations between all measures for the Language Disorder group. Like the autism group, the correlation between SCAS score Strange Stories performance was not found to be significant (ρ = -.694, non significant). The correlation between SCAS score and the scores on the Experience of Emotions task was also not significant (ρ = .523, non significant). No significant correlation was found between SCAS score and the Adaptive Behaviour Scales Socialisation Domain (ρ = .274, non significant). The SCAS also did not correlate at the p = 0.001 level with the Language Development Domain (ρ = -.412, non significant). There was no significant correlation between the SCAS and the pupil version of the SCPQ (ρ = -.654, non significant) or the parent version of this measure (ρ = -.653, non significant).

Correlations were also made using the SWQ. Like the autism group, a significant correlation was found between the SCAS and the Pupil version of the SWQ (ρ = .788, p < 0.001) but not between the SCAS and the Parent version of the SWQ (ρ = .238, non significant). No other measures correlated with scores on the Pupil or Parent Versions of the Social Worries Questionnaires.
Table 11. Spearman’s RHO correlations between all measures for the Language Disorder Group

<table>
<thead>
<tr>
<th></th>
<th>SCAS</th>
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<td>Lang.</td>
<td>-.412</td>
<td>-.421</td>
<td>-.385</td>
<td>.472</td>
<td>.043</td>
<td>.501</td>
<td>.023</td>
</tr>
</tbody>
</table>

N = 15

*Correlation is significant after Bonferroni adjustment at the .001 level (1-tailed).
Typically Developing Group

Table 12 presents the Spearman’s Rho Correlations between all measures for the Typically Developing group. For the typically developing group, there was no significant correlation between SCAS score and Strange Stories performance ($\rho = -.310$, non significant) or between SCAS score and the performance on Experience of Emotions task ($\rho = -.042$, non significant). Neither did the score on the Socialisation Domain of the Adaptive Behaviour Scales correlate significantly with SCAS score ($\rho = .066$, non significant). The Language Development Domain of the Adaptive Behaviour Scales also showed no significant correlation with the SCAS ($\rho = -.358$, non significant). There was no significant correlation between the SCAS and the pupil version of the SCPQ ($\rho = -.352$, non significant) or the parent version of this measure ($\rho = -.456$, non significant).

Correlations were also made for the SWQ. Unlike the autism and language groups, the SCAS was not found to correlate significantly with the Pupil version of the Social Worries Questionnaire at the 0.001 level ($\rho = .671$, non significant). There was also no significant correlation between the SCAS and the Parent version of the SWQ ($\rho = .393$, non significant). Similarly, none of the other measures correlated significantly with the Pupil or Parent versions of the SWQ.
Table 12. Spearman’s RHO correlations between all measures for the Typically Developing Group

<table>
<thead>
<tr>
<th></th>
<th>SCAS Pupil</th>
<th>SWQ Pupil</th>
<th>SWQ Parent</th>
<th>SCPQ Pupil</th>
<th>SCPQ Parent</th>
<th>Str. Stories</th>
<th>Exp. Em.</th>
<th>ABS Social.</th>
</tr>
</thead>
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<tr>
<td>SCAS</td>
<td></td>
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<tr>
<td>Pupil</td>
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<tr>
<td>Parent</td>
<td>.393</td>
<td>.379</td>
<td></td>
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<td>SCPQ</td>
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<td>-.357</td>
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<tr>
<td>Parent</td>
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<td>-.407</td>
<td>.565</td>
<td></td>
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<td>-.337</td>
<td>.148</td>
<td>.011</td>
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<tr>
<td>Stories</td>
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<tr>
<td>Exp.</td>
<td>-.042</td>
<td>-.212</td>
<td>-.172</td>
<td>.446</td>
<td>.055</td>
<td>.346</td>
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<td>Em.</td>
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<tr>
<td>ABS</td>
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<td>-.167</td>
<td>-.211</td>
<td>.488</td>
<td>.137</td>
<td>.370</td>
<td>.340</td>
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<tr>
<td>Social.</td>
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<tr>
<td>ABS</td>
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<td>-.319</td>
<td>-.188</td>
<td>-.156</td>
<td>-.130</td>
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<tr>
<td>Lang.</td>
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</table>

N = 15

* Correlation is significant after Bonferroni adjustment at the .001 level (1-tailed).

Summary of Within Group Findings

- Within group comparisons found a significant correlation between the SCAS and the Pupil version of the SWQ for both the autism and language disorder groups.
- There was a significant negative correlation between the SCAS and the Socialization Domain of the ABS for the autism group.
4.0 Discussion

4.1 Main Findings

Adolescents with high functioning autism will report higher levels of anxiety than two comparison control groups consisting of adolescents with expressive language disorder and typically developing adolescents.

The main hypothesis for this study was that children with high functioning autism would have higher levels of anxiety than two comparison control groups. As measured by the Spence Children’s Anxiety Scale (SCAS), children with autism were found to have higher levels of anxiety than typically developing children but not significantly higher levels of anxiety than children with an expressive language disorder. These results are slightly different to those found by Gillott et al. (2001) in their study exploring levels of anxiety in children with high functioning autism, aged 8-12 years. In their comparison control design, children with autism were found to have considerably higher levels of anxiety than both the expressive language disorder and typically developing groups. The possible reasons for these differing results will be discussed later (see page 130).

Comparisons can be made between the current findings and the normative data from Spence’s standardisation trials. The children with autism from this study scored, on average, over twenty points higher than the mean for the non-clinical male controls aged 13-14 years (Spence et al., in press) (Spence’s non-clinical control mean = 18.85). Although the SCAS for use with adolescents has yet to be validated with a clinically anxious sample, Spence’s first standardisation study on children aged 8-12 years (Spence, 1997a) was found to discriminate at a group level between clinically anxious
children and non-clinical controls (Spence’s clinically anxious mean = 42.48). In comparison to her clinically anxious population, these children with autism obtained slightly lower scores, on average (Autism group mean score = 40.87). However, there were a number of children with high functioning autism in this study who scored much higher and would have been considered clinically anxious, according to Spence’s data. Furthermore, the high adolescents with high functioning autism in this sample had a higher group mean score than the children with high functioning autism, aged 8-12 years (Autism group mean score = 36.53), used in Gillott *et al.*’s (2001) study. As anxiety symptoms are thought to decrease with age (Muris, Schmidt, & Merckelbach, 2000; Ollendick *et al.*, 1996; Spence, 1998) the fact that a number of children with autism in this study scored higher than children of a younger age considered to be clinically anxious is noteworthy.

This study supports evidence from clinical observations (e.g. Attwood, 1997; Groden *et al.*, 1994; Schopler & Mesibov, 1994) and pharmacological studies (Steingard *et al.*, 1997; Szabo & Bracken, 1994) that individuals with autism may experience anxiety. Furthermore, this study supports the findings of Kim *et al.* (2000) who suggested that more specifically, children with autism exhibit greater rates of anxiety than children in the general population. In addition, like Kim *et al.*, this study also found a number of children with high functioning autism to be experiencing ‘clinically relevant’ levels of anxiety. However, this study is unique in that it is the first to have explored anxiety in high functioning autism during middle childhood using standardised self-report measures.
With regards to comparison groups, the mean SCAS scores for the language and typically developing groups were also higher than the mean scores for the non-clinical controls reported in Spence standardisation trials. It was surprising that the language group scores did not differ significantly from the autism group, given previous research findings such as that of Gillott et al. (2001). It was expected that children with autism would show higher levels of anxiety than the language group, given the range of cognitive difficulties with associated possible negative impacts on the processing of social information experienced by children with autism. From one perspective, these results may be taken to indicate that although children with autism experience higher rates of anxiety than typically developing children, they may not have significantly more anxiety symptoms than children from other clinical populations. This outcome would be contrary to the findings by Green et al. (2000) who compared anxiety levels in adolescents with Asperger's Syndrome and children from a different clinical population. Green et al. (2000) found that the Asperger's Syndrome group were experiencing greater overall anxiety than children with a conduct disorder. Due to the lack of significant difference between the two clinical groups in this study, conclusions about increased levels of anxiety being specifically related to autism, rather than language difficulties more broadly, are only tentative.

Although it had been anticipated that the autism group would report higher levels of anxiety than the language group, at the same time it was also assumed that the language group, due to their language difficulties, would report more anxiety than typically developing children. These predictions had been based upon previous research which has suggested that children with expressive language disorder experience more psychological difficulties than children from the general population (Baker & Cantwell
Moreover, some studies have found disorders of expressive language to be specifically implicated in the development of these difficulties (Baker & Cantwell, 1987; Stevenson & Richman, 1978). Therefore, it was surprising that the language disorder group scores were not significantly more elevated than the typically developing group.

There may be a number of reasons why the findings from this study do not support previous research findings for the language disorder group. Firstly this may be due to differences in participants selected. For example, both Gillott et al. (2001) and Stevenson and Richman (1978) selected younger children than those in the present study. Baker and Cantwell (1987) selected a wider age range but with a younger mean age of 5 years and seven months. This suggests that children with language disorders may experience less emotional difficulties as they grow older. Alternatively, as these studies did not specify the types of psychological difficulties found in children with language disorder, it may be that these were not primarily anxiety-related—their emotional difficulties may instead have been related to the experience of low mood, for example.

Compared to Gillott et al.'s (2001) study, while several subscale scores were elevated for the current older sample of adolescents with high functioning autism, it is interesting that the pattern of subscale scores were different. For Gillott et al.'s younger sample, scores for the autism group were particularly elevated on the Separation Anxiety and Obsessive Compulsive Disorder subscales. In the current study, the highest subscale scores for the autism group were Social Phobia and Generalised Anxiety Disorder. This may be a reflection of how the nature of anxiety problems shift in terms of specific focus throughout childhood and adolescence (Craske, 1997). Research addressing anxiety in
the general adolescent population suggests that the most prevalent anxiety problems found in middle childhood are social anxiety or social phobia and generalised anxiety (Kashdan & Herbert, 2001; Morris & Krachhowill, 1991). It is interesting that these subscales yielded the highest mean scores for both the typically developing and autism groups. This may indicate that anxiety difficulties experienced by children with autism are similar to those reported by their typically developing peers. Their elevated scores on the Social Phobia subscale are also interesting given that children with autism are not thought to be concerned about how they appear in front of others (Wing & Gould, 1979). This may suggest that for children with high functioning autism, like their typically developing peers, adolescence is marked by an increase in self-consciousness and sensitivity to self-presentational concerns (Buss, 1986; Elkind, 1980).

Given that many of the features associated with autism, such as a need for sameness, order and routine have been considered as similar to traits observed in Obsessive Compulsive Disorder (Groden et al., 1994 p 177-194; Tantam, 1991, p 147-183) it is surprising that the children with autism did not score more highly on this subscale. Obsessive-compulsive behaviours have been found to be prevalent in previous studies (Gillott et al., 2001; Szatmari et al., 1989) and some authors (e.g. Groden et al., 1992) have argued that certain characteristics of autism are in fact obsessive-compulsive disorder. Howlin (1998) has reported that occasionally children with autism may develop compulsive behaviour involving handwashing or checking lights. She also commented that obsessional thoughts, concerning death or illness or anxieties that they may inadvertently do something wrong, sometimes occur. Despite these similarities Baron-Cohen (1989a) found distinct differences between the obsessive behaviour in autism and that of obsessive-compulsive disorder. Primarily, he reported that
individuals with autism did not report the unwanted quality of their obsessions or the anxiety-reducing function that they served, both considered to be key factors of obsessive compulsive disorders. The results from this study may support the work of those who suggest that there are fundamental differences between the obsessive behaviour in autism and that of OCD (Baron-Cohen 1989b).

Summary

Hypothesis one is partially confirmed. As predicted the high functioning autism group reported significantly higher levels of anxiety than the typically developing group. This supports previous research which has suggested that children with high functioning autism exhibit greater rates of anxiety than children in the general population (Kim et al., 2000; Gillott et al., 2001). However, no significant difference in levels of self-reported anxiety were found between the autism and expressive language disorder groups. This finding is contrary to previous studies which have suggested that children with autism experience more anxiety than children from other clinical populations, including children with an expressive language disorder (Green et al., 2000; Gillott et al., 2001). This finding limits the conclusions that can be drawn about increased anxiety levels being specifically associated with autism and the core triad of impairments rather than language difficulties more broadly.
Hypothesis 2.

Adolescents with autism will report more social worries than two comparison control groups comprising of adolescents with expressive language disorder and typically developing adolescents.

This study also considered whether children with high functioning autism have higher levels of self-reported social worries than two comparison control groups. This was not found to be the case. Children with autism were not found to report more social worries than the language disorder group or the typically developing group, as measured by the Spence Social Worries Questionnaire (SWQ-Pupil). Gillott et al. (2001) is the only study to have used this measure with children with autism previously and the results for this study are in direct contrast to her findings. One reason for this difference may be attributed to the younger participants selected in Gillott et al.'s study. This suggests that children with autism may have fewer social worries as they get older. Alternatively, the Social Worries Questionnaire may not be targeting the types of worries which are particularly pertinent to children with autism of secondary school age.

Parents also completed a version of the Social Worries Questionnaire asking about their perceptions of their children's social worries in situations identical to the Pupil version but containing fewer items. According to this questionnaire, children with autism were perceived to have considerably more social worries than both the language disorder and typical groups. On this version, findings were consistent with those of Gillott et al. (2001). Additionally, parents gave much higher ratings for their children's social worries than the children themselves. It is difficult to clearly account for this discrepancy in parent and pupil ratings. One possibility is that parents are over
estimating the extent of their child's social worries by anticipating that their child will have such anxieties, given the nature of their autistic disorder. Alternatively, the children with autism may genuinely experience such worries but fail to fully report them. The Social Worries Questionnaire or indeed any of the measures used within this study were not designed specifically for use with children with autism. If people with autism do have difficulties in recounting subjective experiences in socially conventional ways then this measure may not have tapped into social worries in a way which was meaningful for them. Features of autism such as overcategorical or concrete thinking may have led to under-reporting of such difficulties. Finally, it is possible that although children with autism experience worry about social situations they do not demonstrate these worries by actively avoiding or ruminating over them as measured by the SWQ.

Comparisons between scores on the SCAS Social Phobia subscale and the Social Worries Questionnaire (Pupil version), also show apparent inconsistencies. Whilst the autism group were not found to show significantly more social worries than comparisons groups, difficulties associated with the experience of social phobia were the most frequently reported for these individuals. Differences between the two scales with regards to the aspects of social anxiety that they measure may go some way to explaining this discrepancy. Items on the Social Phobia subscale tap internal states relating to social-evaluative concerns, such as worry about how other people may perceive the rater and fear about being perceived as a fool. By contrast the Social Worries Questionnaire asks direct questions relating to actions, such as avoidance of going shopping alone or using the telephone.
These differences between the scales may also partially explain the discrepancy between Parent and Pupil versions of the Social Worries Questionnaire. For example, parents may be more able to objectively assess whether their child demonstrates social worries through their actions, such as by ruminating or actively avoiding situations, as measured by the Social Worries Questionnaire. Children, on the other hand, may be better able to comment upon their internal states related to social reactions, as measured by the Social Phobia subscale.

Summary

Hypothesis two is not confirmed. The high functioning autism group were not found to experience more social worries than the language disorder or typically developing groups, as measured by the children’s own self report. This outcome is contrary to Gillott et al. (2001) who found that children with high functioning autism (aged 8-12) reported more worries about social situations than language disordered or typically developing groups. However, the autism group were found to have significantly more social worry than both comparison control groups as reported by parents. This outcome is consistent with previous research (Gillott, 2001). For the present study, it is difficult to ascertain whether children in the autism group genuinely experience fewer social worries than had been anticipated or whether they experience such worry but, for various reasons, have under-reported such difficulties. It is also difficult to establish whether parents overestimated their child’s experience of social worry, perhaps because they anticipate that they will be more anxious due to the nature of their autistic disorder, or whether parents can more objectively report upon social worry based on behavioural observation of their child’s avoidance or rumination over social situations.
4.2 Possible Factors Associated with Anxiety in Adolescents with High Functioning Autism

This study also aimed to explore some of the possible factors associated with anxiety in children with autism. Children with autism are thought to have difficulties in interpreting complex social situations, recognising and expressing emotions, communication abilities, socialisation abilities and social competence with peers. These factors were considered in the context of the anxiety-related cognitive biases and distortions they may create at different stages of the information processing sequence according to Daleiden and Vasey’s information processing model of childhood anxiety.

Hypothesis 3.

If problems at the encoding stage of the information processing sequence are associated with increased anxiety and social worries for adolescents with autism then this group will show poorer ability in recognising and expressing emotions than two comparison control groups consisting of adolescents with language disorder and typically developing adolescents.

Children with autism are thought to have difficulty in recognising and expressing their own emotions (Capps, Yirmiya & Sigman, 1992; Yirmiya et al., 1992). The Experience of Emotions task was chosen to assess this ability.

In this study, children with autism were found to perform significantly more poorly on this task than typically developing children. This outcome is consistent with the findings of Gillott (1999) who also used this measure but with a younger population of children.
with autism. It is difficult to make direct score comparisons to Gillott’s (1999) research, as different scoring criteria were used in the present study. However, despite poorer performance than typically developing children, the autism group described four out of six emotions correctly on average, suggesting that not all children with autism were impaired in their ability to communicate their own emotional experiences. This result is even more striking given that a more stringent system of scoring was implemented than previous studies, whereby responses were only credited if they were correct on all three dimensions of appropriate affect, locus and controllability and presence of an audience.

With regards to children with a language disorder, children from this group also performed more poorly than the typically developing group. No significant differences were found between them and the autism group. As children with an expressive language disorder are not considered to have difficulty recognising and labelling emotional states (Leslie & Frith, 1988; Ziatas et al., 1998), it is possible that their performance was affected by their expressive, processing or word finding difficulties. Indeed the language group were noted to be very brief in their emotional accounts suggesting that their performance may have been affected by the verbal demands of this exercise.

In applying Daleiden and Vasey’s information processing model of childhood anxiety to children with autism it had been suggested that difficulties in recognising and expressing emotions may contribute to anxiety-related biases at the encoding stage of the information processing sequence. During the encoding stage information is selected for further processing while other information is ignored. For typically developing children it is likely that the emotional expression of others are attended to and selected as
important social cues in making realistic appraisals about a situation. Without this innate ability to recognise and understand emotions, children with autism may overlook such important social cues and may instead deploy attention based upon their threat-related knowledge structures making them more likely to detect and attend to minor threat cues. Secondly, it was suggested that in coping with anxiety an ability to label and monitor one’s ongoing affective state, for example, to attend to and recognise anxious arousal is important as they serve as cues to employ anxiety management strategies. With difficulty in distinguishing different emotions individuals with autism may recognise their aroused state as anxiety, therefore compromising their ability to generate appropriate strategies for coping with it.

Overall in this study the autism and language disorder group both performed significantly more poorly than typically developing children in the Experience of Emotion task. However, only the children with autism showed higher levels of anxiety than the typically developing children. Therefore these results provide no evidence to suggest a critical role for difficulties at the encoding stage of the information processing sequence due to problems with emotion recognition, when considering the higher levels of anxiety for the children with autism.

Although the results do not support this hypothesis, the performance of the children with autism on this task can be considered in relation to previous studies which have employed this measure. In considering specific emotions, children with autism had fewer problems recognising and understanding the simple emotions of happiness and sadness than the complex emotions of embarrassment and pride. These results reflect those of Capps et al. (1992) who also found that children with autism had more
difficulty talking about socially derived emotions, pride and embarrassment. These emotions are thought to require certain cognitive advances and a more complex understanding of social and interpersonal situations than more simple emotions (Harter & Whitesell, 1989; Thompson & Paris, 1981). In this study, further breakdown of responses may have helped elicit what the difficult dimensions of these emotions were for the children with autism. A higher percentage of errors were made on the audience dimension for the autism group. It is possible, therefore, as suggested by Capps et al. (1992) that children with autism have a limited understanding of the salience of others in situations creating pride or embarrassment and therefore fail to attribute the presence of an audience in their accounts of these feelings. Whatever the explanations, the evidence from this study suggest that children with high functioning autism can accurately report their experience of some emotions. This adds support to authors who have suggested that such children experience an impairment in understanding and expressing emotion as opposed to a complete deficit (Sigman et al., 1995)

The emotions of worry and fear were included in this task, as they had been initially used by Gillott (1999) due to their relevance to the experimental hypotheses. The autism group gave generally appropriate responses for both these emotions. Where errors did occur, these were in the locus and controllability or audience dimensions. The most prevalent worry for the autism group was about exam preparation. This is consistent with the general child literature which indicates that for older children, worries about school performance are common (Perrin & Last, 1997; Spence & McCathie, 1993). Changing schools or moving to college was also a concern for some children in this group. This may represent the resistance to change fundamental to autism or, more likely, is a
realistic age appropriate concern, as similar worries were expressed by comparison groups.

Unlike the children in Gillott’s (1999) study, this older sample of children with autism did not have particular difficulty recognising or communicating the experience of fear. Similarly the experiences of fear elicited were no different in their content to the comparison groups or to most commonly reported childhood fears cited in the literature (King & Ollendick, 1997). For example, themes mainly concerned a fear of heights, injections and dental procedures. This does not support some literature which suggests that children with autism can experience more unusual stimuli to be sources of distress (Ornitz & Ritvo, 1985).

Summary

Hypothesis 3 is not confirmed. The autism group were found to show significantly poorer ability in recognising and expressing emotion than the typically developing group but they did not differ significantly from the language disorder group in this area. However, only the children with autism showed higher levels of anxiety than the typically developing children on the main measure of anxiety. Therefore there is no evidence to suggest that difficulties in recognising and expressing emotions are directly associated with anxiety-related biases at the encoding stage of the information processing sequence for children with autism. As children with an expressive language disorder are not considered to have difficulty communicating emotional states it is possible that their poorer performance on this measure was affected by their expressive language difficulties.
Hypothesis 4.

If problems at the interpretation stage of information processing sequence are associated with increased anxiety and social worries for adolescents with high functioning autism then this group will show poorer performance on a task requiring theory of mind and central coherence abilities than two comparison control groups consisting of adolescents with expressive language disorder and typically developing adolescents.

Children with autism are thought to show impaired mentalisation abilities, that is difficulties conceptualising and appreciating the thoughts and beliefs of another person (Baron-Cohen, Leslie & Frith, 1985) and also difficulties in ‘central coherence’ (Happe & Frith, 1989). In this study these abilities were assessed using the Strange Stories task (Happe, 1994a). Children with autism in this study were found to perform poorly when this task was administered, compared to typically developing children. This finding was consistent with that of Gillott (1999) and other researchers (Jolliffe & Baron-Cohen, 1999) who also found this group of children to have significantly poorer theory of mind abilities and/or ability to use contextual information to understand social situations.

With regards to the children with language disorder, they also performed more poorly than typically developing children on the Strange Stories Test. However, their scores on this task did not differ significantly from those of the autism group.

In applying Daleiden and Vasey’s information processing model of childhood anxiety to children with autism it had been suggested that difficulties with theory of mind abilities and contextualisation may be associated with anxiety related biases at the interpretation
stage of the information processing sequence. This suggestion was based upon the fact that in making realistic appraisals about situations typically developing children will draw upon social cognitive schemata which has been shaped in part by their innate ability to infer other people’s mental states and to integrate information provided by a variety of cues in complex situations. Without this innate ability to understand the complexities of social interactions, the individual with autism may be more likely to feel vulnerable and assign threatening interpretation such as attributing threatening intentions to others in the face of negative events.

This study found that children with a language disorder were not more anxious than typically developing children despite their significantly poorer performance on a theory of mind and/or weak central coherence task compared to this group. This finding therefore, provides no evidence to suggest a direct association between difficulties at the interpretation stage of the information processing sequence due to theory of mind and/or weak central coherence when considering the elevated anxiety in the autism group.

Although these results do not support this hypothesis, they can be considered in the context of other studies which have employed the ‘Strange Stories’ task. In her original study Happé (1994a) found that the children with autism did not use significantly fewer mental state justifications overall than control groups but that they often failed to use the appropriate mental state terms in response to the Strange Stories. In seeking to explain the use of inappropriate mental state answers, some researchers have begun to question whether poorer performance on the Strange Stories task reflects a ‘pure’ theory of mind deficit or whether this represents weak central coherence (Happé, 1994a; Jolliffe & Baron-Cohen, 1999). That is, individuals with autism have difficulty giving appropriate
mental state answers not because they cannot infer the speaker’s intended meaning from their utterance but because they cannot infer the speaker’s intended meaning from the context in which it is embedded. The present study found that the autism group both produced fewer mental state answers and gave the same mental state answers repeatedly or out of context with the story. This was not thought to be a problem with understanding the stories as comprehension was checked after each story had been read. Due to this pattern of responses the source of the autism group’s difficulty is not entirely clear, although it may suggest that these individuals struggled with both giving a mental state explanation and a context appropriate response.

The poorer performance of the language disorder group compared to typically developing children on the Strange Stories task is not consistent with previous research which has found that children with specific language impairment can pass such tasks requiring the processing of complex social information (Leslie & Frith, 1988; Yirmiya et al., 1996; Ziatas et al., 1998;). Gillott (1999) however also found that her language disorder group fell short of the perfect performance achieved in easier tests of theory of mind and that there was no significant difference between the autism and language groups in the mean number of correct mental state answers. Such findings may indicate that children with language disorder have theory of mind/and or central coherence difficulties which have not yet been detected and that their poor performance represents a true difficulty in processing complex social information. Alternatively, their relatively less efficient performance, as with that on the Experience of Emotions task, could be a reflection of their difficulties in managing the linguistic complexity of these tasks due to symptoms of their expressive language problems, such as limited vocabulary and difficulty with recalling words, making it harder to select words for mental state answers.
Recognising this possibility, Miller (2001) systematically varied level of linguistic demand in ToM tasks and found that children with SLI performed similarly to same-age peers when linguistic complexity was low, but similarly to younger children matched with them on language comprehension ability when linguistic complexity was high. This may suggest that linguistic ability rather than underlying ToM ability limits the performance of such children on standard ToM tasks.

There were no unusual findings in relation to the performance of the typically developing group who, as expected, generally provided appropriate mental state answers.

**Summary**

Hypothesis 4 is not confirmed. Although the autism group showed significantly poorer ability in a task requiring theory of mind and central coherence abilities than the typically developing group they did not differ significantly from the language disorder group in this area. However, only the children with autism showed higher levels of anxiety than the typically developing children on the main measure of anxiety. Therefore there is no evidence to support a direct association between difficulties with theory of mind and/or central coherence and anxiety-related biases at the interpretation stage of the information processing sequence, for children with autism. It is possible that children with language disorder have problems with the processing of complex social information as measured in this task that have not yet been identified or that, once again, this groups' poorer performance on this task was due to their expressive language difficulties.
Hypothesis 5.

If problems at the response access or construction stage are associated with increased anxiety and social worries in adolescents with autism then this group will show greater impairments in social ability or communication ability than two comparison control groups consisting of adolescents with expressive language disorder and typically developing adolescents.

Social ability

Socialisation was assessed using the Adaptive Behaviour Scales (ABS-S). The mean score for the children with autism was significantly lower than the mean scores for both the typically developing children and children with a language disorder. As might have been predicted, the autism group mean Socialisation score was lower than the mean for children their age when compared to the normative data from the Adaptive Behaviour Scales (Sparrow, Balla & Cicchetti, 1984). This is consistent with the findings of Gillott (1999).

Difficulties with social interaction and the social aspects of behaviour, form part of the triad of impairments in autism (Wing & Gould, 1979), therefore it was not surprising that the autism group were found to have poorer social abilities. However, the language disorder group were also found to differ significantly from typically developing children on the Socialisation Domain. In addition, their Socialisation mean score was below the mean for children their age. Closer inspection of the group’s performance on this Domain may have allowed for a better understanding of this finding. It is possible that although the language disorder group were found to have some difficulties with socialisation compared to typically developing children, this may have been for different
reasons than the autism group. Such speculation would be consistent with the findings of Frith et al. (1994) and Fombonne et al. (1994), who found that the profile of social adaptive behaviour for autism and other impaired children was different.

In the context of Daleiden and Vasey's model of childhood anxiety it was proposed that the social skill deficits of children with autism may compromise their knowledge of problem-focused responses in the face of anxiety provoking situations. Without such adaptive skills, for example, to seek help from others, they may show a greater reliance on responses directed towards avoidance and distraction at the response access or construction stage of the information processing sequence.

These results found that the performance of children with autism on the socialisation domain was poorer compared to both comparison control groups. That is, scores for the Socialisation Domain found social ability to differentiate children with autism from language disordered and typically developing children. In addition, a significant negative correlation was found between the socialization domain and the SCAS for the autism group.

However, the autism group were not more anxious than the language disorder group despite their poorer social skills. One explanation of these results could be that there is a 'threshold' effect in which social skills below a certain point are associated with anxiety but that further decreases in social skills do not increase anxiety. Alternatively, it is possible that the failure to find a significant difference on SCAS scores between the autism and language disorder group was due to low statistical power.
Language ability

The Language Development Domain of the Adaptive Behaviour Scale was used to assess communication ability. Difficulties with communication is regarded as one of the triad of impairments in autism. Whatever the individual’s level of intellectual ability it is recognised that there will be some degree of impaired communication (Wing, 1997).

The autism group scored significantly more poorly on the Language Development Domain than the typically developing children, as was also found by Gillott (1999). This finding supports previous research which suggests that for individuals with autism the pragmatics of conversation or the use of language in a social context is problematic (Baron-Cohen, 1988; Tantam et al., 1993). There was also a significant difference between the autism group and the language disorder group, with the language disorder group exhibiting significantly lower scores than both the autism and typically developing group. Once again this finding is consistent with Gillott (1999). Given the specific difficulties with communication for the language group, such an outcome may have been expected.

It was predicted that elevated anxiety may be associated with difficulties at the response access or generation stage of the information processing sequence due to the communication deficits implicit with a diagnosis of autism. This was on the basis of adaptive communication skills being important for generating and selecting constructive coping responses when dealing with anxiety-provoking situations (Spence et al., 1999). Without such skills it was proposed that individuals with autism may show greater reliance on responses directed toward avoidance and distraction (Vasey & Daleiden, 1996), perpetuating the cycle of anxiety.
This study found that despite their significantly poorer performance on this measure of language ability compared to both groups, children with a language disorder were not more anxious than typically developing children or children with autism. In addition, no within group correlation was found between communication ability and anxiety for any of the three groups. These findings therefore, do not offer any direct evidence to suggest an association between difficulties at the response access or construction stage of the information processing sequence due to language impairments specifically when considering the elevated anxiety in the autism group. However, this finding does not entirely rule out the implication of communication difficulties in anxiety. It is possible that an association may exist but via mediators and moderators. This possibility will be explored further in the section discussing theoretical implications (see page 161).

Summary

Hypothesis 5 is partially accepted. The autism group showed significantly greater impairment in socialisation ability than both the typically developing and language disorder group. Although the pattern of between group differences on this measure did not match the pattern of between group differences on the main measure of anxiety, within group correlations found a significant negative correlation between socialisation ability and the main anxiety measure for the autism group. Therefore such results provide some evidence to suggest that anxiety in individuals with autism may in some way be associated with difficulties at the response access or construction stage of the information processing sequence due to socialisation impairments. Poor social skills may mean that children with autism rely on responses directed at escape and avoidance rather than more adaptive problem-focussed responses in the face of a stressful situation.
Although the autism group also showed significantly greater impairment in their communication ability than the typically developing group, the language disordered group were most the impaired out of the three groups in this area. This finding does not support the current hypothesis for an association between elevated anxiety and difficulties at the response access or construction stage of the information processing sequence due to language impairments.

**Hypothesis 6.**

If problems at the response selection stage of the information processing sequence are associated with increased anxiety and social worries in adolescents then this group will perceive themselves to be less socially competent with peers than two comparison control groups consisting of adolescents with expressive language disorder and typically developing adolescents.

As measured by the Social Competence with Peers Questionnaire, children with autism perceived themselves to be less socially competent than typically developing children but there was no significant difference between the children with autism and language disordered children.

There is no published data using this measure with children with autism. However, Spence’s (1995b) standardisation trials for this measure produced normative data (normative mean = 15.33). Compared to this normative data the children with autism scored over five points lower, on average, indicating that they perceived themselves to be less socially competent, as rated by the Pupil version of the Special Competence with Peers Questionnaire (autism group mean 9.53). Children with language disorder also
rated themselves to be less socially competent on average than the children from Spence’s clinical trials but with only three points lower, on average (language disorder mean = 11.40). Although the children from the typically developing group also had a lower mean score than normative data, this was only a one point difference (typically developing mean = 14.0).

In the context of Daleiden and Vasey’s model of childhood anxiety it was suggested that elevated anxiety in children with autism may be associated with difficulties at the response selection stage due to poor perceived social competence. That is, children with autism may access escape/avoidant coping responses to anxiety-provoking situations at the response selection stage because they lack the confidence in their ability to effectively engage in more constructive coping. Although the autism group did not differ significantly from the language disorder group in perceived social competence, on this measure the pattern of between group differences for self-reported social competence with peers was the same as the pattern of anxiety, suggesting that the two factors may be associated. This was the only measure administered which showed this precise pattern of correspondence to the main measure of anxiety. From this perspective it remains a possibility that children with autism have appropriate knowledge of problem-focussed, nonavoidant responses but that they do not select these because their self-efficacy beliefs or outcome expectations for these responses are low compared to escape/avoidant responses. The cycle of anxiety is then perpetuated by the negative reinforcement of escape/avoidant strategies through the removal of demands to continue processing potentially negative outcomes of the situation and risking the possibility of poor performance.
These findings can also be considered in relation to previous studies considering self competence in individuals with autism. Capps, Sigman and Yirmiya (1995) which found that autistic children perceived themselves to be less competent than typically developing children, as measured by the Perceived Competence Scale for Children (Harter, 1982). Amongst other domains, these children perceived themselves to be less competent socially. Although a lack of normal peer relationships is part of the diagnosis of autism (American Psychiatric Association, 1994; World Health Organisation, 1992), the present study suggests that children with high functioning autism have a heightened awareness of this social weakness. One interpretation of these findings is that children with high functioning autism are capable of making accurate self-appraisals and as a result, in Kanner’s (1943) terms, they may be ‘more aware of their peculiarities’ in relation to their peer interactions. This would be consistent with Sigman and Capps (1997) who suggested that during adolescence the lack of social competence becomes painfully apparent to individuals with high functioning autism.

Parents also completed a shorter version of the Social Competence with Peers Questionnaire reporting on their perceptions of their children’s social competence. Compared to the norms for the Parent version of the Questionnaire (normative mean = 14.82), parents of the language disorder group gave scores that were lower than the normative mean (mean = 10.73) as did parents of the typically developing children (mean = 13.47). Once again, however, the differences between normative means and parent ratings were most pronounced for the autism group (mean = 6.60). Analysis confirmed that parents of children with autism perceived their children to be less socially competent than both comparison groups. Moreover, for the children with autism, parents gave lower ratings for their child’s social competence than the children did themselves.
Thus, these results confirm that the core disorder of autism has implications for the consequences and outcomes of social interaction with peers.

Summary

Hypothesis 6 is partially confirmed. The autism group perceived themselves to be significantly less socially competent with peers than the typically developing group. However, there was no significant difference between the autism and language disorder groups in their own reports of perceived social competence. This pattern of between group differences was the only one in the study found to correspond with the pattern of between group differences for the main anxiety measure, suggesting that the two factors may be associated. According to parental ratings, the autism group were perceived to be less socially competent than both comparison groups, as predicted in the hypothesis. Therefore, perceived social competence may be associated with elevated anxiety in the autism group at the response selection stage of the information processing sequence. For example, a lack of perceived competence and low estimations of their coping ability may lead children with autism to select escape/avoidant responses in the face of anxiety provoking situations, perpetuating the anxiety cycle.

Summary of Possible Factors Associated with Anxiety in Adolescents with High Functioning Autism

In summary, the experience of anxiety in autism has been considered in the context of Daleiden and Vasey’s model of childhood anxiety. Specifically, characteristics of autism have been considered in relation to how they may be associated with the biased processing and interpretation of information at different stages of the information processing sequence. Associations between autistic impairments and the selection of
escape/avoidant responses have also been considered. Between group comparisons were
made on measures of theory of mind and/or central coherence, recognition and
expression of emotions, language development, socialisation abilities and perceived
social competence with peers. Children with autism were found to perform significantly
more poorly on all measures compared to typically developing children. Compared to
children with a language disorder, the children with autism showed similar performance
on the theory of mind and recognition and expression of emotions tasks. However, these
groups differed significantly from one another in terms of socialisation abilities and
language development. The language disorder group showed poorest communication
abilities, as indicated by the language development measure. The performance of
children with autism on the Socialisation Domain was found to be poorer compared to
both comparison control groups. A significant negative correlation was found between
socialisation ability and anxiety for the autism group. Therefore, for children with
autism increased levels of anxiety may be associated with problems at the response
access or generation stage of the information processing sequence due to socialisation
impairments. Moreover, the pattern of between group differences for self-reported social
competence with peers was the same pattern found for anxiety. Thus, for children with
autism, increased levels of anxiety may also be associated with problems at the response
selection stage of the information processing sequence, specifically their perceived social
competence with peers. However, these results do not rule out the influence of other
factors in the experience of anxiety which may be implicated but via moderators and
mediators (see Baron & Kenny, 1986).
4.3 Problems with the Research Design

This study has several strengths and unique features. It is the first study to consider anxiety in children with high functioning autism during middle childhood, using self-report measures. It is also one of the few studies to apply a mainstream model of psychological distress to explore factors associated with levels of anxiety in this population. This study has advanced previous research by highlighting that adolescents with high functioning autism experience increased levels of anxiety which may be associated with their impaired social abilities and poor self-perceived social competence with peers through effects at the response access or construction stage or response selection stage of the information processing sequence. Despite such strengths and the interesting findings, there are a number of design limitations that should be taken into account when considering these results and when planning similar future research.

4.3.1 Sample Size

Perhaps the most obvious limitation for this study was the small sample size, with only fifteen children in each group. As is common in such research, numbers were limited due to constraints on time and resources. This factor undoubtedly impacts upon the generalizability of the findings. From a statistical perspective, a small sample and therefore, limited power created the risk of Type 11 error, meaning that analyses may have failed to detect true relations. For example, based upon previous research findings and the number of cognitive processes relevant to anxiety in which their performance might be impaired, it had been predicted that children with autism would experience significantly more anxiety as measured by the SCAS than children with a language disorder. Likewise, it was expected that children with a language disorder would report...
significantly more anxiety than typically developing children based upon previous research suggesting that they experience more emotional difficulties than children from the general population. Whilst the three group mean scores differed according to this expected pattern it was not to a statistically significant degree. An increased sample size may have increased the power of analyses and found such between group differences to be significant.

Use of such small numbers also have implications for the representativeness of the sample. Given the diverse manifestations of autism in childhood, even for those considered high functioning, any conclusions about the findings in relation to the more general population of children with autism can only be tentative. The lack of females in this sample adds further caution regarding the generalisability of these findings. Although girls with high functioning autism were invited to participate, none chose to opt into the study. Speculations as to the reasons for this could be made, for example, it is possible that girls chose not to become involved because they did not consider the study to be relevant to them or, conversely, because it was addressing a particularly sensitive issue. Whatever the reason, the experience of anxiety in girls with high functioning autism is not represented in this study.

4.3.2 Participants

Although children within the autism group had received a diagnosis of autism according to ICD-10 criteria (WHO, 1992) and were not considered to be intellectually impaired, the interview process highlighted some within group variability which may have affected individual scores. For example, although considered to be 'high functioning' the
children varied in their degrees of linguistic and cognitive ability. More stringent inclusion criteria based on formal tests of linguistic and cognitive ability (such as the British Picture Vocabulary Scale; BPVS, Dunn et al., 1982 or Wechsler Intelligence Scale for Children - Third Edition; WISC-III, Wechsler, 1991) for the whole sample would have controlled for this. This would also have avoided the reliance on psychiatric classification and diagnosis as the basis for inclusion criteria. Although psychometric data was available for some children from the autism and expressive language disorder group which served as a reliability check, not having routinely undertaken such assessment for each participant also limited effective between group matching and is perhaps one of the most fundamental flaws of this study. This is particularly the case with the typically developing children, where estimates of intellectual ability were made by educational staff, partly on the basis of the children’s performance on standardised ability tests but partly also on the basis of general teacher impressions.

Inclusion criteria for children in the language disorder group included a formal diagnosis of ‘expressive language disorder’. However, once again there were differences in levels of linguistic ability, suggesting that there may have been some variability within the group. Such factors may have affected scores obtained on some measures and make the findings from this research less clear. Previous researchers have suggested that children’s language difficulties can change over time and that there can be variability within subgroups of specific language impairments (Chapman, 1991; Conti-Ramsden et al., 1999). Therefore, findings in the present study may be attributed to other unreported or newly emerging language problems, such as pragmatic or language comprehension difficulties, in some members of the language impaired group. If there is variability in language disorder and language skills, not only could this affect individual outcome but
it could also mean that the language difficulties of children from the language disorder
group could overlap with those of the children from the autism group. Once again,
increased rigour in selection, such as formal assessments of ability and matching
children across groups based upon this may have gone some way to addressing these
problems.

4.3.3 Unmeasured variables

Additionally, although inclusion criteria for the study stated that individuals should not
be in treatment for psychological difficulties, the presence of such problems was not
formally measured or controlled for. Other variables such as family history, life events
and the child’s own awareness of disability were not considered here but may have been
relevant to understanding the factors associated with the development of anxiety
problems. Related to this, in the initial consideration of the development and
maintenance of anxiety in children with autism, theoretical accounts of executive
dysfunction were considered. This theory was also discussed in relation to how
executive dysfunction might be associated with biases in cognitive processing at the
encoding stage of the information processing sequence. However, these aspects were
not measured in any way despite providing equally plausible accounts of how they may
be associated with the experience of anxiety in autism. It is possible therefore that such
unmeasured variables could account for some aspects of the results.
4.3.4 Measures

This study relied upon the use of self-report measures. Self-report instruments are frequently used in studies of childhood anxiety given that they provide reliable and invaluable insights into subjective feelings of distress (Greig & Taylor, 1999; Yule, 1997). The Spence Children’s Anxiety Scale, the main measure employed in this study, was particularly useful as it had been developed specifically for the child and adolescent population. However, it was limited by not allowing for the exploration of individual unique fears. An alternative methodology, such as semi-structured interview as employed by Green et al. (2000) in their study of the social and emotional functioning of adolescents with Asperger’s Syndrome, may have captured such information. Indeed the development of a self-report measure for use with this specific clinical population would overcome the limitations of existing measures. Although some are now being developed, such as ‘The Stress Survey Schedule for Persons with Autism’ (Groden et al, 2001), there generally appears to be a shortage of measures psychometrically tested and standardised with the individuals with autism.

Related to the use of self report measures with children with autism, there has also been debate about whether the child or adolescent with autism can accurately identify feelings of anxiety, in light of the research that implicates they have difficulty self reporting their own feelings and perceptions (Baron-Cohen, 1989; Capps, Yirmiya & Sigman, 1992). Most research which has suggested that these individuals struggle to introspect have focussed on those with a more pervasive expression of the disorder. In this study children of average intellectual and linguistic ability were selected. There was no suggestion throughout the interview process that children had difficulty in understanding
and answering the questions related to emotional experiences. It is also possible however, that the actual process of participating in the study may in itself have been anxiety provoking for the children with autism, given that new situations and people are potential stressors for this clinical group. Attempts were made to ensure that children were at their ease, for example, by conducting the interview at home if preferred. Nonetheless, stress may have impacted upon the performance of these individuals, especially in the Strange Stories which is a test type measure.

This issue of self-report relates to broader discussion of assessment methods in the study of childhood anxiety. Researchers in this area have had a tendency to rely upon self-report techniques (Daleiden & Vasey, 1997). However, many of the deficits and distortions associated with childhood anxiety may be automatic and unavailable to conscious awareness. As a result, certain researchers are advocating the development of performance based measures to supplement self-report techniques. Performance based methods have been successfully employed with adults (see MacLeod & Matthews, 1991) and some evidence suggests that similar methods are valuable when applied to the study of anxiety among children (Vasey et al., 1995; Vasey et al., 1996). Although self-reports are still the most widely used assessment method because children are in a unique position to report on their private experiences and thus their self reports supply an important dimension in the assessment of children’s anxiety-related cognitions, future research might usefully consider the application of performance based measures.
4.3.5 Limitations of the Model

In discussing the problems with the research design the limitations of the model described should also be recognised. Firstly, an important limitation with Daleiden and Vasey’s information processing model and with the cognitive behavioural theory of childhood anxiety more generally pertains to tests of its aetiological assumptions. There is an assumption that distorted cognition leads to (i.e. causes) maladaptive behaviour, such as anxiety. Although there is research support for faulty cognition as a concomitant of anxiety, evidence for the causal hypothesis is presently mixed and equivocal (Prins, 2001). The possibility remains that some cognitive correlates result from rather than cause the anxiety problem in question. Furthermore, the possibility of circular relationships exists, whereby particular styles of cognitive processing result from overt behaviour patterns and emotions and in turn serve to maintain maladaptive behaviour and emotions (Spence, 1994). Further research is needed to clarify more specifically the nature of these relationships.

Secondly, in presenting the information processing model, childhood anxiety was discussed as a unitary construct. However, differences may be evident in the information processing of children experiencing different types of anxiety (e.g. panic, social phobia, generalised anxiety). In addition, although the model is useful for considering interactions among various stages of information processing it does not address the impact of developmental competencies and limitations on the functioning of children’s cognitive systems.
Finally, it is recognised that the hypotheses for this study are based upon an assumption that similar processes or mechanisms are involved in the experience of emotional distress for people with autism as are implicated for the non-disabled population, failing to acknowledge the qualitative and quantitative differences that may exist in the experience of anxiety in autism. However, there is an apparent lack of theoretical models specific to the experience of psychological and emotional difficulties in this population. Therefore, presentation of this model is but a first step in evaluating the role of different cognitive and behavioural processes that may contribute to anxiety in people with autism.

4.4 Theoretical Implications

The aim of the present study has been to utilise Daleiden and Vasey’s mainstream information processing model of childhood anxiety to consider the experience of anxiety in children with autism. Theoretical accounts of autism have been used to discuss how anxiety-related distortions and biases in cognitive processing may occur at different stages of the information processing sequence. Impairments in socialization and communication for children with autism and the selection of escape/avoidant responses have also been considered.

The pattern of between group differences for self-perceived social competence with peers as reported by the children with autism, was the main factor found to correspond with the pattern of between group differences for anxiety. In addition, according to parental ratings, the autism group were perceived to be less socially competent than both language disordered and typically developing groups, as predicted by hypothesis 6. This
suggests that perceived social competence with peers, as reflected by the consequences and outcomes of social interaction, is in some way associated with the experience of anxiety, for children with autism. This is supported by the finding that social ability was negatively correlated with anxiety for the autism group. Such results are in keeping with findings by other authors who have suggested that for typically developing children social phobia specifically is associated with social skills deficits and poor outcomes from social interaction (Spence, Donovan & Brechman-Tousaint, 1999).

Whilst this research has demonstrated a link between the display of anxiety and perceived social competence and social ability, due to its correlational design it can say nothing about the causal nature of this relationship. Therefore the different possible interpretations of these results shall only be discussed tentatively from an information processing perspective. A very simplified schematic model of how such social and cognitive factors may be associated with the experience of anxiety in this group is presented in Figure 10.

4.4.1 Primary Socialisation Deficit and Anxiety in Autism

Social skills are considered important in the ability to retrieve and generate developmentally-appropriate coping responses that lead to effective emotional self-regulation and management of anxiety (see Vasey, 1993, 1996). For example, adaptive coping responses in the face of stressful situations may require skill and ability to elicit empathy or helpful behaviours from others. Due to the primary socialisation deficit associated with the disorder, a child with autism may have failed to develop such skills. As a result they may not access or generate as many problem-focused responses in the
A simplified schematic model of how social and cognitive factors may be associated with the experience of anxiety in adolescents with high functioning autism.

First place and therefore show a greater reliance on responses directed towards escape-avoidant responses at the response access or construction stage of the information processing sequence. The ongoing selection of escape/avoidance strategies at the response selection stage of the information processing sequence, in turn reduces the...
opportunity for learning or developing adaptive social skills, perpetuating the anxiety cycle.

Another possibility is that these children do generate and attempt to enact problem-focused strategies such as seeking social support but that due to social skill deficits they do so in a manner that increases the likelihood of receiving punishment for such behaviours. For example, an anxious child with autism experiencing difficulties with a peer on the playground during breaktime, may select the strategy of seeking social support but enact this strategy by telling the teacher of the other child’s misbehaviour. This type of response may elicit even more social punishment and peer rejection as the child becomes perceived negatively by their peers. Such ineffective attempts to enact problem focussed strategies results in expectancies of poor outcomes and negative thoughts relating to subsequent situations in which adaptive social skills are required. Therefore for children with autism low perceived social competence and poor self-efficacy beliefs may be quite accurate self-appraisals of their ineptitude.

4.4.2 Low Perceived Self-Competence and Anxiety in Autism

It is possible that children with autism do have knowledge of appropriate problem-focussed responses, including adaptive social skills but that they do not select such strategies due to their self-perceived lack of social competence. At the response selection stage possible responses are evaluated in terms of self-efficacy. For children with autism it may be that their expectations of negative outcome and lack of perceived competence in their ability to effectively engage in problem-solving behaviours results in escape/avoidant strategies being the most positively evaluated responses for enactment.
Selecting such strategies for escaping from anxiety-provoking situations based upon their perceived lack of competence may be negatively reinforced through the removal of perceived environmental threats but also through the removal of demands to continue processing potentially negative outcomes of the situation and risking the possibility of poor performance and further threats to self image. This perpetuates the repetitive cycle of avoidance and increased anxiety.

Alternatively, it is possible that for children with autism the selection and enactment of problem-focused nonavoidant strategies prove ineffective because of cognitive interference associated with anxiety (see Vasey & Daleiden, 1996). That is, high levels of anxiety for children with autism may interfere with their effective social functioning and therefore undermine their competence in peer relationships. To others then they appear less socially skilled. In either case, anxious children with autism would experience repeated punishment from attempting such responses by virtue of their failure.

4.4.3 Parent-Perceived Low Social Competence and Anxiety in Autism

Investigations into the means/mechanisms by which parents convey a cognitive vulnerability for anxiety to their children has suggested that parental behaviour may be linked to the development of anxiety through cognitive factors (e.g. maternal expectations) that may relate to such parenting behaviours as overprotection and excessive control (Kendall & Panichelli-Mindel, 1997). For the child with autism parent-perceived low social competence may mean that parents make low estimations of coping when thinking about their children in potentially stressful social situations.
These lowered expectations for coping and a fear that something harmful may happen to their child may relate to protective parenting and excessive control. Estimating their poor social skills, the parent of a child with autism may choose to protect their child from possible distress by reducing the frequency of exposure to unfamiliar stimuli and by quickly stepping in to soothe or reassure them when the experience of novelty is unavoidable. However in this circumstance, excessive protection from a parent means the child will have both a limited and negative view of both the environment and his or her ability to cope with it. Opportunities to develop the social skills required for adaptive problem focussed responses will be limited, reinforcing their own sense of low perceived social competence and preference for escape-avoidant responses at the response selection stage of the information processing sequence.

4.4.4 The Simplified Schematic Model of Anxiety in Autism – A Cautionary Note

Whilst this study has suggested certain associations between social ability, perceived social competence and the experience of anxiety in children with autism, knowledge about the factors that place children at risk of developing anxiety problems highlights that the development and maintenance of maladaptive fears and anxiety involves a complex interplay between biological, psychological and environmental factors (Craske, 1997). Wider sources of influence include child characteristics, (such as genetic constitution, temperamental style, coping and thinking styles) and environmental factors (including sociocultural influences, negative life events, life transitions, parental psychological difficulties, parental style and modelling) (Craske, 1997). Such influences have not been directly considered in this study. Related to this, the information-processing model places an emphasis on the dynamic flow of information through
anxious children's cognitive systems and the associated interactions and interdependence of these various stages. This study therefore is not suggesting that for children with autism problems related to social skill deficits at the response access or construction stage or perceived social competence at the response selection stage are the isolated factors responsible for their experience of anxiety. In practice the possible influences of social competence and social ability are not operating in a discrete manner and may be interrelated with many more such variables, or represent mechanisms through which particular factors exert their influence. In the adult anxiety literature, state anxiety, stress and other transient variable have been suggested as moderators of the relation of trait anxiety to cognitive biases (Prins, 2001). Indeed it is possible that other such factors might similarly affect processing phenomena in children with autism through moderators or mediators (see Baron & Kenny, 1986). For example, impaired language, specifically the ability to engage language socially may impact upon the child's effective social functioning and their ability to enact adaptive coping strategies such as seeking social support in the face of anxiety provoking situations.

4.5 Clinical Implications

The literature on general populations of children, suggest that most children display some degree of anxiety and that for a substantial minority the level of anxiety experienced can be considered clinically significant and can become debilitating to daily functioning (Klein, 1994). Some authors suggest that this risk of significant anxiety is increased for children with disabilities and children with autism (Allen, 1989; Groden et al., 1994). The findings from this study have important implications for the clinical
assessment, formulation and treatment of anxiety problems in individuals with high functioning autism.

4.5.1 Assessment

The elevated levels of anxiety in this sample of children with autism indicate that when such individuals are referred to clinical psychology services it may be helpful to assess their level of anxiety. Early identification and treatment of anxiety in this population is particularly important given that behaviour patterns established during the course of psychological difficulties can then be very difficult to alter, even when the person’s condition has generally improved (Howlin, 2000). Improving recognition and treatment of anxiety difficulties would enhance the prognosis of adolescents with high functioning autism. It also has the capacity to improve quality of life for families of these individuals, given the effect such symptoms can have on family life.

The present study also demonstrates that measures used within the general child and adolescent population can be utilised with high functioning children with autism (such as the Spence Children’s Anxiety Scale and the Social Worries Questionnaire). Such self-report questionnaires could be employed to measure therapeutic outcome with able children with autism. Indeed, Likert type scales could be used by the child to measure anxiety symptoms at more regular intervals during the course of treatment, maybe on a situational or daily basis.
4.5.2 Formulation of Problems and Targets for Clinical Intervention

The simplistic schematic model derived from the findings offers an alternative way of formulating the anxiety problems in children with high functioning autism. Adopting an information processing perspective more broadly may be helpful in that it outlines a sequence of stages through which the shift from early cognitive approach of threat cues to subsequent behavioural and cognitive avoidance may be mediated. Although individual formulation is especially important with this population given the heterogeneous nature of autism and the problems it encompasses, findings from this study highlights targets for intervention that are likely to produce the most widespread cognitive change.

*Developing Problem-Focussed Coping Strategies*

If specific social skill deficits are associated with the experience of anxiety in children with autism, working to enhance the response access or construction of adaptive responses through the development of social ability may be an important treatment target. Intervention components aimed at developing and refining the social skills necessary for problem-focussed coping strategies may be required and would help to challenge a reliance on escape/avoidant strategies in the face of anxiety-provoking situations. In turn the experience of positive outcomes is likely to enhance the sense of perceived social competence. Behavioural skills training packages (e.g. social skills training) have been implemented with children with autism by certain previous authors (Howlin, 1997; Mesibov, 1992). However, whilst such interventions can improve certain aspects of social functioning they are not without difficulty (Howlin, 1998). For example, authors have noted how teaching the rules of social engagement, such as how
to enter a group of children, how to join their activities, how to talk to peers and how to elicit empathy are all highly complex and very difficult to teach (Dodge et al., 1983).

**Enhancing Self-Perceived Social Competence**

Alternatively if children with autism do have knowledge of appropriate problem-focussed responses, including adaptive social skills but do not select such strategies due to lack of confidence in their ability, then improving perceived social competence and self-efficacy beliefs may be the primary pathway for clinical intervention for this group. From this perspective their lack of perceived self competence may stem from the distorted processing of negative information. Thus treatment could focus on increasing the accuracy of such judgements and improving their confidence in selecting and enacting adaptive responses. For example, intervention could include a component of tasks through which children gather empirical data regarding their coping behaviour which could be used to challenge the inaccurate appraisals of their actual competence or overexaggeration of the extent of their performance deficits and low estimations of their coping ability. In Kendall’s (1994) programme of cognitive therapy addressing childhood anxiety in typically developing children, children completed ‘Show that I Can’ tasks, which included keeping a record of anxiety-provoking situations, efforts to cope with them and information about the efficacy of coping responses. Clearly such techniques would require adaptation to take into account the child’s autistic spectrum disorder, for example avoidance of metaphorical concepts and language and maintaining a concrete and logical approach.

Finally, if poor behavioural performance and apparently poor social ability stems from anxiety-related cognitive interference for children with autism, then treatments
improving the efficiency of children's information processing should directly result in improved social functioning or performance and self-competence or efficacy. Modifying children's cognitions through any of these proposed pathways may have the potential to reciprocally influence other stages of the information-processing sequence (e.g. Vasey & Daleiden, 1996).

4.6 Future Research

Clinical observations of autism have suggested that adolescents with high functioning autism experience anxiety as much, if not more so, than typically developing children (Howlin, 1998). The findings from this study supports this clinical picture. It also adds support to the findings of Gillott et al. (2001), who, using a very similar design, found that younger children with high functioning autism also reported higher levels of anxiety than comparison groups. However, as the present study was the first to employ standardised instruments with children during middle childhood, replication studies would be useful to add support to or refute these findings.

In particular, due to time constraints and resource limitations, this study only involved a small sample of participants, all of whom were male. Therefore, in order to promote the generalisability of these findings, future studies should incorporate larger numbers and include high functioning adolescent girls with autism. In previous research, the pattern of type and level of anxiety in girls with autism has been found to be possibly different to the clinical pattern of anxiety in boys from this population (Gillott et al., 2001). Thus, exploration in this area would be fruitful to ensure that anxiety in adolescent girls with autism is not missed. Also of particular interest would be older adolescents, perhaps at the point of leaving the educational setting and facing the demands of adult life. This
transition from the relatively supportive environments of home and school to the world of college or work is thought to be particularly stressful for this population (Howlin, 1997).

The use of Daleiden and Vasey’s information processing perspective of anxiety has highlighted how mainstream models may provide a helpful starting point in considering the phenomenology and mechanisms of psychological distress in this population. It has highlighted some interesting associations. However, without longitudinal research it is not possible to draw conclusions about the developmental sequelae of anxiety in autism and what comes first: social skills deficits, lack of success in social interactions, perceived lack of competence, negative cognitions, anxiety or avoidance. Future studies, could be conducted that follow through children who are identified as having either poor perceived social competence or high levels of anxiety to determine the impact on the other factors in the chain of events. In practice it is likely that there are multiple pathways to the development of anxiety in children with autism as there is for typically developing children and that the end point is a vicious cycle of all these factors. Clearly, more research is needed to explore this issue further and to clarify any specific patterns of association.

Considering the role of perceived competence in relation to anxiety in children with autism provided some interesting findings in the present study. At a most basic level it highlighted that these children did have some ability to be self-reflective and engage in the social –comparative processes involved in social perception which are usually assumed to be very challenging for these individuals (Capps et al., 1995). Further empirical study of how adolescents with high functioning autism perceive themselves
and the impact of this upon their emotional lives, would be another avenue for future research.

Although this study has attempted to consider problems in social cognition such as deficits in theory of mind in children with autism it has only speculated as to how such deficits may create certain anxiety related cognitive biases. Future research may benefit from directly measuring the types of cognitive distortions individuals with autism may be making such as negative self talk, causal attributions, preoccupation with the evaluations of others and the misperceptions of threat or danger that often plague children with anxiety. Given the current lack of theoretical and research basis for understanding the psychological and emotional distress in this population greater insight into the cognitions of children with autism is a necessary step for developing appropriate interventions with this group.

Finally, in some clinical literature certain features of autism have been linked with the experience of anxiety. In his original paper, Kanner (1943) suggested that many of the core features of autism, particularly the insistence on sameness, repertoire of fixed behaviours, routines and obsessions, are anxiety driven. There have been further clinical observations to supposedly support this understanding and to suggest an association between autism and anxiety (Attwood, 1998; Groden et al., 1994; Howlin, 1997; Jolliffe, Lansdown & Robinson, 1992). Such associations have been widely influential in shaping the views of clinicians, teachers and parents of children with autism and approaches to treatment. However the theoretical basis and the nature of this relationship is unclear. For example, it has been a long held assumption that repetitive behaviours (see Turner, 1995 for a taxonomy of repetitive behaviours), are adaptive
coping behaviours employed by the individual with autism to reduce chronically high arousal levels (Hutt & Hutt, 1965, 1970; Zentall & Zentall, 1983). Specifically, Hutt and Hutt (1965, 1970) suggested that repetitive behaviour serves as a displacement activity to block sensory input and reduce arousal. Alternatively, Baron-Cohen (1989) has questioned whether repetitive behaviours in autism act as a coping strategy to reduce the level of anxiety that results from an impaired ability to comprehend the social world (i.e. theory of mind deficit). Turner (1995) has noted fundamental problems with both of these accounts (see Turner, 1995). It is therefore difficult to conclude that behavioural manifestation of autism such as repetitive behaviour are anxiety driven, whilst there is a paucity of reliable research. With this in mind it may be of interest to explore specifically which early symptoms of autism may be correlated with later anxiety problems. Taking early measures of repetitive stereotyped behaviours and following up in later life with measures of anxiety may be one way of doing this. This approach may also go some way to addressing whether a particular symptom, such as repetitive questioning, is part of an anxiety problem or a core feature of autism itself.
4.7 Conclusions

In conclusion, this study has found significantly higher levels of anxiety in children with high functioning autism compared to typically developing children. The parents of children with high functioning autism also rated their children to be experiencing significantly higher levels of social worries compared to both typically developing children and children with expressive language disorder. This is the first study to quantitatively investigate anxiety in adolescents with autism, using standardised self-report measures. It supports clinical case reports which suggest that these children are more anxious. Recognition and expression of emotion, Theory of mind, central coherence, communication and socialisation ability have been found to be problematic in children with autism in previous research. Daleiden and Vasey's information processing model of childhood anxiety has enabled consideration of how such difficulties may be associated with the biased processing and interpretation of information at different stages of the information processing sequence. Specifically, the present study found actual and self-perceived social ability to differentiate the children with autism from the two comparison groups, in a pattern consistent with that seen for anxiety, whereas measures of understanding of emotions, ability to process complex social information and communication skills did not do so. Additionally, this study found social ability to be negatively correlated with anxiety for the autism group. Therefore, from this study increased levels of anxiety in children with autism appears to be associated with fundamental differences in social abilities and poor self-perceived social competence with peers. Social skills have been considered important for generating and selecting constructive coping responses when dealing with anxiety-provoking situations. It is possible therefore that anxiety in individuals with autism is associated with actual social
skill deficits at the response access or construction stage of the information processing sequence. Poor social skills leads to ineffective attempts to enact coping responses which require social ability and foster a reliance on escape/avoidant strategies. The lack of success in social interactions may lead to less positive outcomes from their relationships with peers and poor perceived social competence. These findings have implications within the clinical setting for the management of adolescents with high functioning autism and in research for the development of more elaborated models of emotional distress in this population.
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at two levels of visual and cognitive perspective taking. *Journal of Autism and 
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200


205


SPENCE CHILDREN’S ANXIETY SCALE (SCAS)

Your name: 

Please tick the box under the word that shows how often each of these things happen to you. There are no right or wrong answers.

1. I worry about things
2. I am scared of the dark
3. When I have a problem, I get a funny feeling in my stomach
4. I feel afraid
5. I would feel afraid of being on my own at home
6. I feel scared when I have to take a test
7. I feel afraid if I have to use public toilets or bathrooms
8. I worry about being away from my parents
9. I feel afraid that I will make a fool of myself in front of people
10. I worry that I will do badly at my school work
11. I am popular amongst other kids of my own age
12. I worry that something awful will happen to someone in my family
13. I suddenly feel as if I can’t breathe when there is no reason for this
14. I have to keep checking that I have done things right (like the switch is off, or the door is locked)
15. I feel scared if I have to sleep on my own
16. I have trouble going to school in the mornings because I feel nervous or afraid
17. I am good at sports
18. I am scared of dogs
19. I can’t seem to get bad or silly thoughts out of my head
20. When I have a problem, my heart beats really fast
21. I suddenly start to tremble or shake when there is no reason for this
22. I worry that something bad will happen to me
23. I am scared of going to the doctor or dentist

Date: 

Appendix 1
24. When I have a problem, I feel shaky  
25. I am scared of being in high places or lifts (elevators)  
26. I am a good person  
27. I have to think of special thoughts (like numbers or words) to stop bad things from happening  
28. I feel scared if I have to travel in the car, or on a bus or train  
29. I worry what other people think of me  
30. I am afraid of being in crowded places (like shopping centres, the movies, buses, busy playgrounds)  
31. I feel happy  
32. All of a sudden I feel really scared for no reason at all  
33. I am scared of insects or spiders  
34. I suddenly become dizzy or faint when there is no reason for this  
35. I feel afraid if I have to talk in front of my class  
36. My heart suddenly starts to beat too quickly for no reason  
37. I worry that I will suddenly get a scared feeling when there is nothing to be afraid of  
38. I like myself  
39. I am afraid of being in small closed places, like tunnels or small rooms  
40. I have to do some things over and over again (like washing my hands, cleaning or putting things in a certain order)  
41. I get bothered by bad or silly thoughts or pictures in my mind  
42. I have to do some things in just the right way to stop bad things happening  
43. I am proud of my school work  
44. I would feel scared if I had to stay away from home overnight  
45. Is there something else that you are really afraid of?

Please write down what it is:

__________________________

How often are you afraid of this thing?

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### Social Worries Questionnaire - Pupil

**Date:**

**Name:**

**Sex:**

**Class:**

**School:**

**Age:**

*Please put a circle around the rating which best describes you over the past four weeks.*

*Please answer all questions.*

*(Avoid' means to try to get out of doing something.)*

<table>
<thead>
<tr>
<th></th>
<th>I avoid or get worried about going to parties</th>
<th>Not true</th>
<th>Sometimes true</th>
<th>Mostly true</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I avoid or get worried about using the telephone</td>
<td>Not true</td>
<td>Sometimes true</td>
<td>Mostly true</td>
</tr>
<tr>
<td>3</td>
<td>I avoid or get worried about meeting new people</td>
<td>Not true</td>
<td>Sometimes true</td>
<td>Mostly true</td>
</tr>
<tr>
<td>4</td>
<td>I avoid or get worried about presenting work to the class</td>
<td>Not true</td>
<td>Sometimes true</td>
<td>Mostly true</td>
</tr>
<tr>
<td>5</td>
<td>I avoid or get worried about attending clubs or sports activities</td>
<td>Not true</td>
<td>Sometimes true</td>
<td>Mostly true</td>
</tr>
<tr>
<td>6</td>
<td>I avoid or get worried about asking a group of kids if I can join in</td>
<td>Not true</td>
<td>Sometimes true</td>
<td>Mostly true</td>
</tr>
<tr>
<td>7</td>
<td>I avoid or get worried about talking in front of a group of adults</td>
<td>Not true</td>
<td>Sometimes true</td>
<td>Mostly true</td>
</tr>
<tr>
<td>8</td>
<td>I avoid or get worried about going shopping alone</td>
<td>Not true</td>
<td>Sometimes true</td>
<td>Mostly true</td>
</tr>
<tr>
<td>9</td>
<td>I avoid or get worried about standing up for myself with other kids</td>
<td>Not true</td>
<td>Sometimes true</td>
<td>Mostly true</td>
</tr>
<tr>
<td>10</td>
<td>I avoid or get worried about entering a room full of people</td>
<td>Not true</td>
<td>Sometimes true</td>
<td>Mostly true</td>
</tr>
<tr>
<td>11</td>
<td>I avoid or get worried about using public toilets or bathrooms</td>
<td>Not true</td>
<td>Sometimes true</td>
<td>Mostly true</td>
</tr>
<tr>
<td>12</td>
<td>I avoid or get worried about eating in public</td>
<td>Not true</td>
<td>Sometimes true</td>
<td>Mostly true</td>
</tr>
<tr>
<td>13</td>
<td>I avoid or get worried about taking tests at school</td>
<td>Not true</td>
<td>Sometimes true</td>
<td>Mostly true</td>
</tr>
</tbody>
</table>
# Social Worries Questionnaire – Parent(s)

**Date:**

**Young person's name:** 

**His/Her sex:**

**School:**

**His/Her age:**

**Name of parent completing the form:**

Please put a circle around the rating which best describes your son or daughter over the last four weeks.

Circle the number 0 if the item is not true. Circle the number 1 if the item is sometimes true. Circle the number 2 if the item is mostly true.

Please answer all items.

<table>
<thead>
<tr>
<th>He or she:</th>
<th>Not true</th>
<th>Sometimes true</th>
<th>Mostly true</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoids or gets worried about going to parties</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Avoids or gets worried about using the telephone</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Avoids or gets worried about meeting new people</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Avoids or gets worried about presenting work to the class</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Avoids or gets worried about attending clubs or sports activities</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Avoids or gets worried about approaching a group of kids to ask to join in</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Avoids or gets worried about talking in front of a group of adults</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Avoids or gets worried about going into a shop alone to buy something</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Avoids or gets worried about standing up for him/herself with other kids</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Avoids or gets worried about entering a room full of people</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

My name is: 

Signature: 

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Experience of Emotions Task
Prompting Stories

Sadness

I remember a time when I entered a drawing competition at school and really thought my drawing was the best and that I would win. When they told us the results, I came second and was really sad.

Happiness

I remember on my birthday when I got a new bicycle, I was really happy.

Embarrassment

I remember a time when I was running in a race at Sports Day and I tripped and fell over. I was really embarrassed.

Pride

I remember a time when I entered a competition and won first prize. I was really proud of myself.

Worry

I remember a time when I had to do a test in class but hadn't studied for it. I was really worried that I was going to fail.

Fear

I remember a time when I was walking in the park and a big dog came running towards me. I was fearful that it was going to bite me.
Appendix 5.

Experience of Emotions Record Form

Code:  Age:  Gender:  Date:

1. Sadness

2. Happiness

3. Embarrassment

4. Pride

5. Worry

6. Fear
One day, while she is playing in the house, Anna accidentally knocks over and breaks her mother’s favourite crystal vase. Oh dear, when mother finds out she’ll be very cross. So when Anna’s mother comes home and sees the broken vase and asks Anna what happened, Anna says “The dog knocked it over, it wasn’t my fault!”.

What it true, what Anna told her mother?
Why did she say this?
One day Aunt Jane came to visit Peter. Now Peter loves his Aunt very much, but today she is wearing a new hat; a new hat which Peter thinks is very ugly indeed. Peter thinks his Aunt looks silly in it and much nicer in her old hat. But when Aunt Jane asks Peter, "How do you like my new hat?", Peter says, "Oh, its very nice".

Was it true what Peter said? Why did he say it?
Katie and Emma are playing in the house. Emma picks up a banana from the fruit bowl and holds it up to her ear. She says to Katie, "Look! This banana is a telephone!".

Is it true what Emma says?
Why does Emma say this?
Daniel and Ian see Mrs Thompson coming out of the hairdresser’s one day. She looks a bit funny because the hairdresser has cut her hair much too short. Daniel says to Ian, “She must have been in a fight with a lawnmower!”.

Is it true, what Daniel says?
Why does he say this?
Emma has a cough. All through lunch she coughs and coughs and coughs. Father says, "Poor Emma, you must have a frog in your throat!".

Is it true, what Father says to Emma? Why does he say that?
A burglar who has just robbed a shop is making his getaway. As he is running home, a policeman on his beat sees him drop his glove. He doesn’t know the man is a burglar, he just wants to tell him he dropped his glove. But when the policeman shouts out to the burglar, “Hey you! Stop!”, the burglar turns round, sees the policeman and gives himself up. He puts his hands up and admits he did the break-in at the local shop.

Was the policeman surprised by what the burglar did? Why did the burglar do this, when the policeman just wanted to give him back his glove?
During the war, the Red army capture a member of the Blue army. They want him to tell them where his army’s tanks are; they know they are either by the sea or in the mountains. They know that the prisoner will not want to tell them, he will want to save his army, and so he will certainly lie to them. The prisoner is very brave and very clever, he will not let them find his army’s tanks. The tanks are really in the mountains. Now when the other side ask him where his tanks are, he says, “They are in the mountains”.

Is it true, what the prisoner said?
Where will the other army look for his tanks?
Why did the prisoner say what he said?
Sarah and Tom are going on a picnic. It is Tom’s idea, he says it is going to be a lovely sunny day for a picnic. But just as they are unpacking the food, it starts to rain, and soon they are both soaked to the skin. Sarah is cross. She says, “Oh yes, a lovely day for a picnic alright!”.

Is it true, what Sarah says? Why does she say this?
Sausages

Brian is always hungry. Today at school it is his favourite meal - sausages and beans. He is a very greedy boy, and he would like to have more sausages than anybody else, even though his mother will have made him a lovely tea when he gets home! But everyone is allowed two sausages and no more. When it is Brian's turn to be served, he says, "Oh please can I have four sausages, because I won't be having any tea when I get home!".

Is it true, what Brian says?
Why does he say that?
Jane and Sarah are best friends. They both entered the same painting competition. Now Jane wanted to win this competition very much indeed, but when the results were announced it was her best friend Sarah who won, not her. Jane was very sad she had not won, but she was happy for her friend who got the prize. Jane said to Sarah, “Well done, I’m so happy you won!”. Jane said to her mother, “I am sad I did not win that competition!”.

Is it true what Jane said to Sarah?
Is it true what Jane said to her mother?
Why does Jane say she is happy and sad at the same time?
It is Halloween, and Chris is going to a fancy-dress party. He is going as a ghost. He wears a big white sheet with eyes cut out to see through. As he walks to the party in his ghost costume, he bumps into Mr Brown. It is dark, and Mr Brown says, "Oh! Who is it?". Chris answers, "I'm a ghost Mr Brown!".

Is it true, what Chris says?  
Why does Chris say this?
At school today, John was not present. He was away ill. All the rest of Ben's class were at school though. When Ben got home after school, his mother asked him, "Was everyone in your class at school today?". Ben answers, "Yes mummy".

Is it true what Ben said?
Why did Ben say that?
Strange Stories Record Form

<table>
<thead>
<tr>
<th>Code:</th>
<th>Age:</th>
<th>Gender:</th>
<th>Date of assessment:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Story Type</th>
<th>Story</th>
<th>True?</th>
<th>Why?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. LIE</td>
<td>Vase</td>
<td>......</td>
<td></td>
</tr>
<tr>
<td>2. WHITE LIE</td>
<td>Hat</td>
<td>......</td>
<td></td>
</tr>
<tr>
<td>3. PRETEND</td>
<td>Banana</td>
<td>......</td>
<td></td>
</tr>
<tr>
<td>4. JOKE</td>
<td>Haircut</td>
<td>......</td>
<td></td>
</tr>
<tr>
<td>5. IDIOM</td>
<td>Cough</td>
<td>......</td>
<td></td>
</tr>
<tr>
<td>6. MISUNDERSTANDING</td>
<td>Glove</td>
<td>......</td>
<td></td>
</tr>
<tr>
<td>7. DOUBLE BLUFF</td>
<td>Soldier</td>
<td>......</td>
<td></td>
</tr>
<tr>
<td>8. SARCASM</td>
<td>Picnic</td>
<td>......</td>
<td></td>
</tr>
<tr>
<td>9. PERSUASION</td>
<td>Sausage</td>
<td>......</td>
<td></td>
</tr>
<tr>
<td>10. CONTRARY EMOTION</td>
<td>Painting</td>
<td>......</td>
<td></td>
</tr>
<tr>
<td>11. APPEARANCE/REALITY</td>
<td>Ghost</td>
<td>......</td>
<td></td>
</tr>
<tr>
<td>12. FORGETTING</td>
<td>School</td>
<td>......</td>
<td></td>
</tr>
</tbody>
</table>
# Social Competence with Peers Questionnaire

**Pupil**

<table>
<thead>
<tr>
<th>Date:</th>
<th>Name:</th>
<th>Sex:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class:</td>
<td>School:</td>
<td>Age:</td>
</tr>
</tbody>
</table>

Please put a circle around the rating which best describes you over the past four weeks.

Please answer all the questions.

<table>
<thead>
<tr>
<th></th>
<th>Not true</th>
<th>Sometimes true</th>
<th>Mostly true</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I have at least one close friend</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>My friendships with other kids last a long time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>I find it easy to make friends</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Other kids choose me to be on their team at school</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Other kids invite me to their homes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Other kids invite me to their parties or social events</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>I get on well with my classmates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>I am popular amongst other kids</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Other kids like to sit next to me in class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>I see my friend or friends at weekends</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Social Competence with Peers Questionnaire

Parent(s)

Date: 

Young person's name: 

His/Her sex: 

Class: 

School: 

His/Her age: 

Name of parent completing the form: 

Please put a circle around the rating which best describes your son or daughter over the last four weeks.

Circle the number 0 if the item is not true. Circle the number 1 if the item is sometimes true. Circle the number 2 if the item is mostly true.

Please answer all items.

<table>
<thead>
<tr>
<th>Item</th>
<th>Not true</th>
<th>Sometimes true</th>
<th>Mostly true</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has at least one close friend</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Has stable friendships with other kids his/her age</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Finds it easy to make friends</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Other kids invite him/her to their homes</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Other kids invite him/her to social events or activities</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Has good relationships with classmates</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Gets invited to parties</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Is popular amongst others his/her age</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Sees a friend or friends socially at weekends</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

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From the Photocopiable Resource Book sold as part of Social Skills Training: Enhancing Social Competence with Children and Adolescents (Code 4320 01 6). Once the invoice has been paid, this sheet may be photocopied for use within the purchasing institution only.

Published by The NFER-NELSON Publishing Company Ltd., Darville House, 2 Oxford Road East, Windsor, Berkshire SL4 1DF, UK.
Dear Ms McGovern

REC reference number 2002/046
Anxiety in High Functioning Adolescents with Autism

South Birmingham Research Ethics Committee are happy to Approve your Study subject to the following:

- Satisfactory Indemnity arrangements being in place.
- Clearance from your Trust or relevant employer.
- That you produce an annual review in line with the Good Clinical Practice Guidelines.
- Active Approval is required until the Study has been completed.
- The Committee would wish to be kept informed of Serious Adverse Events, Amendments and any modifications to Patient Information Leaflets and Consent Forms.

Approval is valid for three years, however, if it is intended to continue the Study after THREE YEARS from the date of this letter South Birmingham Research Ethics Committee would wish to re-examine it.

Would you please communicate this approval immediately to all members of the investigating team and where appropriate the sponsoring commercial company. Please also advise your Research and Development Office of this approval.

Yours sincerely

Chairman
Research Ethics Committee

cc: File
Appropriate Trust
As part of my training to be a Clinical Psychologist, I am required to carry out a piece of research. I am carrying out a study into the nature of anxieties and worries in different groups of young people. I would like to invite you and your child to take part in this study.

1. **What is the purpose of the study?**
The aim of the study is to find out more about the worries and anxieties of young people and how these might differ in young people with autism and communication problems.

2. **What will be involved if I agree to take part in the study?**
If you agree to help I would like to meet with you and your child. This meeting can take place at the clinic where I work or at your home or your child’s school, if this is better for you. The study will involve two interviews, one with you and one with your child. This should take about 1 1/2 hours and can be done in two parts if you wish. During this time, both you and your child will be asked questions about anxiety and worries.

3. **What are the benefits?**
By taking part in this study you will help increase our knowledge of anxiety in different groups of young people. Understanding more about young people and their worries may help the development of better psychological assessments and treatments for young people who are very anxious or worried.

4. **What are the risks?**
There are no known risks involved with taking part in this study. The questionnaires that will be used in the interview are designed for use with children and are therefore not considered to be distressing.
5. What if I do not want to take part in this study or wish to withdraw during the study?
If you or your child do not wish to participate in this study or if either of you wish to withdraw from the study at any time, you may do so without justifying your decision. This will not affect any help you are currently receiving or any help you may require in the future.

6. What happens to the information I give?
Your results will be available to you, should you wish to receive them. No one else will have access to your individual results. Each participant will be given a number so that the information can be kept confidentially. After information is collected from all the participants, the results will be analysed and written into my doctoral thesis.

7. Who else is taking part?
Other young people between the ages of 11-16 years have been invited to take part. Three groups of young people will be involved: young people with autism, young people without a disability and young people with communication problems.

8. What happens at the end of the research study?
At the end of the study the results may be published in a psychology journal but it will not be possible to identify any of the people who took part. If you would like to know what this study has told us about young people and their worries, I can provide you with a copy of my report or you can speak to me directly.

9. What if I have more questions or do not understand something?
If you would like more information before making a decision, please feel free to contact us by telephone. You can contact Zoe McGovern, (0116 225 5330) or Jenny Wilk (0121 243 2000) or Dr Fred Furniss (01302 866906).
Consent Form

Anxiety In Young People

Please complete the following:

<table>
<thead>
<tr>
<th>Parent</th>
<th>Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you read and understood the information sheet?</td>
<td>YES/NO</td>
</tr>
<tr>
<td>Have you received enough information about the study?</td>
<td>YES/NO</td>
</tr>
</tbody>
</table>

Do you understand that you are free to withdraw from the study

- At any time? | YES/NO | YES/NO |
- Without giving reason for withdrawing? | YES/NO | YES/NO |
- And without affecting any future care you may require? | YES/NO | YES/NO |

I agree to take part in this study | YES/NO | YES/NO |

Signed (Parent) ........................................ Date ....................... 

Signed (Child) ........................................ Date ....................... 

Name of child in block capitals ..................................

Date of birth ...........................................

Address ..................................................................
........................................................................

Telephone no. ..................................................................