# SOCIAL AND EMOTIONAL CORRELATES OF ATTACHMENT IN CHILDREN WITH HIGH-FUNCTIONING AUTISM SPECTRUM DISORDER DURING MIDDLE CHILDHOOD

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# TABLE OF CONTENTS

## LIST OF TABLES

## LIST OF TERMS

| | |
|---|---|
| ADHD | Attention Deficit Hyperactivity Disorder |
| ADOS | Autism Diagnostic Observation Schedule |
| ASD | Autism Spectrum Disorder |
| COMP-sib | Comparison group sibling |
| CSQ | Coping Strategies Questionnaire |
| DAI | Disturbance of Attachment Interview |
| DSM | Diagnostic and Statistical Manual |
| ECR-R | Experiences of Close Relationships-Revised |
| FPI | Focused Playtime Intervention |
| FSIQ | Full Scale IQ |
| GAD | Generalised Anxiety Disorder |
| HFASD | High-Functioning Autism Spectrum Disorder |
| ICD | International Classification of Diseases |
| IPPA | Inventory of Parent and Peer Attachment |
| K-10 | Kessler Psychological Distress Scale |
| LFASD | Low Functioning Autism Spectrum Disorder |
| OCD | Obsessive Compulsive Disorder |
| PDD-NOS | Pervasive Developmental Disorder, No Otherwise Specified |
| PRI | Perceptual Reasoning Index |
| PSI | Parenting Stress Index |
| RAD | Reactive Attachment Disorder |
| RBQ | Repetitive Behaviours Questionnaire |
| SCAS-C | Spence Children's Anxiety Scale – Child-report Version |
| SCAS-P | Spence Children's Anxiety Scale – Parent-report Version |
| SRS | Social Responsiveness Scale |
| TD | Typically Developing |

| | |
|---|---|
| VCI | Verbal Comprehension Index |
| WISC | Wechsler Intelligence Scale for Children |
| WASI | Wechsler Abbreviated Scale of Intelligence |

## ABSTRACT

Autism Spectrum Disorder (ASD) is defined as a neurodevelopmental disorder characterised by early-emerging and pervasive impairments in social interaction, communication and repetitive and stereotyped behaviours (American Psychiatric Association, 2013). Despite their impairments, research has established that young children with ASD display clearly discriminated, and frequently secure attachments to caregivers. Existing research has primarily focussed on comparing rates of attachment classifications between groups (i.e. ASD vs non-ASD) however the meaning of this attachment quality remains poorly understood in ASD. Recently, there has been renewed interest in better understanding the correlates and consequences of attachment quality in ASD, and this comes with increasing recognition within contemporary attachment literature of the importance of early attachment experiences in shaping core social and emotional capacities.

The central aim of this thesis was to examine the attachment quality of cognitively high-functioning primary-school aged children with ASD, and the relationship of attachment quality to child social, emotional and behavioural characteristics, and caregiver emotional and relational characteristics. Three empirical studies were undertaken, using both quantitative and qualitative methodology. There were a total of 26 children with ASD and 24 typically developing children, who each participated with their primary caregiver. A majority of participating caregivers were mothers (n = 45, 90%). Children completed self-report questionnaires assessing for their perceived attachment security, use of insecure coping strategies within the attachment relationship, and anxiety symptoms. Caregivers participated in a semi-structured interview regarding their child's attachment behaviours, and completed parent-report questionnaires assessing their child's autism symptoms, anxiety symptoms and externalising problems, and self-report questionnaires assessing their own psychological distress, parenting stress, and romantic attachment style.

The first study aimed to describe the qualitative features of the child-caregiver attachment relationship in children with ASD, and contrast this with typically developing dyads. Children with ASD were described as displaying a range of normative attachment behaviours, however there were impairments in more affectively and cognitively complex aspects of the attachment relationship such as the consistent use of the caregiver as a secure base and co-regulating agent. The caregiver's experience was important in understanding that attachment relationship in ASD. The unique impacts of ASD impairments (i.e. emotion processing, intersubjectivity) on the attachment relationship during middle childhood are discussed.

The second study aimed to examine self-reported child attachment security and insecure coping strategies in ASD, alongside the caregivers' experience in terms of psychological distress, parenting stress and romantic attachment style. Children with ASD were no less secure, however their caregivers reported more psychological distress, parenting stress and attachment-related anxiety compared to typically developing dyads. Child attachment security was related to less caregiver psychological distress and less caregiver attachment-related anxiety, but only amongst typically developing dyads. No such association was found amongst ASD dyads. The possible impact of emotion processing impairments in ASD on the attachment relationship is discussed, as well as implications for understanding the intergenerational transmission of attachment.

The third study aimed to examine the relationships between self-reported child attachment security and insecure coping strategies, and child autism symptoms, anxiety symptoms, and externalising problem behaviours, in children with ASD and typically developing children. Lower levels of attachment security were associated with more severe autism symptoms and more problems with defiance/aggression. The use of insecure-preoccupied coping strategies was associated with higher levels of anxiety. Problems with inattention and hyperactivity/impulsivity were not associated with attachment quality. Associations were not moderated by group (i.e. ASD vs typically developing), suggesting a

similar profile of attachment correlates in ASD as in typically developing children. Implications for understanding the meaning of attachment quality in ASD are discussed.

Taken together, results of the current thesis highlight the child-caregiver attachment relationship in ASD as a complex, bi-directional, and clinically important aspect to the presentation of a child with ASD. Results suggest that there is a reciprocal interplay between ASD impairment, the caregiver experience, and normal attachment processes, which warrants closer study. The current thesis contributes to a broadening of the clinical conceptualisation of ASD, and advocates for the need to better understand the correlates, consequences, and trajectories of attachment quality in ASD.

## GENERAL DECLARATION

In accordance with Monash University Doctorate Regulation 17.2 Doctor of Philosophy and Research Master's regulations the following declarations are made:

I hereby declare that this thesis contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

This thesis includes three original unpublished publications. The core theme of the thesis is attachment quality in children with Autism Spectrum Disorder during middle childhood. The ideas, development and writing up of all the papers in the thesis were the principal responsibility of myself, the candidate, working within the Department of Psychology under the supervision of Professor Louise Newman, Professor Nicole Rinehart, and Associate Professor Kylie Gray.

The inclusion of co-authors reflects the fact that the work came from active collaboration between researchers and acknowledges input into team-based research.

In the case of three chapters, my contribution to the work involved the following:

| Thesis Chapter | Publication Title | Publication Status | Nature and extent of candidate's contribution |
|---|---|---|---|
| Three | *A qualitative study of attachment relationships in ASD during middle childhood* | Under Review | 70% contribution by candidate. This included formulation of experimental design, data collection, data analysis and writing the manuscript. |
| Four | *Parents of children with ASD experience more psychological distress, parenting stress, and attachment-related anxiety* | Under Review | 70% contribution by candidate. This included formulation of experimental design, data collection, data analysis and writing the manuscript. |
| Five | *Social, emotional and behavioural factors associated with attachment security in children with and without Autism Spectrum Disorder during middle childhood* | Under Review | 70% contribution by candidate. This included formulation of experimental design, data collection, data analysis and writing the manuscript. |

I have renumbered sections of submitted and published papers in order to generate a consistent presentation within the thesis.

Signed: 

Date: 11/04/16

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# CHAPTER ONE

# LITERATURE REVIEW

## 1.1 INTRODUCTION

Autism spectrum disorders (ASDs) comprise a group of related neurodevelopmental disorders that are characterised by early-emerging, pervasive, and persistent impairments in social interaction and communication, and a pattern of restricted and repetitive behaviours and interests. In the context of increasing ASD prevalence, poor understanding of the genetic and biological processes underlying aetiology, and the vast heterogeneity of clinical symptoms in ASD, there has been recent interest in characterising broader social, emotional and relational factors that may inform the clinical understanding of ASD. Attachment has long been discussed in the context of ASD due to the early-emerging and pervasive impairments in social and emotional interaction that characterise the disorder (American Psychiatric Association, 2000, 2013). This chapter is concerned with evaluating the current state of knowledge with regard to ASD and attachment.

This literature review will commence with a discussion of ASD, including the diagnostic criteria, epidemiology, aetiology, and clinical profile of ASD across development. This will be followed by a discussion of attachment, including a description of early attachment theories that gave rise to the first empirical studies of attachment behaviour, a discussion of attachment classifications, and an overview of the known developmental outcomes of attachment quality. This will lead to an overview of more contemporary attachment literature which has begun to uncover the developmental processes which underlie and direct the implications of attachment quality across the lifespan. Subsequently, this review will examine the extant knowledge regarding attachment relationships amongst children with ASD, including the group differences in attachment quality for ASD and non-ASD groups and known correlates and consequences of attachment in ASD. Current gaps in empirical knowledge will be highlighted as avenues for future research, and this will provide a context for the current study rationale, aims, and hypotheses.

## 1.2 AUTISM SPECTRUM DISORDER

### 1.2.1 Definitions

The current thesis has been undertaken during a transitional period in the conceptualisation of autism and related conditions, with the introduction of new diagnostic criteria for Autism Spectrum Disorder (ASD) within the Diagnostic and Statistical Manual of Mental Disorders (DSM), published by the American Psychiatric Association. Accordingly, for the purposes of a comprehensive literature review, it is important to outline both the DSM-IV-TR (American Psychiatric Association, 2000) diagnostic criteria for ASDs – upon which a majority of the extant literature on autism and attachment is based, and by which the current study participants were selected – alongside the more recent DSM-5 (American Psychiatric Association, 2013) criteria which will have relevance for understanding future directions in this research field.

According to DSM-IV-TR criteria, Autistic Disorder (hereafter referred to simply as autism), Asperger's Disorder, and Pervasive Developmental Disorder – Not Otherwise Specified (PDD-NOS), are regarded as pervasive neurodevelopmental disorders that are characterised by deficits across social interaction, communication, and repetitive and stereotyped behaviours and interests (American Psychiatric Association, 2000; World Health Organisation, 1992). Diagnosis of autism is made in the presence of language and communication delays, impairment in social interaction, and a restricted, repetitive or stereotyped pattern of behaviours or interests, emerging prior to 3 years of age (American Psychiatric Association, 2000). Qualitatively, social impairments in autism frequently include deficits in the use of non-verbal behaviours such as eye contact, gestures, and facial expressions, a reduced interest in or capacity for age-appropriate friendships, and a lack of appropriate social or emotional reciprocity. In the communication domain, individuals may display a complete lack of language, or deficits in the ability to flexibly initiate or maintain conversation. With regard to repetitive, stereotyped behaviour, individuals with autism often display preoccupation with specific, narrow interests or

activities, repetitive motor movements, and rigid adherence to routines or rituals (American Psychiatric Association, 2000). Individuals with autism may also display comorbid intellectual impairment (i.e. IQ less than 70). The rate of comorbid intellectual impairment varies depending on ASD diagnostic category, with 30% of pre-schoolers with any category of ASD found to present with comorbid intellectual impairment, while 67% of pre-schoolers diagnosed with autistic disorder met criteria for intellectual impairment (Chakrabarti & Fombonne, 2005). Accordingly, autism is commonly discussed in terms of high-functioning ASD (HFASD), in the absence of intellectual disability, and low-functioning ASD (LFASD) when intellectual disability is co-morbid (LaMalfa, Lassi, Bertelli, Salvini, & Placidi, 2004). Asperger's Disorder was diagnosed according to DSM-IV-TR diagnostic criteria when there was impairment in social interaction and a restricted or repetitive pattern of behaviours, but no early language delays and no intellectual disability (American Psychiatric Association, 2000; Woodbury-Smith & Volkmar, 2009). PDD-NOS was diagnosed when there was clear impairment across social, communication and repetitive behaviour domains of functioning, however these impairments are atypical and do not meet threshold criteria for a diagnosis of autism (American Psychiatric Association, 2000).

Since first proposed, there have been criticisms of the DSM-IV-TR criteria describing ASDs. It has been suggested that criteria delineating the different disorders are unclear (Worley & Matson, 2012), and do not capture the full range of symptoms that may be displayed (Frith, 2004; Woodbury-Smith & Volkmar, 2009). There is some suggestion that ASD diagnoses are not consistently replicated in research populations (Klin, Pauls, Schultz, & Volkmar, 2005), and there has been difficulty in identifying biological markers that underlie, and could distinguish, different diagnoses (Palmen, van Engeland, Hof, & Schmitz, 2004). In light of these issues, the DSM-5 features significant changes to the way in which autism and related disordered are classified, with these disorders now subsumed under the single diagnostic label of Autism Spectrum Disorder (ASD; American Psychiatric Association, 2013). DSM-5 diagnoses continue to be made based on clinical

observation of behavioural impairments, however diagnostic impairments are described across two, rather than three, domains. These two domains are (1) impairment in reciprocal social interaction and communication, and (2) a restricted and repetitive pattern of behaviour. To account for the vast heterogeneity that is seen across children with ASDs (Garon et al., 2009; Jones & Klin, 2009), the DSM-5 allows for severity of impairment to be specified for both social communication and repetitive behaviour symptoms. Furthermore, the presence or absence of comorbid intellectual impairment and language impairment can be specified.

Diagnosis of ASD by DSM-5 criteria requires a more severe level of impairment than DSM-IV-TR criteria (Rieske et al., 2015). This has been demonstrated by a range of studies revealing a decrease in the number of children identified as having an ASD when DSM-5 criteria are used, compared to when DSM-IV-TR criteria are used (Matson, Kozlowski, Hattier, Horovitz, & Sipes, 2012; McPartland, Reichow, & Volkmar, 2012; Smith, Reichow, & Volkmar, 2015; Worley & Matson, 2012). As it pertains to the current thesis, the high-functioning sample studied here, who had a DSM-IV-TR diagnosis of autism or Asperger's Disorder, may comprise a sample of children who are less severely impaired than a sample selected based on DSM-5 criteria. It is possible that some of these children, if diagnosed again using this most recent criteria, may even be neglected from future research studies because they do not meet DSM-5 criteria. Nonetheless, studies have indicated that children who meet DSM-IV-TR criteria, but do not meet DSM-5 criteria, continue to display more severe impairment across social, communication and repetitive behaviour domains than children who do not meet either ASD criteria, suggesting that this group remain a clinically impaired sample that warrant empirical study (Mayes, Black, & Tierney, 2013; Rieske et al., 2015). Because the current thesis features participants that were selected based on the presence of a DSM-IV-TR diagnosis of autistic disorder or Asperger's disorder, the label ASD will be used hereafter to describe children with these diagnoses. Where literature is referred to that samples children

selected based on DSM-5 criteria for Autism Spectrum Disorder, or an alternate DSM-IV-TR diagnosis (i.e. PDD-NOS), this will be clearly specified.

### 1.2.2 Aetiology

Substantial genetic and behavioural evidence supports the notion of a strong genetic basis for autism (for a review, see Folstein & Rosen-Sheidley, 2001; Gauglerl et al., 2014). Recent twin studies suggest concordance rates of between 44-88% for monozygotic twins, and 15-36% for dizygotic twins (Hallmayer et al., 2011; Lichtenstein, Carlstrom, Rastam, Gillberg, & Anckarsater, 2010; Rosenberg et al., 2009), while concordance rates of between 15-20% have been reported for younger siblings of children already diagnosed with ASD (Ozonoff et al., 2011; Rogers, 2009). Despite this, no biological markers have yet been identified that can reliably diagnose an individual with ASD (Ecker et al., 2010; Muhle, Trentacoste, & Rapin, 2004). Instead, a multi-gene involvement has been suggested, in which the majority of ASD cases may be attributed to multiple variable genes, each conferring a small risk of ASD, and the interaction of these genes with the environment (Abrahams & Geschwind, 2008).

In addition to providing strong evidence for a genetic basis for ASD, recent twin studies have also increasingly highlighted the important role of environmental factors in ASD aetiology (Kim & Leventhal, 2015). For instance, Hallmayer and colleagues (2011) found a 37% heritability estimate, while 55% was explained by environmental factors. Environmental factors including prenatal exposure to toxins (Moore et al., 2000; Williams et al., 2001), perinatal complications (Gardener, Spiegelman, & Buka, 2009), and advanced maternal age (Sandin et al., 2012; Williams, Helmer, Duncan, Peat, & Mellis, 2008), have been cited as playing a role in the complex aetiology of ASDs. These factors may influence vulnerability to developing ASD and the nature of ASD symptoms expressed (Kim & Leventhal, 2015).

### 1.2.3 Epidemiology

A progressive increase in the prevalence of ASDs over time has been widely described (Fombonne, 2009; Kim et al., 2011; Leonard et al., 2010; Rutter, 2005; Volkmar & Pauls, 2003). Early estimates suggested the prevalence of autism to be 4.5 per 10,000 children aged 8 to 10 years (Lotter, 1966), while more recent studies have provided substantially larger estimates, at between 60 and 180 per 10,000 individuals affected (Baird et al., 2006; Fombonne, 2009; Kawamura, Takahashi, & Ishii, 2008; Yeargin-Allsopp et al., 2003). In Australia, recent prevalence estimates suggest rates of between 12 and 36 per 10,000 (Atladottir et al., 2015; Williams, MacDermott, Ridley, Glasson, & Wray, 2008). While there is variation in reported prevalence rates between regions and according to the methodology used, the overall trend of increasing prevalence over time has been consistently observed. This trend is regarded as most likely reflecting a broadening of diagnostic criteria for ASDs in recent times, increased public and professional awareness, increased service availability, and a system of diagnosis-dependent funding (Atladottir et al., 2015; Fombonne, 2009; Leonard et al., 2010).

Although recent discussions of an 'autism epidemic' appear unfounded in the true sense of the word (Fombonne, 2009), this increasing prevalence has important clinical and empirical implications. More than ever before there is pressure on health care providers to accept and respond to ASD-related referrals for assessment and intervention (Gillis & Beights, 2012). There have been suggestions that the public awareness of, and focus on, ASD may contribute to some children receiving a label of ASD who might previously have received an alternate diagnosis (Leonard et al., 2010). In the face of complex and still poorly understood aetiology, and the steady increases in ASD prevalence, there has been a focus on accurate and timely detection of clinical signs and symptoms of ASD in order to facilitate early intervention. The research community has responded to this demand through vast empirical study of the early-emerging clinical profile of ASD.

### 1.2.4 The Clinical Profile of ASDs across Development

ASDs are characterised by a unique, yet widely heterogeneous, array of deficits across social, emotional, communication and behavioural domains. These deficits are early-emerging, enduring across development, and have significant impacts on quality of life (Kuhlthau et al., 2010; van Heijst & Geurts, 2015). Heterogeneity is seen not only in the nature, expression, and severity of fundamental ASD impairments, but also in terms of intellectual capacity, adaptive functioning, and comorbid clinical problems (Bryson et al., 2007; Prior et al., 1998). This heterogeneity poses challenges to timely identification of ASDs as well as the development of appropriate, individually-tailored interventions for individuals with ASD.

Impairments in social and emotional interaction have been documented in the first year of life in ASD. Retrospective studies have reported early deficits in social orienting (Adrien et al., 1993; Baranek, 1999; Dawson, Meltzoff, Osterling, Rinaldi, & Brown, 1998; Osterling & Dawson, 1994; Osterling, Dawson, & Munson, 2002; Werner, Dawson, Osterling, & Dinno, 2000), joint attention (Mundy & Neal, 2001; Osterling & Dawson, 1994), imitation (Receveur et al., 2005) and face processing (Dawson et al., 2002a). Consistent with retrospective findings, prospective studies of infants later diagnosed with ASD have shown deficits in social functioning including reduced eye contact, social smiling, social interest, and imitation, emerging in the second half of the first year of life (Ozonoff et al., 2010; Tager-Flusberg, 2010). There is also decreased responsiveness to other's bids for joint attention and to the child's own name being called, relative to typically-developing infants at 12 months (Ozonoff et al., 2010; Presmanes, Walden, Stone, & Yoder, 2007; Zwaigenbaum et al., 2005).

Beyond the first year of life, young children with ASD continue to display deficits in typically-emerging social-cognitive and affective skills. Emotion processing impairments are well characterised in children with ASD (Nuske, Vivanti, & Dissanayake, 2013),

including poor facial emotion recognition (Harms, Martin, & Wallace, 2010; Jemel, Mottron, & Dawson, 2006; Uljarevic & Hamilton, 2013), difficulties recognising subtle or complex emotions, poor monitoring of emotionally-relevant stimuli, including failures in spontaneously monitoring faces (Chawarska, Macari, & Shic, 2012), and reduced responsiveness to others' emotions (Charman et al., 1997; Sigman, Kasari, Kwon, & Yirmiya, 1992). Children with ASD make emotional expressions less frequently and less overtly (Kasari, Sigman, Mundy, & Yirmiya, 1990; Paul, Augustyn, Klin, & Volkmar, 2005), can be difficult to understand (Snow, Hertzig, & Shapiro, 1987; Yirmiya, Kasari, Sigman, & Mundy, 1989), and may express emotion more commonly within non-social contexts (Maestro et al., 2005; Snow et al., 1987). Children with ASD may also display a reduced capacity to infer the mental states of others, referred to as theory of mind, or more broadly, mentalisation (Baron-Cohen, 1995). It has been suggested that these deficits leave children 'mindblind', that is, children with ASD may be less able to infer the emotional or cognitive states of others, and this has been suggested to be a core impairment of ASD (Baron-Cohen, 1995). However, there is ongoing debate and contrasting empirical findings regarding how pervasive affect processing and mentalisation impairments are in ASD (Nuske et al., 2013). For instance, it has been suggested that some individuals with ASD may be relatively unimpaired on simple theory of mind or emotion recognition tasks (Nuske et al., 2013). Furthermore, children with ASD may compensate for affect processing impairments by using more cognitive-based strategies (Nuske et al., 2013). Children with ASD also display impairments in social cognitive skills that underlie later social competencies including impairments in executive functioning (Ozonoff, South, & Provencal, 2005), imitation (Rogers & Pennington, 1991; Williams et al., 2004), and joint attention (Charman, 2003; Charman et al., 1997; Dawson et al., 2002b).

Contributing to the clinical complexity of ASD across development is the high degree of psychiatric comorbidity displayed by individuals with ASD (Leyfer et al., 2006; Tsai, 1996). Individuals with ASD often present with sub-clinical elevations in

hyperactivity, impulsivity and inattention (Leyfer et al., 2006), and there is a high rate of co-morbidity between ASD and Attention-Deficit/Hyperactivity Disorder (ADHD; Gargaro, Rinehart, Bradshaw, Tonge, & Sheppard, 2011; van der Meer et al., 2012). As many as 28-78% of children with ASD may also meet criteria for a clinical diagnosis of ADHD (Lee & Ousley, 2006; Leyfer et al., 2006; Mattila et al., 2010; Simonoff et al., 2008). This comorbidity is clinically important as children who meet criteria for ASD + ADHD have been found to present with more severe impairment in social skills, working memory, executive functioning, adaptive behaviour, and internalising and externalising problems compared to children with a diagnosis of either ASD or ADHD (Holtmann, Bolte, & Poustka, 2007; Tureck, Matson, May, & Turygin, 2013; Yerys et al., 2009).

Children with ASD also often present with elevations in anxiety symptoms, with between around 40% of children with ASD also meeting criteria for the diagnosis of an anxiety disorder (Gjevik, Eldevik, Fjaeran-Granum, & Sponheim, 2011; Mattila et al., 2010). Depressive disorders, tic disorders and Oppositional Defiant Disorder are all noted to occur at increased incidence amongst clinical and community samples of children with high-functioning ASD, compared to non-ASD groups (Mattila et al., 2010; Simonoff et al., 2008). Like problems with ADHD, problems with anxiety and depression in ASD are associated with greater difficulties in areas of social skills and adaptive functioning during childhood through to young adulthood (Gotham, Brunwasser, & Lord, 2015; Mattila et al., 2010; Sukhodolsky et al., 2008). Thus, comorbid clinical problems, across a range of internalising and externalising problem domains, occur at elevated rates in ASD and have important implications for the functioning of children with ASD. Such clinical problems are understood in typically-developing populations in terms of multiple and interacting genetic and environmental aetiological factors. Importantly, one environmental factor identified as playing as central role in development of, or vulnerability to, internalising and externalising is the quality of the child's attachment and internal working models (Brumariu & Kerns, 2010; Lyons-Ruth, 1996; Pierrehumbert, Miljkovitch, Plancherel, Halfon, & Ansermet, 2000), owing to its central role in shaping the development of

emotion regulation skills (Brumariu, Kerns, & Seibert, 2012). As it pertains in children with ASD, research highlighting the high rates of comorbid clinical problems in ASD highlights that effective intervention in ASD requires thorough assessment and targeting of comorbid clinical problems and their causes, in addition to the interventions that target core ASD areas of impairment.

## 1.3 ATTACHMENT

### 1.3.1 Attachment Theory and Definitions

Attachment refers to the affective bond that forms between an infant and caregiver during the first year of life (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969/1982). Attachment theory regards attachment as an infant's innate drive to seek proximity to a protective caregiver in times of stress or danger (Bowlby, 1969/1982). From this attachment relationship the infant also derives a sense of security that enables the infant to confidently explore their surrounding environment, secure in the knowledge that they can return to their attachment figure in times of threat (Goldberg, Grusec, & Jenkins, 1999). Attachment is a dyadic bond and thus also refers to the caregiver's capacity to provide emotional attunement and consistent attention (Bowlby, 1969/1982). The formation of this bond is regarded as one of the most important tasks of an infant's first year of life (Bohlin, Hagekull, & Rydell, 2000; Sigman, Dijamco, Gratier, & Rozga, 2004) as it serves to promote caregiver-derived protection essential for infant survival, while also facilitating the exploratory behaviours that are necessary for infants to learn from their environment (Grossmann, Grossmann, & Zimmermann, 1999). It is in the context of organised attachment relationships that the infant is supported in the development of their own capacity to regulate their affective states and to develop inner working models of relationships.

Bowlby (1969/1982) originally proposed that attachment is an evolutionary drive that ensures safety by maintaining proximity between infant and caregiver. This conceptualisation has since been extended to represent attachment as a system that provides the infant with a sense of security which enables them to confidently explore and learn from their environment (Ainsworth et al., 1978; Bowlby, 1969/1982; Goldberg et al., 1999). The attachment system is thus viewed as a dyad in which the caregiver acts as a "safe haven" to which the infant can retreat in times of stress or danger, but also a "secure base" from which the child can explore and learn from their environment. The quality of a child's attachment is therefore regarded as the extent to which the child can trust in their caregiver to act as a secure base from which they can confidently explore the world (Ainsworth et al., 1978; Bartholomew & Horowitz, 1991).

Bowlby (1973) proposed that over the course of the first year of life, the infant's experiences with their caregiver lead them to develop expectations regarding the caregiver's likely availability, responsiveness and sensitivity to their bids for proximity and comfort. Bowlby referred to these expectations as internal working models, and argued that they help the infant organise their attachment behaviours in order to best engage the parent in caregiving behaviour. Thus, qualitatively different attachment relationships were said to give rise to different patterns of infant behaviour, reflecting underlying internal working models of attachment (Main, Kaplan, & Cassidy, 1985).

Organised patterns of attachment arise in response to a predictable pattern of caregiver behaviour, and may be secure or insecure. Infants who experience attentive and sensitive caregiver behaviours develop confidence in their caregiver to effectively meet their needs for emotion co-regulation and containment in times of distress, and are said to develop a secure attachment (Main et al., 1985). In a secure attachment relationship, the child develops an understanding that the caregiver will be available and responsive to his or her needs, and is therefore better able to openly express their attachment needs and derive comfort from interaction with the caregiver. These children internalise this sense of relational safety while also experiencing effective co-regulation of their emotional state,

leading to more optimal development of emotion self-regulation skills (Belsky, 1999; Cassidy & Berlin, 1994). In contrast, insecure attachment develops in the context of unresponsive or inconsistently responsive caregiving behaviour, where children develop a sense that their attachment needs will be met inconsistently or insufficiently. In response to these expectations, children develop organised strategies for interacting with their caregiver in ways that maximise attainment of their attachment needs. Insecure-avoidant attachment is characterised by a failure of the children to express need for the caregiver and arises in response to consistent failures by the caregiver to be responsive to attachment signalling. Insecure-preoccupied (also known as insecure-ambivalent) attachment is characterised by an over-expression of attachment needs and an inability to derive comfort from the caregiver, and develops as an attempt to ensure responsiveness from an inconsistently available caregiver. Children who develop insecure attachments experience less optimal emotion co-regulation leading to later problems with self-regulation and understanding (Cassidy & Berlin, 1994; Main, 1990).

Main and Solomon (1986) proposed a fourth category of attachment, disorganised attachment, to describe the behaviour of some children who, unlike the organised patterns described above, appeared to lack a consistent strategy for responding to their caregiver. Disorganised attachment is said to arise within the context of frightened, frightening or dissociative parenting behaviour (Hesse & Main, 2006; Lyons-Ruth, Bronfman, & Parsons, 1999; Main & Hesse, 1990). These children exhibit contradictory behaviours (e.g. strong avoidance paired with strong proximity-seeking) and demonstrate overt signs of being frightened of the caregiver (Main & Solomon, 1986). Often arising within the context of parental abuse and neglect, this disorganised behaviour is said to reflect the child's inability to cope with an unresolvable situation where the parental figure is viewed as both a source of danger and the only available safe haven (van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). When an infant is classified as disorganised, a sub classification of security or insecurity is often given to describe the infant's behaviour

during instances when a coherent behavioural strategy is observable (van IJzendoorn et al., 1999).

It is worth noting at this point that the current thesis aims to examine only organised patterns of attachment. Given the complexity of disorganised attachment, adequate consideration of this attachment type is beyond of the scope of the current thesis. Furthermore, disorganisation of attachment constitutes a small proportion of attachment classifications seen within non-clinical samples (van IJzendoorn et al., 1999). Disorganisation of attachment also has particular complexities in the context of ASD, as there is considerable phenomenological overlap between these presentations (Capps, Sigman, & Mundy, 1994) which remain poorly defined. Accordingly, the discussion of attachment that follows will focus primarily on secure, insecure-avoidant and insecure-preoccupied styles of attachment, however some discussion of disorganised attachment will occur within the context of understanding the need to distinguish biologically-based ASD from trauma-induced disorganisation and quasi-autism (Rutter et al., 1999).

### 1.3.2 Internal Working Models of Attachment

As the infant develops, and their cognitive and emotional capacities increase, Bowlby (1973) proposed that internal working models of attachment become more cognitively complex and enriched. Beyond infancy, children begin to generalise their internal working model of the caregiver's likely responsiveness and sensitivity, and apply these expectations to others outside the attachment dyad, and to the self (Bowlby, 1973). For instance, the securely-attached infant who views their attachment figure as sensitive, nurturing and consistent in their supply of support begins to translate these expectations to others in their social world. They learn to approach the world more confidently, viewing their peers and older adults as generally helpful and supportive, while holding a view of themselves as worthy of such care and respect.

In contrast to a secure internal working model of attachment, children who cannot count on their caregiver to be available and responsive during infancy, who develop insecure attachment, are said to develop a view of the world as unpredictable or unresponsive, and themselves as unworthy of care. Bowlby argued that the development of internal working models enables the infant to gather and summarise information related to their attachment relationship, and apply this knowledge to help them interpret their wider social environment. Because these mental representations are shaped by early attachment experiences, they can reflect conceptualisations of the world and self that are positive (i.e. secure attachment) or negative (i.e. insecure or disorganised attachment; Dykas & Cassidy, 2011). In this way insecure attachment behaviours that were once adaptive within an insecure attachment relationship may be maladaptive when applied to contexts outside this dyad. For instance, insecure representations about the self may bring about low self-esteem and self-worth in social contexts, while insecure representations of the world may lead to maladaptive social information processing styles and pessimistic biases (Dykas & Cassidy, 2011). This suggestion, that the caregiver-child attachment relationship impacts later conceptualisation of the self and others, implies a role for early attachment in shaping later social competence. Indeed, a wealth of research has established a strong link between attachment quality and a range of later social, emotional, and relational capacities, and an overview of this literature will be provided in the next section of this review.

### 1.3.3 Developmental Implications of Attachment Quality

Behavioural studies indicate that early attachment experiences are highly predictive of later psychosocial development and functioning (Bartholomew & Horowitz, 1991; Bohlin et al., 2000; Thompson, 1999; van IJzendoorn et al., 1999). Infants who develop secure relationships with their caregivers during infancy display higher levels of positive affect, confidence, and problem solving skills as toddlers (Matas, Arend, & Sroufe, 1978), and

show greater self-reliance, resilience and resourcefulness during pre-school (Arend, Gove, & Sroufe, 1979; Weinfield, Sroufe, Egeland, & Carlson, 1999). During middle childhood and adolescence, securely-attached children are more socially competent and popular amongst peers (Cohn, 1990; Shulman, Elicker, & Sroufe, 1994; Urban, Carlson, Egeland, & Sroufe, 1991), show better adjustment to school and fewer problem behaviours (Granot & Mayseless, 2001), and exhibit better cognitive functioning (Jacobsen, Edelstein, & Hofmann, 1994). In contrast, insecure attachments are risk factors for social, emotional and behavioural problems, and later psychopathology (Lyons-Ruth, 1996; Robinson, 2002; van IJzendoorn et al., 1999). Infants who display insecure attachment show emotion regulation difficulties in preschool years (Bosquet & Egeland, 2006), and greater impairment in social interactions during school years, including social withdrawal, aggressive behaviour, and reduced reciprocity in social interactions (Bohlin et al., 2000; Cassidy & Berlin, 1994; Lyons-Ruth, 1996; van IJzendoorn et al., 1999). When measured concurrently during middle childhood, insecure attachment has also been associated with poorer social and emotional functioning, including increased report of depressive symptoms, social anxiety, shyness, and inattention (Bohlin et al., 2000; Borelli, David, Crowley, & Mayes, 2010). In explaining these associations, Elicker, Englund and Sroufe (1992) have suggested that a secure attachment relationship, characterised by parental responsiveness and availability, may promote positive socioemotional outcomes by creating positive social expectations in the child, providing a context in which the child can learn about social reciprocity and empathy, and generating a sense of self-worth. These findings highlight child-caregiver attachment quality as an important mediator of the child's psychosocial development, and suggest that a holistic understanding of child developmental trajectories must take into account the child's attachment quality.

### 1.3.4 Contemporary Attachment Literature

Recently, contemporary attachment literature has sought to unpack the mechanisms underlying the strong associations seen between early attachment quality and developmental outcomes discussed above. In this endeavour, there has been increasing appreciation for the role of the attachment relationship in providing a relational context in which children develop core social and emotional capacities (Feldman, Greenbaum, & Yirmiya, 1999; Kochanska, Aksan, & Carlson, 2005; Schore, 1996, 2001a, 2001b, 2014). These core capacities include social responsiveness, emotion recognition and understanding, and the capacity to infer and understand others' inner states – known as Theory of Mind within social cognitive research, but regarded more broadly within attachment literature as the capacity for mentalisation (Fonagy, Steele, Steele, Moran, & Higgitt, 1991). These skills are thought to form a foundation for later, more sophisticated skill development seen in longitudinal studies. In explaining the mechanisms for this, Fonagy, Gergely, Jurist, and Target (2002) explained that early relationships between children and attachment figures create opportunities to learn about mental states, both others and one's own. In this process the child's capacity to attend to the caregiver is important, as this enables them to detect affective cues and begin to link external events with internal, emotional states. The caregiver's capacity to understand their child's behaviour in terms of underlying mental states (i.e. mentalise the child) is also crucial (Slade, 2005; Slade, Grienenberger, Bernbach, Levy, & Locker, 2005). This capacity to understand and interpret the child's behaviour as an expression of particular mental or affective states such as feelings, thoughts, desires, and beliefs, has been operationalised using the term parental reflective functioning (Fonagy et al., 2002). Parents foster mentalisation and emotion processing skills in their child by interpreting their child's inner world, and representing this back to the child through facial expression, tone of voice, and social interaction during play (Fonagy, Gergely, & Target, 2007). In this way, the child begins to draw links between internal states and the external social world. The

parent's representations of the infant's emotional states are internalised by the infant to form an internalised representation of the self (Fonagy & Target, 1996). Thus, in order to foster the infant's own development of affect regulation and sense of self, parents need an accurate psychological model of the infant mind (Slade, 2005).

Research has demonstrated a role for reflective functioning in fostering very early social and emotional infant development, as well as security of attachment. Fonagy and colleagues (1991) provided some of the earliest support for the role of reflective functioning in attachment and developmental outcomes, by showing that pre-natal reflective functioning amongst first-time mothers and fathers predicted security of attachment in the child at 12 months of age. Others have established a role for reflective functioning in the development of core social and emotional skills in children (Meins, Fernyhough, Russell, & Clark-Carter, 1998; Meins et al., 2002). Mothers of three-year-old children who demonstrate greater use of mentalising language had children with greater emotional understanding two years later (Meins et al., 1998). Mothers who used accurate mental state language when interacting with their infant as early as six months of age were shown to have children with enhanced theory of mind skills, a component of mentalisation, at four years of age (Meins et al., 2002). Studying parents' representations of their child more directly, Slade, Grienenberger, Bernbach, Levy and Locker (2005) found that mothers who were judged as autonomous (i.e. secure) during pregnancy were more likely to display parental reflective functioning when their infant was 14 months of age. Furthermore, mothers of secure infants displayed higher levels of reflective functioning (Slade et al., 2005). In this study, reflective functioning played a mediating role between parental and infant attachment quality, and the authors suggested this mediating role might help explain the 'transmission gap' seen in studies that attempt to predict infant security from parenting sensitivity (Slade et al., 2005). In explaining links between parental reflective functioning and infant security of attachment, Fonagy and Target (2005) suggested that the mentalising capacity of the parents allows them to create a secure base for their infant from which the infant derives a sense of security. Parental

reflective functioning therefore emerges as an important construct in directing the intergenerational transmission of attachment quality from parent to child.

With this increasing understanding of how the attachment relationship provides a relational context around the development of core social and emotional skills, there has been growing interest in better understanding the role of attachment in neurodevelopmental disorders which feature in-born deficits in these core capacities (Clarke, Ungerer, Chahoud, Johnson, & Stiefel, 2002; Schmidt Neven, Anderson, & Godber, 2002; Sivaratnam, Newman, Tonge, & Rinehart, 2015; Slade, 2009). Children with ASD display biologically-based impairments in social reciprocity, emotion recognition and understanding, and theory of mind. There is a need to better the nature and role of attachment relationships in influencing developmental outcomes in these children. It has been suggested that there may be a complex and bidirectional interplay of developmental processes underlying biological and environmental factors in ASD (Sivaratnam et al., 2015; Slade, 2009), and this warrants examination if we are to gain a more holistic understanding of ASD.

## 1.4 ATTACHMENT IN ASD

### 1.4.1 Historical Contexts

Attachment has a long history in the discussion of ASD, dating back to the earliest descriptions of autism by child psychiatrist Leo Kanner in 1943. Through a series of case studies, Kanner (1943) described a group of 11 children who he regarded as displaying "an extreme autistic aloneness" (p. 242). These children were described as displaying a preference for being alone, failing to respond to their mother's approaches or departures, and showing a general indifference to, or active avoidance of, their social surroundings. Kanner concluded that children with autism exhibit "an innate inability to form the usual, biologically provided affective contact with people" (p. 250). This suggestion by Kanner,

that children with autism were unable to form affective attachments to others, spurred on later descriptions of autism as a disorder featuring "a lack of attachment" (Rutter, 1978), with children "devoid of emotional ties" (p. 69, Mahler, 1968). As recently as 1987, such suggestions were maintained in the Diagnostic and Statistical Manual of Mental Disorders-III (American Psychiatric Association, 1980), which noted disturbances of attachment among the diagnostic criteria for Autistic Disorder.

Perhaps the most harmful early suggestion about ASD made by Kanner was the notion that parents of the case study children seemed to present with a degree of emotion coldness towards their child, and this may contribute to the syndrome (Kanner, 1943). The suggestion that the caregiving environment may give rise to autism was consistent with the prevailing view of psychiatric disturbance at the time, which tended to emphasise environmental causation while de-emphasising biological or genetic contributions (Irwin, MacSween, & Kerns, 2011). However, Kanner's suggestions were not based upon rigorous empirical evidence and there were other plausible explanations for his observations. For instance, there was a small sample size of only 11 children, there may have been genetic factors underlying the parents' presentation (i.e. what we know today as the 'broader autism phenotype') which may have explained their presentation, and there may have been reciprocal effects of children's challenging presentation on the caregiver's style of interaction with the child (Irwin et al., 2011). Nonetheless, Kanner built upon these ideas in later writings, suggesting that a cold and emotionally distant style of caregiving, dubbed the 'refrigerator mother', was apparently frequently seen in parents of children with autism, and contributes to the development of the disorder (Kanner, 1949; Kanner & Eisenberg, 1956). However, Kanner also maintained a role for biology in autism aetiology throughout his publications. He suggested that the 'refrigerator mother' contributed to the development of ASD only amongst children who displayed autistic disturbances from birth, i.e. those with a genetic predisposition (Kanner & Eisenberg, 1956).

Kanner's early theorising about the role of the caregiver in autism aetiology served to propagate the harmful psychogenic theory of autism, discussed most famously by Bruno

Bettelheim in the 1960's. Bettelheim (1967) suggested that autism was directly caused by pathology within the parent-child relationship, proposing that the social withdrawal of children with autism was a reaction to extreme maternal rejection and hostility. These damaging suggestions mark a dark time in the history of autism, as medical professionals allowed political agendas to compromise and cloud objective empirical analysis. Despite being widely and convincingly rejected since this time, the impacts of these early suggestions continue to be felt today, as parents of children with autism continue to report experiencing stigmatisation (Sousa, 2011). Early empirical evidence refuting psychogenic theories of autism has come in the form of research demonstrating that parents of children with autism do not display pathology in their interactions with their infants (Byassee & Murrell, 1975; Cantwell, Baker, & Rutter, 1979), there is a strong neurobiological basis to autism (Folstein & Rutter, 1977; Rimland, 1964), and children with autism form discriminating attachments to their caregivers (Sigman & Mundy, 1989; Sigman & Ungerer, 1984).

Since these harmful beginnings, substantial research in the fields and ASD and attachment theory has established ASD as a distinct neurodevelopmental disorder, with a strong genetic and biological aetiology. ASD literature has increasingly aimed to better understand the neurodevelopmental underpinnings of the disorder, in order to enhance early detection and intervention in ASD. Meanwhile, attachment literature has featured an increasing understanding of how early adverse experiences and extreme relational deprivation can give rise to a phenotype that is similar to, but distinct from, ASD (Rutter et al., 1999; Rutter et al., 2007a; Rutter et al., 2007b; Rutter et al., 2007c). Rutter and colleagues (1999) described autistic-like patterns of behaviour, labelled 'quasi-autism', observed amongst some (but not all) young children who had experienced severe early deprivation within a Romanian orphanage. These children displayed symptoms of autism such as difficulties in social relationships, reciprocal conversation, non-verbal communication (ie. eye gaze, use of gestures), and repetitive and stereotype behaviours and interests. Distinguishing these behaviours from ASD was the gradual recovery and

remission from these symptoms over time, following placement within a healthy caregiving environment. Authors highlighted that while 'quasi autism' bears important similarities to 'ordinary autism', differences between the conditions suggest that the features of each have distinct meanings.

The harm created from early discussions of attachment in the context of ASD may have resulted in some reluctance to return to the study of attachment in ASD, for fear of this being misinterpreted as a return to psychogenic theorising. Indeed, researchers that have examined attachment in ASD since these early psychogenic theories have been eager to state that they do not suggest any causal relationship between attachment and ASD (Oppenheim, Koren-Karie, Dolev, & Yirmiya, 2008). Instead, researchers have explained such research as recognising the significant role for attachment quality in shaping developmental outcomes in typically developing children, and seeking to better understanding the role of attachment quality in ASD, within the obvious constraints imposed by the disorder (Oppenheim et al., 2008). Researchers have also highlighted that because children with ASD are impaired in social communication skills that are central to attachment interactions, attachment quality may be particularly important to understand (Chandler & Dissanayake, 2014; Dissanayake & Sigman, 2001; Hoppes & Harris, 1990; Rogers, Ozonoff, & Maslin-Cole, 1991; Slade, 2009; van Ijzendoorn et al., 2007). There is also a need to recognise that attachment disruption can mimic ASD impairment (Mukaddes, Kaynak, Kinali, Besikci, & Issever, 2004; Phelps, Eisert, Schulz, & Augustyn, 2012; Sadiq et al., 2012; Scheeringa, 2001), and there may be several pathways by which to arrive at the phenomenological appearance of ASD (Sadiq et al., 2012; Scheeringa, 2001). While ASD is clearly neurodevelopmental in aetiology, conditions born from attachment pathology or trauma may erroneously receive an ASD label (Phelps et al., 2012). Therefore, in addition to understanding the impact of attachment experiences for children with ASD, renewed study in this field seems important to contribute to complexities inherent in accurate, timely, differential diagnosis of ASD and child-caregiver relational problems.

### 1.4.2 Attachment Behaviours in ASD

Despite their impairments in social interaction and emotion processing, empirical evidence suggests children with ASD display a range of normative attachment behaviours. Like typically developing children, children with ASD have been observed to show a clear preference for their caregiver over a stranger, direct more social behaviours towards their caregiver than a stranger, react in a unique way to their caregiver's departure, and increase their proximity-seeking and proximity maintaining behaviours upon reunion for their caregiver (Capps et al., 1994; Dissanayake & Crossley, 1996; Rogers et al., 1991; Shapiro, Sherman, Calamari, & Koch, 1987; Sigman & Mundy, 1989; Sigman & Ungerer, 1984). Dissanayake and Crossley (1996) examined whether these overt attachment behaviours reflected an underlying conceptualisation of the caregiver as a secure base and safe haven for children with ASD. In a continuous observation of children's social and proximity-seeking behaviours, children with ASD were observed to play more readily with toys in their mother's presence, but upon entry of stranger children retreated to their mother and displayed an increase in their attachment behaviours directed towards their caregiver. The ASD group was only distinguished from the control group by the behaviours used during social interaction with their mother, not the behaviours used in an attachment-evoking scenario.

Despite displaying normative attachment behaviours, atypical social behaviours remain evident within the attachment relationship and may have important impacts upon the health of this dyad. Early studies have indicated that children with ASD demonstrate attachment behaviours with reduced frequency compared to non-ASD children (Sigman & Mundy, 1989), and children with ASD relate to caregivers in ways that are more challenging, less responsive, and less comprehensible compared to clinical and non-clinical comparison groups (Dissanayake & Crossley, 1997). For instance, studies have found that young children with ASD display less frequent looking, smiling and showing

behaviours with their caregivers (Dissanayake & Crossley, 1996), are less responsive and involved in play interactions (van Ijzendoorn et al., 2007; Willemsen-Swinkels, Bakermans-Kranenburg, Buitelaar, van IJzendoorn, & van Engeland, 2000), and are less consistent in their attachment behaviours (Dissanayake & Crossley, 1997). Recently, at study by Grzadzinski, Luyster, Spencer, and Lord (2014) indicated that children with ASD make fewer displays of pleasure, experience difficulty being soothed by their caregiver, and display atypical reunion behaviours with their caregiver. These atypical behaviours may also be felt by caregivers, with Hoppes and Harris (1990) finding that parents of children with ASD perceive their child as less attached to them, and report feeling less rewarded in their interactions with their child, compared to caregivers of children with Down Syndrome.

Historically, it seems that the presence of certain atypicalities within the attachment relationship (i.e. limited eye contact, poor reciprocity) were cited as evidence that children with ASD do not form attachments. However these behaviours are not necessarily indicative of the presence or absence of attachment (Dissanayake & Sigman, 2001). When specific attachment behaviours are examined, it becomes clearly apparent that children with ASD display discriminating and meaningful attachments to significant caregivers, through a range of normative attachment behaviours.

### 1.4.3 Attachment Quality in ASD Groups

Since research clearly established that children with ASD are capable of forming discriminating attachments to caregivers (Sigman & Mundy, 1989; Sigman & Ungerer, 1984), empirical interest switched towards characterising the quality of this attachment. Early research examining the rate of attachment security in children with ASD suggested that despite their atypical social behaviours, around 40-50% of these children could be classified as displaying a secure attachment to their caregiver (Capps et al., 1994; Rogers, Ozonoff, & Maslin-Cole, 1993; Shapiro et al., 1987). Early studies comparing rates of

attachment security in ASD to other clinical and non-clinical groups have been mixed; some studies have reported equivalent rates of attachment security in young children with ASD compared to children with other developmental and psychiatric disorders (Rogers et al., 1991; Shapiro et al., 1987; Sigman & Mundy, 1989; Sigman & Ungerer, 1984; Willemsen-Swinkels et al., 2000), while others have found young children with ASD to display higher rates of insecurity and disorganisation of attachment relative to a normative sample (Capps et al., 1994).

Amongst these early findings, several criticisms have been raised with regard to aspects of the study design and methodology employed (Rutgers, Bakermans-Kranenburg, van IJzendoorn, & van Berckelaer-Onnes, 2004; Rutgers, van IJzendoorn, Bakermans-Kranenburg, & Swinkels, 2007a). For instance, studies have frequently lacked typically-developing comparison groups (e.g. Capps et al., 1994; Rogers et al., 1991, 1993), leading to difficulty in verifying the validity of the attachment classifications offered to autistic and non-autistic clinical groups, particularly when modifications were made to Ainsworth's traditional Strange Situation paradigm (Capps et al., 1994; Rogers et al., 1991; Shapiro et al., 1987). Furthermore, there was often a failure to match ASD and comparison groups on verbal and nonverbal ability, variables known to be important in predicting attachment quality (Rogers et al., 1991; Rutgers et al., 2004). Autism has not been consistently or strictly defined in past literature (Rutgers et al., 2004), for instance, some studies combined children diagnosed with Autistic Disorder and children diagnosed with PDD-NOS, and many have combined low-functioning (IQ<70) with high-functioning children, leading to further difficulty establishing clear links between a specific autism phenotype and attachment. Finding an appropriate comparison group has been difficult given the vast range and severity of impairments seen across children with ASD (Rogers et al., 1991). Furthermore, given that ASD is typically diagnosed in early childhood, there has been a need to modify the 'gold-standard' attachment paradigm, the Strange Situation, which was originally intended for use with infants (Ainsworth et al., 1978). This has been justified by some with the suggestion that the developmental delay displayed by children with ASD

would place them within the appropriate developmental range for assessment using the Strange Situation (Capps et al., 1994), however children with ASD sampled for some studies have clearly exceeded this developmental level (Buitelaar, 1995; Sigman & Mundy, 1989). Finally, questions remain as to whether the stressful nature of the Strange Situation might be more challenging for children with ASD, who display poor tolerance of changes in routine or environment (Buitelaar, 1995; Rutgers et al., 2007a), and therefore responses within this paradigm may be less comparable to typically developing children.

Given the varied previous research designs and findings in this field, Rutgers and colleagues (2004) conducted a meta-analysis with the aim of summarising the explaining the existing findings within the attachment and ASD field. Rutgers and colleagues drew together findings from sixteen studies of attachment in children with ASD. Perhaps most significantly, they found that a slight majority (53%) of children with ASD exhibited secure attachment to their caregiver. This is in stark contrast to early descriptions of ASD as a failure to form attachments, however this rate does fall below the rate of security commonly reported within normative typically developing groups (65%; van Ijzendoorn, Goldberg, Kroonenberg, & Frenkel, 1992). Meta-analysis indicated that this rate of security in ASD was below that reported amongst typically-developing and clinical comparison groups (Rutgers et al., 2004). Looking to explain the variation in the findings of past studies, Rutgers and colleagues examined specific predictor variables to determine their association to attachment. They found that when autism was more strictly defined (i.e. studies that included only children meeting criteria for a diagnosis of Autistic Disorder) or when only children with ASD and intellectual impairment were studied, there was a stronger association between autism and insecurity of attachment. Notably, the influence of intellectual impairment was such that when only high-functioning children (IQ>70) were studied, there was no increased risk of insecurity for children with ASD. Thus, Rutgers and colleagues were able to summarise the complex and often conflicting findings of previous research conducted within early childhood, and reported that children

with ASD do exhibit secure attachment, however rates of insecurity were elevated, and this effect was moderated by intellectual impairment and the classification of autism.

Since the meta-analysis by Rutgers and colleagues, research into the question of security of attachment in ASD has continued, with research designs particularly focussed on improved matching of ASD participants and comparison groups, and developing more ethologically valid methods of assessing attachment in children with ASD (Rutgers et al., 2007a). Recent studies using the Strange Situation paradigm have estimated the rate of security in two year-old children with ASD of varying intellectual ability at between 35% (Naber et al., 2007) and 48% (van Ijzendoorn et al., 2007). Building on this, with the aim of enhancing the sensitivity and validity of measurement for this ASD sample, both studies then featured a calculation of a continuous security score, based on observations within the Strange Situation. Examining children with autism and children with PDD-NOS separately, Naber and colleagues reported that children within each group were less often rated as secure compared to typically developing children., while van Ijzendoorn and colleagues reported no differences in security between children with ASD and children without ASD. These group comparisons did not taken account of differences in developmental level, which are known to influence rates of security. To overcome this, both studies also measured autism symptoms within these ASD groups using the Autism Diagnostic Observation Schedule (ADOS; Lord, Leventhal, & Cook, 2001) which allowed for the specific evaluation of the autism phenotype, with the option of controlling for developmental level. Importantly, within ASD groups, autism symptoms showed an inverse association with security, even after controlling for developmental level of participants (Naber et al., 2007; van Ijzendoorn et al., 2007). Rutgers and colleagues (2007b) also studied toddlers with ASD, sampling both children with low-functioning and high-functioning ASD, as well as children with intellectual disability, language delay, and typically developing children, however they utilised a clinician-rated attachment questionnaire to assess secure attachment behaviours demonstrated by children during a period of observation. With high- and low- functioning groups combined, children with

ASD displayed significantly less attachment security than clinical and non-clinical comparison groups. Surprisingly, when ASD groups were compared, high-functioning children with ASD displayed significantly less attachment security compared to children with low-functioning ASD. This finding contrasted sharply with previous findings around the influence of intellectual impairment on increasing rates of insecurity within ASD samples (Naber et al., 2007; Rutgers et al., 2004; van Ijzendoorn et al., 2007). Differences may be accounted for by the different methodology used, as the vast majority of studies reviewed by Rutgers and colleagues (2004) utilised the Strange Situation paradigm, while the method used by Rutgers and colleagues (2007b) was based upon the Attachment Q-sort which may have more ethological validity within ASD (Rutgers et al., 2007a).

In sum, recent findings on attachment quality in ASD highlight the heterogeneity and clinical complexity of ASD, and point to a need to more closely consider individual differences within ASD groups, particularly with regard to intellectual ability and autism symptom severity, when attempting to unpack the interrelationships between observed attachment quality and the autism phenotype.

### 1.4.4 Correlates of Attachment in ASD

Although a vast majority of studies of attachment in ASD have taken a quantitative approach, comparing rates of security or insecurity between ASD and non-ASD groups (i.e. Rutgers et al., 2004), accumulating evidence from these studies has pointed to the need to better understand the within-group correlates of attachment quality. Rogers and colleagues (1991) noted that despite rates of security being similar across ASD and non-ASD groups, security was associated with better cognitive, language and gross motor skills in children with ASD, but not amongst typically developing children. This led the authors to suggest that attachment may develop via different mechanisms for children with ASD, given their unique impairments. Specifically, it was suggested that the development of a secure internal working model of attachment may be a more cognitively demanding task for children with ASD, and may occur later in children with ASD (Rogers et al., 1993).

Dissanayake and Sigman (2001) have argued that normative attachment processes may interact differently with ASD processes across development, such that early attachment formation, while attachment relationships are largely behaviourally-based, may be unimpeded by the unique deficits of ASD. They contrast this with later attachment, when mental representations of relationships become increasingly internalised and based upon an internal working model of the caregiver, and suggest attachment representations later in development may be more directly adversely impacted by children's social and emotional impairments. Due to their unique impairments, it has been questioned whether attachment relationships develop in the same way for children with ASD as children without ASD (Chandler & Dissanayake, 2014; Rogers et al., 1991), and also whether the attachment relationship serves a similar function in ASD as in typical development (Dissanayake & Sigman, 2001; Rogers et al., 1993; van Ijzendoorn et al., 2007). In order to begin to address such broad and theoretically important questions, there is a need to explore the factors that are associated with attachment quality for these children.

Correlates of attachment in ASD have primarily been evaluated during early childhood (i.e. 2-6 years of age). Along with early studies by Rogers and colleagues, Capps, Sigman & Mundy (1994) also examined qualitative aspects of social behaviour displayed by young children (aged 3-6 years) with ASD in the Strange Situation paradigm. They found that securely attached children with ASD initiated social interaction with their caregiver more often than insecurely-attached children, and were more responsive to bids for joint attention (e.g. looking, pointing, showing) during an unstructured play interaction. Parents of secure children with ASD were also rated as more sensitive than parents of insecure children. The authors suggested these findings validate the use of Ainsworth's attachment classifications and the Strange Situation paradigm in ASD, because security was associated with social behaviours and parenting sensitivity in theoretically-predicted ways for children with ASD. However it must also be noted that language ability differed across secure and insecure groups and may have accounted for the observed group differences. Willemsen-Swinkels and colleagues (2000) distinguished

between different ASD diagnoses and found no relationship between severity of diagnostic category (i.e. autism vs PDD-NOS) and attachment classification. However, when grouped together, children with ASD (autism or PDD-NOS) who were classified as insecure displayed fewer social initiates, faced their parent less, and were less responsive to the parent's social bids (Willemsen-Swinkels et al., 2000). The authors of these studies (Capps et al., 1994; Willemsen-Swinkels et al., 2000) suggest that their findings, linking security to positive social interactive skills, support the validity of traditional attachment classifications in children with ASD. However these findings seem to have further significance beyond simple validation. These findings establish that specific areas of impairment in ASD (e.g. attention to faces, reciprocal social interaction) are associated with the child's attachment quality.

It has been previously noted that autism symptom severity has been associated with lower levels of attachment security in young children (Naber et al., 2007; van Ijzendoorn et al., 2007). Building on this, more recent studies have demonstrated that secure children with ASD are more socially responsive and interactive during play (Hudry et al., 2013; Naber et al., 2008) and engage in more symbolic play (Marcu, Oppenheim, Koren-Karie, Dolev, & Yirmiya, 2009) than those classified as insecurely attached. Such cross-sectional findings obviously do not allow for conclusions to be made regarding causation, but are nonetheless significant in beginning to suggest that security may be associated with less severe autism symptomatology in ASD. Findings also suggest that security and better social functioning may have similar positive associations in ASD as commonly reported in typically developing samples. Importantly these findings begin to address questions of whether attachment security means the same thing for children with ASD as for typically developing children.

The majority of the research examining attachment in ASD has sampled children during early childhood (2-6 years of age). While this research has been helpful in describing attachment behaviours and attachment correlates at this developmental stage, these studies do not address questions of whether attachment develops in the same way

prior to two years of age, or whether it continues to develop normally beyond this early childhood period (Dissanayake & Sigman, 2001; Sigman et al., 2004). Particular questions arise beyond early childhood, as attachment relationships become more cognitively and affectively sophisticated, and the successful use of the attachment figure increasingly depends upon the child's own socioemotional skills (Kerns, 2008). For these reasons, middle childhood has been highlighted as a particular developmental period of interest in ASD (Chandler & Dissanayake, 2014) and yet it has received comparatively little empirical study to date.

### 1.4.5 Attachment in ASD Beyond Early Childhood

There is considerable theoretical and clinical importance to better understanding attachment beyond early childhood in children with ASD. Middle childhood marks a period of significant change and growth with regard to the child's attachment relationships (Kerns, 2008; Kerns & Seibert, in press). Normative developmental changes such as increasing cognitive development, greater capacity for self-regulation, and increased drive for self-reliance, bring with them changes in the set goal of the attachment system (Kerns, Tomich, & Kim, 2006). Where immediate physical availability and responsiveness was once most important to the young child's sense of security, in middle childhood it is a sense of psychological availability of the caregiver that becomes most important (Kerns, Tomich, Aspelmeier, & Contreras, 2000). There is a shift from close monitoring of the child by the attachment figure, to an increasingly even relationship where both the attachment figure and the child monitor the need for co-regulation. Children play an increasingly active role in getting their needs met by the caregiver. As the attachment relationship becomes more affectively and cognitively complex, a continued sense of security depends upon a good ability to infer and comprehend the caregiver's thoughts, goals and intentions, as children must plan and adapt their behaviour in response to their caregiver's behaviour, in order to maximise the attainment of their attachment needs.

The increased cognitive and affective complexity of the attachment relationship with age may pose unique challenges to children with ASD, who have deficits in social and emotional interaction and understanding (Dissanayake & Sigman, 2001; Rogers et al., 1991, 1993). Early studies of attachment in ASD featured suggestions that children with ASD may be unlikely to form more than very rudimentary internal working models of the attachment relationship (Sigman & Mundy, 1989). Others have suggested that children with ASD may struggle to develop an enriched working model of the caregiver (Capps et al., 1994; Rogers et al., 1991). Dissanayake and Sigman (2001) wondered about the need to distinguish between two stages in the development of the attachment relationship in ASD. Firstly, Dissanayake and Sigman propose that infants display a psychobiological form of attachment, where interactions with caregivers are largely behaviourally-based and attachment needs are signalled through a range of concrete attachment behaviours (i.e. proximity seeking, caregiver preference). They suggest that children with ASD may be unimpaired during this psychobiological stage of attachment development, because interactions with the caregiver do not strongly depend upon emotion processing, reciprocity, or theory of mind skills. However, Dissanyake and Sigman argue that as children age, a more cognitive form of attachment emerges, and it is this form of attachment that may be compromised by the cognitive and affective impairments frequently seen in ASD. Consistent with this notion, Yirmiya and Sigman (2001) suggested that while young children with ASD may demonstrate secure patterns of attachment during early childhood, when child-caregiver interactions are largely behavioural in nature, they may struggle to maintain a sense of security beyond early childhood, when relationships become more complex. Because common ASD impairments (i.e. emotion processing, mentalisation, social reciprocity) seem to be at the core of successful attachment relationships during middle childhood, it may be that, with age, children with more severe autism symptoms may face greater challenges in attaining a secure internal working model of the caregiver (Dissanayake & Sigman, 2001; Rogers et al., 1993).

To date, there has been some limited research exploring these questions regarding attachment quality and its correlates in ASD beyond early childhood. Bauminger, Solomon and Rogers (2010) studied self-reported attachment quality amongst high-functioning children (IQ>70) with ASD, aged 8-12 years. Using the Security Scale (Kerns, Aspelmeier, Gentzler, & Grabill, 2001), a self-report measure of children's perceptions of attachment security to their primary caregiver, it was found that 54.5% of children with ASD reported secure attachments to their mother, compared to 71% of typically developing children. While this was a non-significant differences between the groups, this rate bears similarity to rates of security reported amongst young children with ASD, using behaviour-based measures (Rutgers et al., 2004). Beyond examining possible group differences in attachment security, Bauminger, Solomon and Rogers examined how attachment quality related to the children's perceived friendship quality. Using the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987), a self-report measure of children's perceptions of parent-child relationship quality, the authors found that perceptions of parent-child relationship quality were positively associated with perceptions of current friendship quality. Children with ASD who viewed their relationship with their caregiver more positively also viewed their friendship quality with peers more positively. Interestingly, children's perceptions of their attachment security on the Security Scale were related to perceived friendship quality only amongst children with poor theory of mind skills. In unpacking this relationship, the authors suggested that secure internal working models may play an indirect, compensatory mechanism, by supporting children with lower theory of mind skills to attain more positive friendship quality.

Using similar methodology to Bauminger, Solomon and Rogers, Chandler and Dissanayake (2014) found equivalent rates of attachment security using the Security Scale, between children with ASD and typically developing children during middle childhood (8-12 years). Importantly, they also found no between-group differences on parents' ratings of their children's security, also using the Security Scale, providing support for the validity

of the Security Scale in ASD. Recently, Wu and colleagues (2015) examined attachment quality using the IPPA, in the context of gelatophobia, that is, the fear of being laughed at. Amongst a large sample of children aged 12-15 years with high-functioning (IQ<70) ASD and a sample of typically developing children, child-reported attachment quality to both mother and father, using the IPPA, was remarkably similar between groups. Gelatophobia was inversely related to perceived father-child attachment quality in children with ASD, while no associations were observed between gelatophobia and perceived mother-child attachment quality in children with ASD. This is despite gelatophobia being inversely associated with both father- and mother- attachment quality in typically developing children. In one of the only studies of longitudinal outcomes in ASD, Dolev and colleagues (2014) reported that security in young children with ASD predicted placement in a less restrictive school setting later in childhood. Thus in addition to having concurrent associations with better social functioning in certain domains, security may also have longitudinal outcomes that help explain a child's functioning during middle childhood.

Some research in middle childhood has examined concepts related to attachment security, such as parent-report of perceived closeness to their child. Baker, Seltzer and Greenberg (2011) studied a large sample of children, adolescents and young adults (10-22 years of age) with ASD and reported that lower levels of parent-reported closeness within the parent-child relationship was associated with higher rates of parent-reported child behavioural problems. Similarly, Hoffman and colleagues (2009) found that parents who reported less closeness with their child on the Attachment subscale of the Parenting Stress Index (PSI; Abidin, 1995), also rated their child as displaying more behaviour problems (i.e. distractibility/hyperactivity, demandingness, mood, adaptability) on the Child Domain scales of the PSI. Finally, In a study sampling children with ASD across early and middle childhood (4-14 years of age), Beurkens, Hobson, and Hobson (2013) found autism symptom severity, measured using the ADOS (Lord et al., 2001), was inversely related to parent-child interaction quality during a semi-structured play observation, but was not related to parent's perceptions of parent-child relationship quality. These findings, while

limited, show consistency with research findings in typically developing children that have linked security with better social functioning, and insecurity with increased behavioural problems.

Available research in middle childhood is limited, and while there is some evidence to suggest that attachment security is associated with better functioning in certain social and behavioural domains, there are notable limitations to this evidence. Firstly, only a few studies (Bauminger et al., 2010; Chandler & Dissanayake, 2014; Wu et al., 2015) have employed measures aimed at directly capturing children's working models of attachment by using self-report methods. Other studies have instead relied upon indirect methods such as parent-report (Baker et al., 2011; Hoffman et al., 2009), or have assessed constructs peripheral to the child's internal working models of attachment (i.e. parent's perceived closeness; Hoffman et al., 2009). Of the studies specifically examining security, only two (Bauminger et al., 2010; Wu et al., 2015) have examined attachment correlates, and these were relatively specific constructs (i.e. friendship quality, fear of being laughed at) meaning a broader understanding of the social, emotional, and behavioural correlates of attachment is still lacking within this population. Studies have at times compared child-report of attachment with child-report of social functioning (Bauminger et al., 2010; Wu et al., 2015) or have compared parent-report of closeness with parent-report of child functioning (Baker et al., 2011; Hoffman et al., 2009), leading to possible difficulties in interpretation. Furthermore, available studies have frequently sampled children across a wide age-range, spanning middle childhood, adolescence and young adulthood (Baker et al., 2011; Beurkens et al., 2013; Hoffman et al., 2009), making the specific study of middle childhood difficult.

Despite empirical studies highlighting autism symptom severity as an important factor predicting insecurity amongst young children with ASD, and theoretical discussions suggesting autism severity may continue to be relevant in attachment beyond early childhood, there is yet to be a thorough examination of internal working models of attachment in the context of autism severity during middle childhood. Thus, while there is

clearly an increasing appreciation of the need to understand the developmental correlates of attachment quality in ASD (Dissanayake & Sigman, 2001; Rogers et al., 1991, 1993; Sivaratnam et al., 2015; Slade, 2009), there is a need for a more comprehensive and systematic study of attachment in this population during middle childhood.

## 1.5 CAREGIVER FACTORS IN ASD

Given the dyadic, and bi-directional nature of attachment relationships, an understanding of attachment must take into account not only child-centric factors but also caregiver-related factors. This may be a particularly important consideration in ASD populations, given the social-interactive deficits that may complicate child-caregiver interactions (Hoppes & Harris, 1990; Oppenheim, Koren-Karie, Dolev, & Yirmiya, 2012; van Ijzendoorn et al., 2007) and the unique parenting experiences of caregivers of children with ASD (Lee, 2009).

Raising a child with ASD comes with unique challenges and stressors (Dabrowska & Pisula, 2010). In fact, parents of children with ASD experience higher rates of parenting stress compared to parents of typically developing children (Abbeduto et al., 2004; Tomanik, Harris, & Hawkins, 2004), and compared to parents of children with other developmental disabilities (Baker-Ericzen, Brookman-Frazee, & Stahmer, 2005; Dabrowska & Pisula, 2010). Stress levels in parents of children with ASD have been associated with certain core characteristics of ASD impairment, including social and communicative deficits, self-stimulatory behaviours, and cognitive impairment (Tomanik et al., 2004), as well as overall severity of autistic impairment (Abbeduto et al., 2004; Hoffman et al., 2009; Hoffman et al., 2008). In addition to stress, parents of children with ASD are at increased risk of experiencing poorer mental health (Hodge, Hoffman, & Sweeney, 2011; Lee, 2009; Yirmiya & Shaked, 2005). Rates of depression (e.g. Abbeduto et al., 2004; Yirmiya & Shaked, 2005) and anxiety (e.g. Lee, 2009; Piven & Palmer, 1999) are particularly elevated in these parents. Some have attributed poorer parent well-being to the increased burden of care associated with raising and child with ASD (Yirmiya &

Shaked, 2005). Others have suggested that genetic vulnerabilities amongst parents of children with ASD confer an increased risk for experiencing stress and poor mental health (Hodge et al., 2011).

Regardless of the source of these increased challenges for caregivers of children with ASD, parental stress and poor mental health are important in the discussion of ASD and socio-emotional functioning because they have been widely associated with poorer outcomes in typically developing children (Carter, Garrity-Rokous, Chazan-Cohen, Little, & Briggs-Gowan, 2001). For instance, Carter and colleagues (2001) found that maternal depression is associated with suboptimal mother-infant interactions and insecure attachment, as well as behavioural problems and lower competency levels for boys. Other studies have similarly found that children of depressed mothers show increased rate of insecure attachment (Murray & Cooper, 1996), difficulties with emotion regulation (Conroy et al., 2012), decreased competence (Redding, Harmon, & Morgan, 1990) and problem behaviour (Hoffman, Crnic, & Baker, 2006). While research within the ASD field often examines ASD impairments as predictive factors for parental stress or psychopathology, it is also important to consider how poor parental wellbeing is experienced by the child (Baker et al., 2011), particularly in terms of the child's perceptions of felt security.

### 1.5.1 Links with Attachment

Child attachment quality has long been understood in the context of caregiver factors within typically developing dyads (Ainsworth et al., 1978; Bowlby, 1969/1982). In Bowlby's early discussion of attachment he suggested security is transmitted from one generation to the next (Bowlby, 1973, 1980). This has certainly received support from intergeneration studies that have demonstrated that secure mothers often have secure children (van IJzendoorn, 1995). A primary mechanism underlying this intergeneration transmission of attachment security is parenting sensitivity (DeWolff & van Ijzendoorn, 1997). Mothers classified as secure in adulthood are more sensitive to the needs of their

child during infancy (Haft & Slade, 1989; Ward & Carlson, 1995), prepare their child better for separation at preschool (Crowell & Feldman, 1991) and are warmer and more supportive of their school-aged child (Crowell, O'Connor, Wollmers, Sprafkin, & Rao, 1991). Secure maternal attachment has also been linked with decreased problem behaviour and distress in children during middle childhood (Cowan, Cohn, Cowan, & Pearson, 1996; Crowell et al., 1991). While sensitivity is a strong predictor, only 23% of the variation between maternal attachment quality and infant attachment quality was accounted for by parental sensitivity (Van Ijzendoorn, Juffer, & Duyvesteyn, 1995), suggesting other factors are also at play. Along with parenting sensitivity, factors such as maternal insightfulness, responsiveness and reflective functioning are known to promote secure attachment in typical children (Ainsworth et al., 1978; Bretherton, Biringen, Ridgeway, Maslin, & Sherman, 1989; Fonagy et al., 1991; Koren-Karie, Oppenheim, Dolev, Sher, & Etzion-Carasso, 2002).

Recently, there has been increasing enquiry into caregiver factors within ASD. This has stemmed from research questions around the need to validate the use of traditional attachment classifications in ASD, and also from the recognition of the unique interactive challenges within ASD that may make insightfulness and sensitivity to the child's inner world more challenging for caregivers, or may limit the degree to which children with ASD can perceive and make use of sensitive responding by their caregiver (Slade, 2009).

Studies of parenting sensitivity in ASD have generally indicated, consistent with findings in typically developing children, that children with ASD who have sensitive parents are more likely to be securely attached (Capps et al., 1994; Koren-Karie, Oppenheim, Dolev, & Yirmiya, 2009). One exception to this finding came from a prospective study by van Ijzendoorn and colleagues (2007) who used the Strange Situation (Ainsworth et al., 1978) to study attachment classifications of children with ASD and typically developing children, at two-years of age. Van Ijzendoorn and colleagues reported that security was associated with parent sensitivity only within a typically developing group, and not within the group of children with ASD. In explaining this unexpected

pattern of findings, van Ijzendoorn and colleagues suggested that the social and emotional impairments of children with ASD may interrupt or alter this usual transmission of attachment security from sensitive parent to secure child. Children with ASD may be less able to benefit from sensitive maternal behaviours because of impairments in emotion processing and theory of mind. While this possibility warrants further examination, it should also be noted that, as previously discussed, parenting sensitivity is only one of multiple factors that moderate the development of child attachment security.

Other parental attributes, such as maternal insightfulness into the child's inner world (Hutman, Siller, & Sigman, 2009; Oppenheim et al., 2008; Oppenheim, Koren-Karie, Dolev, & Yirmiya, 2009; Oppenheim et al., 2012), caregiver synchrony during play interaction (Kuhn, 2007; Siller & Sigman, 2002, 2008), emotional availability (Dolev, Oppenheim, Koren-Karie, & Yirmiya, 2009) and responsiveness (Siller, Swanson, Gerber, Hutman, & Sigman, 2014) have been associated with more optimal attachment quality and better developmental outcomes for children with ASD. This is consistent with theoretical notions of attachment (Bowlby, 1969/1982) and empirical findings in typically developing children (Belsky, 1999; Koren-Karie et al., 2002). Thus, from these early childhood studies, it would seem that despite children with ASD exhibiting early-emerging and enduring impairments in emotion processing, social reciprocity and mentalisation, they may continue to benefit from more optimal caregiving in similar ways to children with typical development when it comes to their attachment quality.

Caregivers of children with ASD may have unique experiences within the child-caregiver attachment relationship, and recent research has begun to take this into account. In particular there has been attention on factors that may form unique challenges or barriers to typical functioning within this dyad (Dolev et al., 2009). Parents' resolution to their child's diagnosis (Marvin & Pianta, 1996) has been linked to child attachment security in ASD (Oppenheim et al., 2009, 2012). In explaining these findings, Oppenheim and colleagues suggested that parents who resolve their own feelings of grief or sadness

regarding their child's disability, and are insightful into their child's inner world, are better able to provide their child with a sense of containment and acceptance that promotes the development of security. Hoffman and colleagues (2009) examined the impacts of parenting stress in ASD and found that while parents of children with ASD display significantly higher levels of stress compared to parents of typically developing children, they continued to report emotional closeness with their child. The authors suggested that parenting stressors, while significant, may not compromise the affective quality of the parent-child relationship. In other words, parents may remain emotionally sensitive and responsive to their child despite the unique challenges that they face. While Hoffman and colleagues relied on parents' report of their parenting stress and perceived closeness, Dolev and colleagues (2009) captured parenting qualities more directly by using an observation-based measure of parental emotional availability, alongside parent-report of psychological distress, amongst parents of children with ASD aged two-five years. Parents who reported experiencing more psychological distress also displayed greater levels of parental intrusiveness during parent-child play interactions, suggesting that more distressed parents may provide children with a less optimal style of caregiver interaction. Thus, despite some conflicting findings, available evidence suggests that the emotional qualities of caregivers of children with ASD have implications for the relational experience of their children.

Given that intergenerational transmission of attachment is seen in typically developing dyads (van IJzendoorn, 1995), the attachment style of parents themselves also warrants examination within ASD dyads. While available research is limited, there is evidence suggesting that parents of children with ASD report a similar degree of attachment security within their adult romantic relationships as parents of typically developing children (Karabekiroglu & Rodopman-Arman, 2011; Lau & Peterson, 2011). There is some research exploring the implications of parental internal working models of attachment. Seskin and colleagues (2010) studied attachment representations of parents of children with ASD and found that secure parents showed greater capacity to support

symbolic play and reflective functioning in their children, and had children who exhibited better reciprocal social interaction skills. Karabekiroglu and Rodopman-Arman (2011) conducted a study examining maternal and paternal attachment style and the severity of emotional and behavioural problems in toddlers with ASD. It was found that maternal, but not paternal, attachment avoidance scores on the Adult Attachment Scale (Collins & Read, 1990) were significantly correlated with hyperactivity and irritability scores in children with ASD, as measured by the Aberrant Behaviour Checklist (Aman, Singh, Stewart, & Field, 1985) and internalising and externalising behaviour ratings on the Child Behaviour Checklist (Achenbach, Edelbrock, & Howell, 1987). Direct links between parent attachment style and child attachment security are yet to be explored, but studies of typically developing dyads have clearly established that secure parents are more likely to have secure children (van IJzendoorn, 1995). It has been suggested that this intergenerational transmission of attachment quality warrants specific exploration within ASD, due to the possibility that the social and emotional impairments of children with ASD may interrupt or alter this usual transmission (van Ijzendoorn et al., 2007).

Given the vulnerabilities to stress and mental health problems amongst caregivers of children with ASD, and the interactive challenges posed by children with ASD who may relate to their caregiver in ways that are more challenging, less comprehensible, and less responsive (Dissanayake & Crossley, 1997), it seems ASD dyads face a range of unique challenges to the attuned and secure functioning of the attachment relationship. Indeed, there have been recent calls for greater exploration of parents' subjective experiences of caring for a child with ASD because of the implications this may have for healthy attachment formation in these dyads (Dolev et al., 2009; Siller et al., 2014; Slade, 2009). A better understanding of the caregiver correlates of attachment quality in ASD may pave the way for more targeted, longitudinal research into the antecedents of security in this group, and may also support the development of parent-mediated interventions aimed at promoting security (Dolev et al., 2009; Siller et al., 2014).

## 1.6 SUMMARY AND LIMITATIONS OF PREVIOUS LITERATURE

This literature review presents an emerging picture of attachment in ASD as a complex and multifaceted construct. Research has primarily focussed on early childhood (ages 3-6 years), and has indicated that children with ASD invariably display functional and affective attachments to important caregivers (Dissanayake & Crossley, 1996; Rogers et al., 1991; Shapiro et al., 1987; Sigman & Mundy, 1989) and a majority of these children can be classified as securely attached (Rutgers et al., 2004). Nonetheless, rates of insecurity appear elevated in this group relative to clinical and non-clinical comparison groups (Rutgers et al., 2004), and there may be early-emerging social interactive deficits that make child-caregiver interactions more challenging for caregivers and children (Grzadzinski et al., 2014; Hoppes & Harris, 1990). Beyond this emerging picture, there are areas of conflicting findings and gaps in knowledge that require further evaluation, as well as important theoretical notions in attachment and ASD literature that warrant empirical study.

Beyond establishing the capacity for attachment in ASD and quantifying rates of security, the need to better understand within-group differences in attachment quality has been highlighted recently (Bauminger et al., 2010; Dissanayake & Sigman, 2001; Rogers et al., 1993). A better understanding of the precipitants, correlates, and consequences of attachment quality in ASD would support important theoretical questions of whether attachment relationships develop in the same way for children with ASD compared to typically developing children (Bauminger et al., 2010), and whether attachment quality has the same developmental implications for children with ASD as for typically developing children (Chandler & Dissanayake, 2014; Dissanayake & Sigman, 2001).Contemporary attachment literature has also brought the need to understand atypical neurodevelopmental conditions such as ASD into sharper focus. Early attachment experiences have been increasingly recognised as providing a crucial relational context in which core social and emotional skills are fostered. For children with ASD, who display unique and early-emerging biologically-based deficits in such core skills, unpacking the

interacting attachment-based and ASD-based processes that shape development seems particularly important (Slade, 2009).

There is accumulating evidence to suggest that insecurity may be associated with particular features of ASD, such as autism symptom severity (Naber et al., 2007; Rutgers et al., 2004; van Ijzendoorn et al., 2007) and broader social and cognitive outcomes (i.e. social reciprocity, joint attention; Capps et al., 1994; Hudry et al., 2013; Naber et al., 2008) during early childhood, however limited research exists examining attachment correlates beyond this developmental stage. In light of the abundant literature attesting to the central role for attachment quality in shaping developmental outcomes in typically developing children, and the comparative lack of empirical research exploring attachment correlates in ASD, there is a need to better understand the ways in which attachment quality is related to the unique and heterogeneous impairments that characterise ASD.

An attachment-oriented perspective to viewing ASD, while not intended to suggest that attachment problems underlie the aetiology of the disorder, may be important in contributing to a broadening of the clinical conceptualisation of ASD. An attachment-informed conceptualisation of ASD may be one that takes account of attachment experiences and understands that environmental and biological factors may interact to contribute to the clinical phenotype in ASD, just as they do in typically developing children. A clearer picture regarding the correlates of attachment quality in children with ASD may highlight attachment security as an important environmental factor in predicting the heterogeneous presentation of ASD impairment. In turn, such findings could have implications for the planning of holistic early-intervention programs for children diagnosed with ASD, or even those determined to be at-risk of developing ASD.

Only a small body of research has looked beyond early childhood, to later developmental stages such as middle childhood, despite considerable theoretical basis for doing so. Middle childhood may represent a key point of developmental divergence for children with ASD, as attachment relationships become more cognitively and affectively

complex, and place greater onus on the child to play an active role in getting their attachment needs met. The inborn impairments in emotion processing and understanding for children with ASD may have increasing impacts upon the child-caregiver attachment relationship as children enter middle childhood. Furthermore, the study of high-functioning children (IQ>70) during middle childhood would allow for a more direct assessment of internal working models of attachment, as the ASD phenotype could be isolated from any role that intellectual disability may play.

Available research in middle childhood has primarily relied on questionnaire-based measures and has indicated similar levels of attachment security between ASD and non-ASD groups (Bauminger et al., 2010; Chandler & Dissanayake, 2014; Wu et al., 2015). Of the few studies that have examine the developmental correlates of attachment in middle childhood, these studies have tended to explore specific aspects of ASD functioning, such as a specific social domain (i.e. friendship quality) or trait (i.e. gelatobphobia), rather than taking a broader look at the triad of impairments that characterise the ASD phenotype. Furthermore, available studies have at times utilised measures that do not directly tap internal working models of attachment, instead measuring related constructs, such as parents' perceptions of closeness (Baker et al., 2011). Finally, sole reliance on quantitative, questionnaire-based measures may contribute to a reductionist approach, which fails to capture the more complex, nuanced individual differences in attachment quality that might only be captured through the use of qualitative methodology (Dwyer, 2005). A thorough quantitative and qualitative exploration of the broad developmental correlates of attachment quality in ASD during middle childhood has not yet been attempted, and may be important in shedding light on the intersection of these complex developmental processes.

## 1.7 RESEARCH AIMS AND HYPOTHESES

In accordance with the identified gaps in the existing field of research, the current thesis sets out four primary aims. These are discussed below, along with specific research hypotheses.

### 1.7.1 Aim 1: To explore the quality of child-caregiver attachment relationships in children with ASD during middle childhood

This aim was pursued within the first (Chapter 2) and second (Chapter 3) empirical studies presented herein. Within the first empirical paper, using qualitative parent interview methodology to examine child-caregiver attachment relationships amongst children with ASD and typically developing children, several hypotheses were proposed;

a) That children with ASD will be described as exhibiting a number of normative attachment behaviours that do not depend upon sophisticated theory of mind, emotion processing, or mentalisation skills, such as having a clearly discriminated attachment figure and displaying increased proximity seeking in situations of stress or threat
b) That children with ASD will be described as exhibiting certain atypical or disordered attachment behaviours, relative to typically developing children, in more cognitively and affectively complex aspects of attachment system functioning. Specifically, children with ASD are expected to be described as experiencing difficulty using affect-based strategies (i.e. social referencing, sharing affect) within their attachment relationship to support their sense of security, and may be overly reliant upon behavioural strategies (i.e. proximity maintenance).

Within the second empirical study, using quantitative child-report questionnaire methodology, the following hypothesis was proposed;

a) That children with high-functioning ASD will self-report similar levels of attachment quality compared to typically developing children.

### 1.7.2 Aim 2: To investigate the relationship between attachment quality and autism symptoms, across social, communication, and repetitive behaviour domains

This aim was pursued in the third empirical study (Chapter 4), and the following hypotheses were proposed;

a) That more optimal attachment quality (i.e. more security, less use of insecure relational coping strategies) will be associated with less severe autism symptoms .

### 1.7.3 Aim 3: To examine the relationship between attachment quality and common comorbid emotional and behavioural problems in ASD

This aim was pursued in the third empirical study (Chapter 4), and the following hypotheses were proposed;

a) That more optimal attachment quality (i.e. more security, less use of insecure relational coping strategies) will be associated with lower levels of anxiety and fewer problems with inattention, hyperactivity/impulsivity, and defiance/aggression.

### 1.7.4 Aim 4: To examine the relationship between attachment quality and caregiver factors, including parenting stress, psychological distress, and romantic attachment style

This aim was pursued in the second empirical paper (Chapter 3), and the following hypotheses were proposed;

a) That caregivers of children with ASD will report greater psychological distress and parenting stress, but similar romantic attachment styles within their own adult relationships, compared to caregivers of typically developing children.
b) That caregiver psychological distress, parenting stress, and attachment insecurity will be associated with poorer attachment quality in children with ASD and typically developing children.

# CHAPTER TWO

## A QUALITATIVE STUDY OF ATTACHMENT RELATIONSHIPS IN ASD DURING MIDDLE CHILDHOOD

## 2.1 PAPER COMMENTARY

Chapter Two presents a paper that has been submitted for publication in *Attachment and Human Development*. This paper has been formatted (including spellings) to the specific requirements of the journal. The following is a copy of the manuscript that is under review. Page and table numbers have been re-numbered for the ease of reading and to provide consistency throughout the thesis.

The aim of this study was to explore the qualitative features of child-caregiver attachment relationships for children with ASD during middle childhood. This study extended upon previous research by applying qualitative methodology to an area of study that has principally featured the use of quantitative methodology with a primary focus on applying attachment classifications to children and comparing classifications between groups (Rutgers et al., 2004). Furthermore, the study broadens current knowledge regarding child-caregiver attachment relationships in ASD by examining children during middle childhood (7-12 years). Previously, research examining attachment behaviours in ASD has primarily focussed on young children with ASD (i.e. 3-6 years of age). Child-caregiver attachment relationships remain important for children into and beyond middle childhood, however there has been limited study of the qualitative nature of these attachment relationships for children with ASD during middle childhood (Bauminger et al., 2010; Chandler & Dissanayake, 2014; Wu et al., 2015). In addressing these gaps in previous research, the current study sought to provide a more nuanced and holistic view of the child-caregiver attachment relationship in ASD during middle childhood, and sought to contribute to future directions in the field of attachment-ASD research.

Submitted Paper:

Keenan, B.M., Newman, L.K., Gray, K, & Rinehart, N.J. (Submitted). A qualitative study of attachment relationships in ASD during middle childhood. *Attachment and Human Development*.

## 2.2 DECLARATION FOR THESIS CHAPTER TWO

**Declaration of the Candidate:** In the case of Chapter Two, the nature and extent of my contribution to the work was the following:

| Nature of contribution | Extent of contribution |
|---|---|
| Formulation of experimental design (in consultation with supervisors), review of the relevant literature, acquisition of ethics approval, recruitment and testing of participants, data analysis, and writing of paper. | 70% |

The following co-authors contributed to the work:

| Name | Nature of contribution |
|---|---|
| Louise Newman | Consultation in formulation of experimental design, data analysis, discussion of ideas expressed in manuscript and critical review of manuscript. |
| Kylie Gray | Consultation in formulation of experimental design, discussion of ideas expressed in manuscript and critical review of manuscript. |
| Nicole Rinehart | Consultation in formulation of experimental design, discussion of ideas expressed in manuscript and critical review of manuscript. |

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the candidate and co-authors' contributions to this work.

**Candidate's Signature:** [redacted] **Date:** 11/04/16

**Main Supervisor's Signature:** [redacted] 11/04/16

## 2.3 ABSTRACT

Although research has indicated that children with Autism Spectrum Disorder (ASD) display normative attachment behaviours, to date there has been limited qualitative research exploring these relationships. This study aimed to describe qualitative features of the child-caregiver attachment relationship in children with ASD. Primary caregivers to 26 children with ASD (aged 7-14 years) and 23 typically developing children (aged 7-13 years) were administered the Disturbances of Attachment Interview (Smyke & Zeanah, 1999) to elicit descriptions of children's attachment behaviours. Thematic analysis of interview transcripts indicated that while children with ASD demonstrated a range of normative attachment behaviours, they displayed impairments in the use of the caregiver as a secure base and co-regulating agent. ASD-associated impairments in emotion processing, sharing/reciprocity, and emotion co-regulation, as well as the caregiver's experience, were important in understanding attachment relationships in ASD. Findings highlight the need to consider the bidirectional nature of the attachment relationship in ASD.

## 2.4 INTRODUCTION

Young children with Autism Spectrum Disorder (ASD) are known to display a range of normative attachment behaviours (Dissanayake & Crossley, 1996; Rogers, Ozonoff, & Maslin-Cole, 1991; Sigman & Mundy, 1989; Sigman & Ungerer, 1984). Beyond this, however, there is little available qualitative information regarding the nature of attachment relationships for these children, who display unique and pervasive deficits in social relatedness, emotion recognition and understanding, and intersubjectivity (American Psychiatric Association, 2013; Volkmar, Lord, Bailey, Schultz, & Klin, 2004). With increasing recognition within attachment literature of the importance of the attachment relationship in fostering a range of core social and emotional capacities (Feldman, Greenbaum, & Yirmiya, 1999; Kochanska, Aksan, & Carlson, 2005; Schore, 1996, 2001a, 2001b, 2014) that underlie much of later child development in typical populations (Bohlin & Hagekull, 2009; Bohlin, Hagekull, & Rydell, 2000; Fearon, Bakermans-Kranenburg, van Ijzendoorn, Lapsley, & Roisman, 2010), there has been recent discussion of the need to better understand how attachment processes might interact with, or be shaped by, early-emerging and biologically-based social and emotional impairments seen in ASD (Sivaratnam, Newman, Tonge, & Rinehart, 2015; Slade, 2009). Understanding the degree to which children with ASD can flexibly and resourcefully relate to their attachment figure beyond early childhood, and the factors associated with this, may have important implications in contributing to a more holistic conceptualisation of the complex clinical picture of ASD, and follows a similar trend in empirical research in other neurodevelopmental disorders such as Attention Deficit Hyperactivity Disorder (Clarke, Ungerer, Chahoud, Johnson, & Stiefel, 2002; Schmidt Neven, Anderson, & Godber, 2002).

Attachment refers to the affective bond formed between an infant and caregiver during the first year of life (Ainsworth et al., 1978; Bowlby, 1969/1982). Attachment theory proposes that infants have an innate drive to seek and maintain proximity to an

important caregiver, particularly in times of stress or threat (Bowlby, 1969/1982). The attachment relationship not only promotes infant survival, but provides a context in which the infant receives essential early scaffolding of their emotional experiences, develops an understanding of emotional interactions and relationships, and builds self-regulation capacities, while being supported to explore and learn from the environment. In this way, infants use the caregiver as a *secure base* from which to explore the world, and a *safe haven* to return to in times of threat. A balance of exploration and proximity seeking is seen as ideal and indicative of a secure attachment to the caregiver (Ainsworth, Blehar, Waters, & Wall, 1978). Importantly, the attachment relationship provides a relational context in which the infant first begins to learn about mental states, and the quality of interaction and the parent's capacity to understand the child shapes the degree to which children develop emotion processing, intersubjective and social information processing skills (Fonagy, Steele, Steele, Moran, & Higgitt, 1991). The child's capacity to attend to the caregiver is important, as is the caregiver's capacity to understand the child's behaviour in terms of underlying mental states. Both of these processes may be compromised in ASD (Sivaratnam et al., 2015; Slade, 2009).

Historically, ASD was described by Kanner (1943) as a disorder characterised by a lack of attachment, and later by Bettelheim (1967) as a disorder of pathological attachment. These **harmful early suggestions** have long since been refuted by substantial empirical evidence demonstrating that young children with ASD show clear behavioural signs of discriminated attachments to caregivers; they approach, look at, and face their caregiver more often than a stranger, display distress on separation, and react upon reunion (Dissanayake & Crossley, 1996; Rogers et al., 1991; Sigman & Mundy, 1989; Sigman & Ungerer, 1984). Nonetheless, young children with ASD show atypical social behaviours within their attachment relationships, including less frequent looking, smiling and showing behaviours (Dissanayake & Crossley, 1996), reduced responsiveness and involvement in play interactions (van Ijzendoorn et al., 2007; Willemsen-Swinkels, Bakermans-Kranenburg, Buitelaar, van IJzendoorn, & van Engeland, 2000), fewer

displays of pleasure, difficulty being soothed, and atypical reunion behaviour (Grzadzinski, Luyster, Spencer, & Lord, 2014). Young children may also show increased rates of insecurity of attachment (Rutgers, Bakermans-Kranenburg, van IJzendoorn, & van Berckelaer-Onnes, 2004), and this insecurity has been associated with the severity of children's autistic impairment (Naber et al., 2007; van Ijzendoorn et al., 2007). Caregivers may also perceive differences in the parent-child relationship, with Hoppes and Harris (1990) finding that parents of children with ASD perceive their child as less attached to them, and report feeling less rewarded in their interactions with their child, compared to caregivers of children with Down Syndrome. However, studies conducted in middle childhood suggest that children themselves do not report subjective differences in attachment quality, compared to typically developing children (Bauminger, Solomon, & Rogers, 2010; Chandler & Dissanayake, 2013; Wu et al., 2015). Thus, the clinical picture of attachment quality in ASD warrants further clarification.

Understanding attachment in ASD beyond early childhood is a theoretically important, yet neglected, area of study (Chandler & Dissanayake, 2013; Sivaratnam et al., 2015; Yirmiya & Sigman, 2001). The attachment relationship becomes increasingly cognitively sophisticated with age, and depends upon the child's ability to infer their caregiver's mental states (i.e. moods, intentions, goals) in order to more flexibly meet their attachment needs (Ainsworth, 1973; Bowlby, 1969/1982). Since children with ASD are often specifically impaired in skills that underlie this capacity for mentalisation (i.e. theory of mind, emotion recognition and understanding) some have suggested that security may be more difficult to achieve in ASD (Rogers et al., 1991; Rogers, Ozonoff, & Maslin-Cole, 1993), particularly beyond early childhood (Yirmiya & Sigman, 2001). Dissanayake and Sigman (2001) suggested that children with ASD may use more effortful, cognitive strategies in their attachment relationship, to compensate for their impairments in more intuitive social and emotional responsiveness. The study of attachment in ASD during middle childhood has primarily relied upon the use of self-report, questionnaire-based measures (Bauminger et al., 2010; Chandler & Dissanayake, 2013; Wu et al., 2015) to

quantify rates of security and insecurity in these children. There is a need for a more nuanced, qualitative exploration of these attachment relationships beyond early childhood.

### 2.4.1 The Current Study

The current study aims to explore qualitative aspects of the child-caregiver attachment relationship amongst children with ASD during middle childhood (7-12 years of age), and compare and contrast this to child-caregiver attachment relationships with typically developing children. It is hypothesised that children with ASD will display a number of normative attachment behaviours that do not depend upon sophisticated theory of mind, emotion processing, or mentalisation skills, such as having a clearly discriminated attachment figure and displaying increased proximity seeking in situations of stress or threat. Secondly, it is hypothesised that children with ASD will display certain atypical or disordered attachment behaviours in more cognitively and affectively complex aspects of attachment system functioning. Specifically, children with ASD are expected to experience difficulty using affect-based strategies (i.e. social referencing, sharing affect) within their attachment relationship to support their sense of security, and may be overly reliant upon behavioural strategies (i.e. proximity maintenance).

## 2.5 METHOD

### 2.5.1 Participants

Twenty six children with a DSM-IV diagnosis of Autistic Disorder (n = 14) or Asperger's Disorder (n = 12), hereafter referred to collectively as ASD (M = 10.59, SD = 2.12 years), and 23 typically developing children (M = 10.50, SD = 1.77 years), and their primary caregiver participated in the study. All children had a FSIQ of 70 or above (NB: FSIQ could not be calculated for 2 participants with ASD due to behavioural difficulties during

testing, however both had a VCI and PRI in the Low Average or Normal range so were therefore retained in the sample). Clinical diagnosis of ASD was confirmed for all children with ASD through review of diagnostic assessment reports from a paediatrician and/or psychologist. Typically developing children had no history of parent-reported developmental delay.

Children with ASD and their caregivers were recruited via an existing research study, online noticeboards, and contact with community groups across metropolitan and regional Victoria and New South Wales. Typically developing children and their caregivers were recruited through Victorian public schools and online noticeboards. Primary caregivers were identified for each child by asking "*who spends the most time caring for the child?*" In instances of 50:50 shared care, the participating primary caregiver was self-nominated based on convenience. Accordingly, 44 interviews were conducted with mothers, 3 interviews with grandmothers, 1 with a step-mother, and 1 with a father. It should be noted that several sibling pairs participated in the study; two pairs of siblings within the ASD group, and 4 sibling pairs within the typically developing group. Therefore, some caregivers undertook two interviews, resulting in unequal total numbers of caregivers (n = 43) and children (n = 49) who participated.

## 2.5.2 Measures

### 2.5.2.1 Cognitive Functioning

Children's cognitive ability was assessed using the Wechsler Intelligence Scale for Children, fourth edition, Australian version (WISC-IV; Wechsler, 2005) for children with ASD, and the Wechsler Abbreviated Scales of Intelligence, second edition (WASI-II; Wechsler, 2011) for typically developing children. Where children had recently (<2 years) undertaken a cognitive assessment separate to the current study, those scores were used. In the current study, the full scale IQ score (FSIQ), verbal comprehension index (VCI),

and perceptual reasoning index (PRI) were examined in order to clarify whether samples of children were cognitively similar or not, since IQ has been associated with attachment quality (Rutgers et al., 2004).

#### 2.5.2.2 Autism Symptoms

The Social Responsiveness Scale (SRS; Constantino, 2002) is a 65-item parent-report measure of autism symptoms, and was used to rule out undetected autism in the typically developing group. Raw scores are converted to T-Scores with a T score of 60 reflecting some elevation in autism symptoms, and a T score of 70 reflecting a clinical elevation in autism symptoms. The SRS Total score was examined in the current study. The scale has demonstrated good psychometric properties (Constantino et al., 2003; Constantino & Gruber, 2005).

#### 2.5.2.3 Socioeconomic Status

Socioeconomic status (SES) was estimated for each child based on residential postcode, using the Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD) composite from the Australian Bureau of Statistics Socio-Economic Index for Areas data (Australian Bureau of Statistics, 2013).

#### 2.5.2.4 Attachment Behaviour

Parental descriptions of child-caregiver attachment behaviours were elicited using the Disturbances of Attachment Interview (DAI; Smyke & Zeanah, 1999; see Appendix A). The DAI is a 12-item semi-structured caregiver interview that explores signs of disturbed or disordered attachment in the child. Each item is rated 0 (symptom definitely not present), 1 (symptom sometimes/somewhat present), or 2 (symptom definitely present). Four scales

(Non-Attachment/Inhibited, Non-Attachment/Disinhibited, Indiscriminant Behaviour, and Secure Base Distortions) can be derived by summing different sets of items. The Non-Attachment/Inhibited scale comprises the first five items and reflects signs of an emotionally-withdrawn style of attachment disturbance (e.g. lack of a discriminated attachment figure (Item 1), failure to preferentially seek comfort from an available caregiver (Item 2), failure to respond to comfort from a caregiver (Item 3), lack of emotional reciprocity (Item 4), and emotion dysregulation (Item 5). The Non-Attachment/Disinhibited scale sums item 1 with items 6-8, and examines behavioural signs of a disinhibited or indiscriminate style of attachment disturbance (e.g. failure to check back with caregiver in an unfamiliar environment (Item 6), lack of reticence in the presence of unfamiliar adults (Item 7), and willingness to go off with a stranger (Item 8). The Indiscriminant Behaviour scale comprises items 6-8 and gives a measure of social indiscriminance without regard to whether the child has a discriminated attachment figure. The Secure Base Distortion scale (items 9-12) examines a range of behaviours possibly reflecting disturbances in the use of a caregiver as a secure base (i.e. self-endangering behaviours (Item 9), excessive clinginess (Item 10), hypervigilance towards caregiver (Item 11), and caregiver role-reversal (Item 12).

The DAI was originally developed to explore signs of Reactive Attachment Disorder (RAD) in severely deprived and/or institutionalised samples of children, and has shown strong psychometric properties in this context, including good internal consistency, inter-rater reliability, and temporal stability (Gleason et al., 2011; Smyke, Dumitrescu, & Zeanah, 2002; Zeanah et al., 2004; Zeanah, Smyke, & Dumitrescu, 2002). The DAI has shown convergence with other measures of RAD (Boris et al., 2004; Chisholm, 1998; Gleason et al., 2011; O'Connor, Rutter, & English Romanian Adoptees Study Team, 2000), and scores show divergence from measures of other common domains of impairment (e.g. aggression, language development and behavioural stereotypies; Smyke et al., 2002). The DAI has also demonstrated validity within other contexts, such as with non-institutionalised foster children (Jonkman et al., 2014; Oosterman & Schuengel, 2008)

and children with developmental delay (Giltaij, Sterkenburg, & Schuengel, 2015), during both early childhood (Smyke et al., 2002) and into middle childhood (Giltaij et al., 2015; Jonkman et al., 2014; Oosterman & Schuengel, 2008), and has been used to explore sub-clinical signs of attachment disturbance (Giltaij et al., 2015). The DAI was used in the current study as a qualitative tool to elicit descriptions of children's attachment behaviours. Accordingly, qualitative themes emerging from administration of the DAI are the focus of the Results section. In addition, quantitative scores on the DAI were also calculated by the second author who is trained in DAI scoring, in order to provide a description of the sample and allow comparison to existing research..

### 2.5.3 Procedure

The study received ethics approval from the Monash University Human Research Ethics Committee and the Victorian Department of Education and Early Childhood Development Ethics Committee. Fully informed written consent was obtained from caregivers prior to participation. Interviews, questionnaires and cognitive assessments were conducted in a quiet, private setting, in a location of convenience, including university premises, the child's school, or the caregiver's home. The interviews were audio-recorded and transcribed verbatim by the first author. The transcripts were then scored by two trained coders (first and second authors), with discrepancies resolved through discussion leading to a consensus code for each item. Finally, thematic analysis of transcripts was conducted by the first and second authors.

### 2.5.4 Data Analysis

Both quantitative and qualitative analyses were used to examine the current data. Quantitative analysis comprised independent samples *t*-tests to compare demographic, IQ scores, and DAI subscale scores across ASD and typically developing groups. Qualitative

analysis comprised thematic analysis of semi-structured interview transcripts according to an approach outlined by Braun and Clarke (2006). This approach was chosen because its exploratory nature best allowed for broad examination of the research aims outlined for the current study. In the first step, outlined by Braun and Clarke, audio recordings of interviews were transcribed verbatim by the first author, and the first and second authors read the transcripts in order to develop familiarity with content, note initial impressions, and identify contrasts between ASD and TD groups. During this process quantitative scoring of the DAI was conducted by the second author who is trained in DAI coding. For the second step, the first author identified and attached general codes to transcripts in a systematic way using NVivo 10 software (QSR International, 2012). Initial coding was 'theory-driven' in that codes were formed around the 12 items on the DAI. Next, the researchers met to discuss these general codes and emerging themes which cut across DAI items and/or contrasted between the two groups (step 3). Codes were then developed into a thematic map by the first author, in consultation with the second author (step 4), and definitions were given to key themes (step 5). Lastly, sections of transcripts which clearly highlighted key themes or noteworthy findings were identified, and identified themes were related back to the key research questions and over-arching literature in order to organise qualitative findings in a way that clearly addressed the study aims.

## 2.6 RESULTS

### 2.6.1 Sample Characteristics

Descriptive statistics for sample demographics are presented in Table 2.1. There were no between-group differences in terms of child age, gender, number of children in family, socioeconomic status, VCI, or PRI, however typically developing children had significantly higher FSIQ ($t(41) = -2.34$, $p = .02$), and children with ASD had higher SRS Total scores ($t(43) = 8.94$, $p < .001$). No children in the typically developing group exceeded the cut-off

(T ≥ 70) on the SRS, confirming that no children in the typically developing group presented with clinically significant autism symptoms.

Table 2.1

Sample demographics, Mean (Standard Deviation)

| | ASD<br>N = 26 | TD<br>N = 23 |
|---|---|---|
| Age, years | 10.59(2.12) | 10.50(1.77) |
| SES | 1012.92(48.00) | 1009.65(79.49) |
| Children in Family | 2.00(0.98) | 2.22(0.74) |
| FSIQ | 97.75(14.57) † | 107.91(11.36) |
| VCI | 98.88(17.20) | 106.48(9.74) |
| PRI | 102.27(13.58) | 106.83(13.83) |
| SRS (total) score | 93.46(29.27) | 27.09(16.86) |

SRS, Social Responsiveness Scale, † N = 24

DAI subscales scores across the two groups are presented in Table 2.2. It should be noted that subscales scores for one caregiver in the ASD group could not be coded for Non-Attachment/Disinhibited, Indiscriminant Behaviour, and Secure Base Distortions subscales due to uncodeable responses being provided. There were significant between-group differences on all subscales of the DAI, with caregivers of children with ASD reporting significantly greater levels of behaviours consistent with attachment disturbance.

Table 2.2

*DAI Subscale Scores across ASD and TD groups*

| | ASD | | | TD | | | |
|---|---|---|---|---|---|---|---|
| | n | M | SD | n | M | SD | *t* statistic |
| Non-Attachment/Inhibited (DAI items 1-5) | 26 | 3.31 | 1.26 | 23 | 0.17 | 0.49 | -11.85** |
| Non-Attachment/Disinhibited (DAI 1, 6-8) | 25 | 1.88 | 1.99 | 23 | 0.17 | 0.49 | -4.01** |
| Indiscriminant Behaviour (DAI 6-8) | 25 | 1.76 | 1.96 | 23 | 0.13 | 0.46 | -3.88** |
| Secure Base Distortions (DAI 9-12) | 25 | 1.16 | 1.37 | 23 | 0.35 | 0.98 | -2.34* |

** p < .05; ** p < .001; DAI, Disturbance of Attachment Interview*

### 2.6.2 Thematic Analysis

Thematic analysis revealed several themes that were deemed to have particular importance in understanding the behaviour and experience of ASD dyads. These themes are grouped accordingly; normative attachment behaviours, inconsistent use of the caregiver as a secure base, ASD-associated impairments to attachment system function, and the caregiver's experience, and are presented below.

#### 2.6.2.1 Normative Attachment Behaviours

All caregivers of children with ASD described their child as displaying a range of normative attachment behaviours that were consistent with reports by caregivers of typically developing children, and reflected behavioural signs of these children having a discriminated attachment to at least one specific caregiver. Behaviours described included

children making clear and preferential approaches to a specific caregiver, showing a preference for their attachment figure over a stranger, displaying distress upon unexpected separation in a novel environment, and making approaches to a caregiver in times of stress or threat. Illustrating this, one caregiver to a 13-year-old boy with ASD described him as making preferential approaches to her when hurt or upset, "*If he's upset he probably comes to me more for comfort than anyone else, he knows that I understand what comfort he needs, whether he's physically hurt or emotionally hurt*". The emotional component of the attachment relationships in ASD was also highlighted by a caregiver of an 11-year-old boy with ASD who reported, "*He comes to me when he's worried, he wants to sit next to me, he likes to hold my hand*".

Also similar to reports by caregivers of typically developing children were descriptions of children with ASD as displaying increased attachment behaviours in times of physical injury or distress. Children with ASD were often described as actively seeking caregiver proximity following physical injury or emotional upset (n = 20, 77%), and many would maintain proximity to the caregiver in stressful environments such as an unfamiliar environment or when in the company of an unfamiliar adult (n = 16, 62%). These reports were similar to those made by parents of typically developing children, who also often described children as seeking (n = 19, 83%) and maintaining (n = 16, 70%) proximity with stress, suggesting that children with ASD display normative activation of their attachment system in response to stress, and that they attempt to use their caregiver as a source of affect co-regulation and safety.

#### 2.6.2.2 Inconsistent Use of the Caregiver as a Secure Base

Children with ASD were described as displaying unique patterns of behaviour that reflected impairment in their ability to use the caregiver as a secure base or safe haven. Many children with ASD were described as displaying significant anxiety in unfamiliar places or in the company of unfamiliar adults (n = 21, 81%). This acute anxiety led some

children to engage in excessive safe haven behaviour (n = 11, 42%). For instance, one caregiver to an 11 year-old boy with ASD reported, "*He just sticks in my personal space*". Another caregiver described her child, also an 11-year old male with ASD, as seeking emotional comfort through close physical contact with the caregiver in public places;

> *"We could just be walking down the street and he'll want to hold my hand, or wrap his arm around my… I mean, my arm would be straight and he'll link his arm in, that kind of stuff. So we could be anywhere, anytime, doing anything really, and he'll want that reassurance and comfort".*

These descriptions suggest that while not all children with ASD showed excessive anxiety to novelty, those who did often sought safety through maintaining close physical proximity to their caregiver. This close proximity seeking appeared to result in some children with ASD experiencing fewer opportunities for developmentally-appropriate exploration and learning from their environment.

Children with ASD were often described as showing inconsistent secure base behaviours in relational in their caregiver when in novel environments. Caregivers of children with ASD frequently described their children as wandering off in unfamiliar settings (n = 22, 85%), and this was described both as an active, purposeful behaviour (i.e. running off towards an interest or away from a threatening stimuli), and as an absent-minded behaviour (i.e. forgetting to look where the caregiver is and continuing to explore). Furthermore, children were often described as failing to check back after a period of exploration (n = 10, 38%). When asked whether her child would check back with her in unfamiliar environments, one caregiver to an 8 year-old girl with ASD reported, "*No, she's more likely to just go off and explore. She'll just decide she's going to wander and off she'll go*". It was also noted that caregivers of children with ASD rarely described their child as using social referencing of the caregiver to gain social information in socially ambiguous settings (n = 2, 8%). This was in contrast to caregivers of typically developing

children who described social referencing as a more typical manner of behaving for their child (n = 13, 57%). Despite frequent wandering off and failing to check back, many children with ASD were still described as displaying distress upon realising their separation from their caregiver (n = 24, 92%). This suggests that while proximity to their caregiver was important to their sense of safety, these children with ASD were often ineffective at consistently maintaining or monitoring this.

Some children with ASD were described as displaying significant socially indiscriminant behaviour when interacting with unfamiliar adults (n = 11, 42%). This behaviour seemed to be driven by the child's special interest, leading children to be overly familiar with an adult when talking about a special interest, or approaching an unfamiliar adult in order to gain access to a special interest. For instance, when describing her child's behaviour around unfamiliar adults, one caregiver of a 12-year old boy with ASD reported;

> *"He loves them, he loves the chance to talk to people, and tell them about his interests, and ask them if they share his interests. He's not fazed at all by meeting new people. He's quite chatty, he will initiate conversation".*

In addition to children being described as talkative and friendly with strangers, other caregivers reported children having poor physical boundaries with strangers (i.e. touching, "invading their personal space") if a stranger had in their possession something of interest to the child. Other caregivers to children with ASD described poor awareness of dangers and a lack of normative reticence with unfamiliar adults as underlying their willingness to approach and engage with strangers. These descriptions offered by caregivers suggest that children with ASD display social indiscriminance which is most commonly motivated either by the child's special interest, or the child's inability to appreciate interpersonal risks. Importantly, indiscriminance with the purpose of fulfilling an attachment need was not described within the ASD group. In contrast, social indiscriminance was described in

three typically developing children (13%), and descriptions of these behaviours ranged from a caregiver regarding their child as "too trusting" of strangers, to a more pervasive pattern of over-familiarity with strangers in which the child sought attachment needs from unfamiliar adults.

#### 2.6.2.3 ASD-Associated Impairments to Attachment System Function

In discussing the child-caregiver attachment relationship, caregivers highlighted several areas of impairment that are common to ASD and impacted upon the functioning of the attachment system. These were; impaired affect processing, poor reciprocity and sharing, and affect dysregulation, and are discussed below.

##### *2.6.2.3.1 Impaired Affect Processing*

Caregivers of children with ASD frequently described their child as showing affect processing impairments across domains of emotion monitoring, recognition and understanding, which adversely impacted upon the cohesiveness of the dyad. Children with ASD were described as failing to consistently monitor their caregiver's mood states (n = 13, 50%), with caregivers often suggesting that their child was not aware and not interested in how they were doing. Illustrating this, when a caregiver was asked whether her 10-year old boy with ASD knew when she was sad, mad or upset, she stated, "*No, he couldn't really care (laughs)*". Another caregiver to an 8-year-old boy with ASD responded, "*No I don't think so (laughs), not very often, I mean, he can sometimes pick something up spontaneously, but by and large life is primarily about him and what he's doing, and people are a bit tangential to it*". These descriptions also capture a sense of ego-centricity that was described by many caregivers of children with ASD (n = 19, 73%). When asked whether their child knows how they are feeling, many caregivers of children with ASD gave emotive responses; they laughed or scoffed at the suggestion, or they stated with conviction that their child does not seem to care. Caregivers often perceived a lack of emotional attunement or empathy from their child, and that this was an emotionally-

laden experience for them. These responses were in contrast to reports of caregivers of typically developing children who more frequently described their child as being aware of their caregiver's mood, despite them not needing to actively watch their caregiver or be preoccupied by this.

Poor emotion recognition and understanding was reported frequently by caregivers of children with ASD (n= 19, 73%). Many stated that their child would recognise extreme and overtly expressed emotions, such as anger (when accompanied by yelling) or sadness (when accompanied by crying), but would fail to notice or comprehend more subtle emotions. For instance, one caregiver of a 13 year-old boy with ASD stated;

> *"He's getting better at reading people. He'd probably understand happy, sad, angry, maybe frightened, so there's a more limited range of emotions that he understands than most people, he doesn't get the subtleties of most things, but he does understand the basic ones".*

These descriptions are in contrast to those given by caregivers of typically developing children, who more commonly described their child as noticing and comprehending a wide range of emotions.

#### *2.6.2.3.2 Poor Reciprocity and Sharing*

All caregivers of children with ASD described their children as displaying some sort of deficit in reciprocal communication when interacting with them. This was discussed by some caregivers in terms of children failing to spontaneously discuss thoughts, feelings or events of the day (i.e. caregivers having to 'pry' details from the child; n = 22, 85%). This is illustrated by one caregiver when asked whether her 8-year old daughter shares things with her;

> "Very rarely, she's starting to a bit more now, but it's still very rare. It's a rare occasion that you'll get too much out of her, without trying to get more information out of her. You know, sometimes she just won't want to talk anymore, she'll just say 'I don't want to talk'".

Some caregivers spoke of children having an ego-centric style of communication in which they were readily engaged in conversations reflecting their own special interests but these conversations were characterised by narrow subject range and minimal reciprocity (i.e. "talking at" caregiver; n = 17, 65%). This is illustrated in a description offered by a caregiver of an 8-year-old boy with ASD when asked whether the child will share and engage reciprocally in conversation, "*He'll definitely tell you, it tends to be unedited, it'll just come out, and it is definitely all about him. You're just there to listen*". Caregivers of typically developing children also described their children as often preferring to talk about their own interests, however their descriptions reflected a greater flexibility and willingness in the child to volunteer information, share thoughts, feelings and events of the day, and ask questions of their caregiver in a more spontaneous and reciprocal manner.

#### *2.6.2.3.3 Impaired Emotion Co-Regulation*

Caregivers of children with ASD often described their child as having difficulty accepting and using their caregiver as a source of emotional co-regulation. When asked to describe their child's mood, caregivers of children with ASD frequently described significant mood lability (n = 20, 77%) that was more extreme and more frequent than judged as typical given the child's age. Most commonly described were problems with significant anxiety (n= 13, 50%), sadness (n= 9, 35%), or anger (n= 6, 23%). Some caregivers who discussed mood dysregulation also described children with ASD as having difficulty making use of

the co-regulation provided by their caregiver (n= 16, 62%), such that they would stay dysregulated for a longer period of time, or they would need to regulate away from the caregiver. This co-regulation difficulty is illustrated in a statement by one caregiver, when asked whether her child (ASD, 11-year old, male) accepts her comfort;

> *"He accepts it but he just talks, and talks and talks. He can't just talk and go 'oh I feel better now', you know, he's got to explain over and over again why he's upset and try to process the emotions out loud, he doesn't really… yeah he can't just be upset and say 'I feel crappy' and that's the end of it. It's got to be talked about".*

Other caregivers discussed the challenges in providing co-regulation in a manner that the child will tolerate and accept, such as one caregiver who noted that her child (ASD, 13 year-old, male) sometimes needs to regulate away from her;

> *"I think if he was upset the last thing I would do, you know, when he's agitated, the last thing I would do would be touch him. Generally I'd sit next to him or opposite him, until he calmed down a bit. Sometimes it would be maybe getting him to just have a walk around might be better for him".*

Thus, it appears that aspects of ASD, such as mood lability, perseveration, cognitive inflexibility, and sensory sensitivities, may impede children's capacity to accept comfort and co-regulation in a way that caregivers would intuitively provide this comfort, leading ASD dyads to find alternate ways to manage this. The reports of caregivers of children with ASD contrasted with reports from caregivers of typically developing children who rarely described significant emotional lability (n = 4, 17%), and described their child as using their caregiver in more typical ways (i.e. a cuddle, applying Band-Aid, or talking) to

help them regulate their emotional state and return to equilibrium within what they perceived to be a normal time frame (n= 18, 78%).

#### *2.6.2.3.4 The Caregiver's Experience*

Caregivers of children with ASD described a range of unique experiences within their caregiving role, compared to those reported by caregivers of typically developing children. Caregivers of children with ASD often reported experiencing significant emotional distress associated with their parenting role (n = 11, 42%). Caregivers often associated their stress with challenging behaviours of their child, including their child's unpredictable behaviour and the child's apparent lack of empathy or responsiveness to their emotional state.

Caregivers who reported difficulties understanding or predicting their child's behaviour (n = 15, 58%), often linked this to the fact that their child's behaviour seemed inconsistent and contradictory. For some caregivers, this was discussed in the context of their child's response to physical injury. Some caregivers noted that sometimes their child would respond with a high level of distress following a minor injury, but signal no distress following a more significant injury. For instance, one caregiver to an 11 year-old female with ASD reported, "*She can hurt herself quite badly and not even be that worried, but other times, quite minor things, it'd be completely an over-reaction*".

Other inconsistencies were noted by caregivers in relation to how their child behaves in unfamiliar environments, with many describing a pattern in which the child can show anxiety and cling to the caregiver in these setting, but equally can wander off and or run away in such an environment, apparently having no concern for physical proximity to the caregiver. One caregiver describing her 12 year-old child with ASD stated;

> *"Yeah, see that's the thing with autism, there's always these contradictions, like when he was little he'd cling to you and not leave your side, but sometimes you*

*can go to the supermarket and you come out, and… I can remember, sometimes he'd just take off to go to the car, or god knows where he'd go once the doors open, and he'd just run, and it was this two or three year old and he'd just be gone".*

Other caregivers reported inconsistencies with respect to the manner in which they relate to unfamiliar adults or within unfamiliar environments. One caregiver described her child's (8 year-old male with ASD) occasional extreme avoidance of unfamiliar adults, contrasted with occasional overly-familiar interaction with unfamiliar adults;

*"So in this case he avoids the lady, but in the other (case) he'll go up and play with his hair, no worries. So, yeah, those are like two extremes that I can think of, but all these in-betweens happen all the time".*

When describing inconsistent behaviour, caregivers frequently conveyed a sense of being baffled by these behaviours or being caught off guard. Caregivers conveyed a sense of being unable to understand their child's motivations, intentions or reasoning. Such difficulty for the caregiver in mentalising the child appeared to pose a challenge to the caregiver's capacity to be emotionally attuned and appropriately responsive to the child's needs.

Another challenge described by caregivers of children with ASD was their child's apparent emotional non-responsiveness or lack of empathy towards the parent. For instance, one caregiver to an 11-year-old boy with ASD stated;

*"Well I think if he's having a meltdown and if it's a particularly bad one, I could end up in tears, and he could end up in tears, and I think he knows that I'm cross or angry or frustrated, or upset, but it doesn't stop what he's doing".*

Another caregiver recalled her distress when her child (ASD, 11-year-old, male), would show little emotional responsiveness towards her when he was 2-3 years of age, "*He had no… it was absolutely gut-wrenching for me, because he had no emotional connection to me at all. I was just the one who provided the food, end of story*". These excerpts reflect powerful experiences for many caregivers that were interviewed, and indicate that interactive strains may be present from early childhood into middle childhood. These reports were in contrast to typically developing dyads where children were less frequently described as being emotionally non-responsiveness (n = 3, 13%), and these descriptions tended to occur in the context of developmentally appropriate egocentricity or attempts at gaining increasing independence from the caregiver.

## 2.7 DISCUSSION

The current study offers an in-depth, qualitative consideration of the social and emotional impairments that characterise ASD, within the context of the attachment relationship. ASD literature has frequently explored emotion processing and theory of mind impairments in terms of their neurobiological underpinnings and impacts upon functioning within social or cognitive contexts (Baron-Cohen, Leslie, & Frith, 1985; Harms, Martin, & Wallace, 2010; Nuske, Vivanti, & Dissanayake, 2013). The impact of these impairments within an attachment context has rarely been explored, despite significant theoretical discussions of this (Dissanayake & Sigman, 2001; Sivaratnam et al., 2015; Slade, 2009).

Current findings suggest that, consistent with findings in young children with ASD (Dissanayake & Crossley, 1996; Rogers et al., 1991; Sigman & Mundy, 1989; Sigman & Ungerer, 1984), middle-childhood aged children with ASD continue to display a range of behaviours which signal a discriminated attachment to a specific caregiver, including proximity seeking with stress, caregiver preference over a stranger, and distress upon

unexpected separation. Nonetheless, children with ASD displayed impairments in their ability to confidently, flexibly and consistently use their caregiver as a secure base. Children with ASD displayed difficulties using their caregiver to co-regulate their anxiety and help them process affective cues, and they were less able to derive a sense of security from the caregiver which could facilitate confident exploration of their environment within the context of a secure base. Underlying the atypical patterns of attachment behaviour were deficits in emotion processing, reciprocity and sharing, and emotion co-regulation, and a failure to use social referencing or attention to the caregivers' affective state.

A novel theme that emerged from the current analysis was the caregiver's experience of the child with ASD, and this highlighted the importance of taking into account the bi-directional nature of attachment in ASD. These findings provide some of the first insights into the complex, qualitative aspects of attachment system functioning in ASD during middle childhood, from the caregiver's point of view, and provide detailed insights into the challenges and strengths exhibited by children and caregivers within these dyads.

### 2.7.1 Attachment Behaviours in ASD

Current findings contribute to and extend upon a large body of empirical research within early childhood that has contradicted early suggestions that ASD is a disorder of non-attachment (Kanner, 1943) or pathological attachment (Bettelheim, 1967). All children with ASD were described as signalling their attachment through a range of normative attachment behaviours, which were activated in normative ways in response to environmental stress or threat. As Rogers and colleagues (1991) suggest, it is clearly evident that the social and emotional impairments of ASD do not preclude the capacity for affective and discriminating attachments in these children.

Nonetheless, current findings suggest that ASD impairments are important in understanding qualitative aspects of the attachment relationship for these dyads. Descriptions of children with ASD featured a range of abnormal means of relating to the caregiver, ranging from excessive safe haven behaviour with novelty (i.e. clinging, continual proximity maintenance) which seemingly limited opportunities for exploration, to a failure to use the caregiver as a secure base in unfamiliar social settings (i.e. wandering off, failing to check back, being socially indiscriminant). These behaviours are regarded as indicative of insecurity of attachment in typical dyads (Ainsworth et al., 1978), and yet previous quantitative studies of attachment in ASD during middle childhood have shown equivalent rates of security between ASD and non-ASD groups (Bauminger et al., 2010; Chandler & Dissanayake, 2013; Wu et al., 2015). It may be that while children and caregivers report a normative sense of child security, members of ASD dyads have learnt to adapt over time to the atypical ways that children relate. Alternatively, it may be that while children with ASD experience a subjective sense of security, their aberrant behaviour within their attachment relationship may still impact significantly upon development. Atypical behaviours in ASD may serve to deprive the child of normative social and emotional learning experiences that are readily available to typically developing children. Typically developing children, who naturally orient more towards their caregiver and use the social referencing of the caregiver to learn about their social world, may reasonably be expected to have more social and emotional learning opportunities than children with ASD, who engage in these behaviours less frequently.

Current findings provide support for previous suggestions that ASD-associated impairments may have pronounced impacts on attachment functioning beyond middle childhood, when attachment relationships become more cognitively and socially sophisticated (Fonagy et al., 1991; Kerns, Tomich, & Kim, 2006; Rogers et al., 1991, 1993). In particular, findings seem consistent with suggestions that children with ASD display "mindblindedness" (Baron-Cohen, 1995) that has effects within the attachment relationship (Slade, 2009), and may result in children working from primarily

"behavioural data" when relating to their caregiver (Dissanayake & Sigman, 2001; Rogers et al., 1991). For instance, children with ASD who displayed an excessive need for caregiver proximity may do so because they are less able to derive an internalised sense of security and psychological availability from interactions with their caregiver, or because they cannot use social-emotional strategies such as social referencing and emotion monitoring to promote safe exploration in the context of this relationship.

### 2.7.2 The Interplay of Attachment and ASD processes

The current findings are important in contributing to recent discussions regarding the likely complex interplay between ASD and attachment processes (Sivaratnam et al., 2015; Slade, 2009). Consistent with the suggestions of Slade, findings indicate that ASD-associated impairments have impacts within the attachment relationship to the caregiver. There is also some support for the suggestion that these impairments may have compounding impacts upon children's learning within these relationships. Children displayed a general tendency to orient away from social or emotional cues within the attachment relationship; they did not consistently monitor caregiver emotional states, nor did they readily share and reciprocate with their caregiver, and some could not tolerate caregiver co-regulation of affect in typical ways. In typical development, attachment relationships depend upon some early orientation to social and emotional stimuli in the child, in order for this relationship to then provide a further context in which children build mentalisation capacities. If early barriers to this orientation to mental states can be identified and mitigated, perhaps through dyadic attachment-oriented early interventions, it is possible that children with ASD could be provided with a more normative entry into an attuned and sensitive attachment relationship.

### 2.7.3 The Importance of the Caregiver's Experience

Current findings offer important insights into qualitative aspects of the caregiver's subjective experience of the child-caregiver attachment relationship. ASD literature has primarily focussed on either child-centric deficits or caregiver-centric challenges, but has rarely considered the interaction of these factors (Baker, Seltzer, & Greenberg, 2011). Current findings suggest that the child's aberrant social and relational behaviours have adverse impacts on caregivers. Caregivers of children with ASD often reported experiencing their child's behaviour as inconsistent and at times incomprehensible. The caregiver's capacity to mentalise the child, that is, understand and infer the child's inner mental state from their overt behaviour, is central to secure attachment formation (Fonagy et al., 1991). Current findings suggest that caregivers subjectively report difficulties inferring their child's mental processes from their overt behaviour. This is consistent with previous theoretical discussions the unique difficulties with mentalisation faced by caregivers of children with ASD, because of their child's social communication impairments (Slade, 2009).

Some caregivers of children with ASD reported feeling emotionally hurt by their child's emotional non-responsiveness or apparent lack of empathy. This finding is consistent with previous suggestions that caregivers of children with ASD experience less reward and reinforcement in their parenting interactions (Hoppes & Harris, 1990). Caregivers in the current study were particularly challenged by their child's egocentricity, lack of emotional responsiveness, and apparent lack of empathy for them. Caregiver affective state is crucial to determining the emotional attunement within the attachment relationship. While caregiver stress has been widely described in ASD literature (Bouma & Schweitzer, 1990; Hoffman, Sweeney, Hodge, Lopez-Wagner, & Looney, 2009; Montes & Halterman, 2007), the attachment-oriented perspective of parenting stress that emerged within the current study highlights the need to better understand the caregiver's experience from an attachment perspective.

### 2.7.4 Limitations

Current findings must be understood within the context of several study limitations. Firstly, there is limited information available regarding key demographic information for caregivers, such as age, ethnicity, and education level. This is potentially relevant given that the caregiver's experience emerged as a central component to understanding the attachment relationship in these dyads, and given the broader understanding that caregivers of children with ASD face unique challenges in their parenting role (Falk, Norris, & Quinn, 2014; Lee, 2009). Secondly, male caregivers were poorly represented in the current study, meaning that implications cannot necessarily be drawn to this sub-set of caregivers. Nonetheless, the large sample size of the current study, and the inclusion of a typically-developing comparison group, has allowed for a broad-ranging and clear identification of several key themes for further study, perhaps within a sample that features better representation of male caregivers.

### 2.7.5 Clinical Implications and Future Directions

In line with recent increasing interest in understanding the reciprocal interactions between ASD and attachment processes, the current findings highlight the likely complex interplay of children's biologically-based social and emotional interactive deficits, with children's subjective experience of attachment relationships, and caregivers' experience and responses within this challenging clinical picture. Appreciation of this clinical complexity comes at an important time, as the increasing ASD prevalence means there is pressure on health providers to assess for ASD (Stiefel, Shields, Swain, & Innes, 2008) and develop individually-tailored treatment plans for children diagnosed with ASD (Gillis & Beights, 2012; Phelps, Eisert, Schulz, & Augustyn, 2012). Empirical research aimed at describing both prospective and longitudinal associations between ASD symptoms, attachment processes, caregiver experiences, and behavioural outcomes, are needed in

order to improve the holistic conceptualisation and prediction of developmental trajectories in ASD, and aid in appropriate, timely and sensitive intervention planning.

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# CHAPTER THREE

# PARENTS OF CHILDREN WITH ASD EXPERIENCE MORE PSYCHOLOGICAL DISTRESS, PARENTING STRESS, AND ATTACHMENT-RELATED ANXIETY

## 3.1 PAPER COMMENTARY

Chapter Three presents a paper that has been submitted for publication in the *Journal of Autism and Developmental Disorders*. This paper has been formatted (including spellings) to the specific requirements of the journal. The following is a copy of the manuscript that is under review. Page and table numbers have been re-numbered for ease of reading and to provide consistency throughout the thesis.

There were two aims of this paper. The first aim was to examine between-group differences in self-reported child attachment quality, caregiver psychological distress, parenting stress, and caregiver romantic attachment style, between ASD and typically developing groups during middle childhood. The second aim was to examine within-group patterns of relationships between child attachment quality and caregiver variables (psychological distress, parenting stress, and caregiver romantic attachment style).

It is well-recognised that caregivers of children with ASD face unique challenges in their parenting role, including but not limited to experiencing elevated rates of parenting stress and mental health problems (Falk, Norris, & Quinn, 2014; Lee, 2009). Such factors are known to have relevance for understanding child attachment quality in typically developing dyads (Ainsworth et al., 1978; Bowlby, 1969/1982), however these factors have received only limited study in the context of attachment within the ASD population (van IJzendoorn et al., 2007).

Findings from the first empirical study of the current thesis (Chapter 2) highlight the importance of understanding the experience of caregivers when examining child-caregiver attachment in ASD. Caregivers of children with ASD were unique in their experience of their child as lacking empathy or awareness of the caregiver's emotional state. Furthermore, caregivers of children with ASD reported difficulty comprehending the motivation or mental state underlying their child's behaviour which was often perceived as contradictory. These stressful and unique experiences associated with caring for a child with ASD seem important to take account of within attachment research conducted within the ASD population.

Thus, previous findings, both within the current thesis and within the broader literature, highlight the importance of better understanding the unique experience of caregivers in the context of child attachment. This study therefore sought to extend upon current empirical knowledge by assessing self-reported child attachment quality in ASD during middle childhood in the context of specific caregiver factors, namely psychological distress, parenting stress, and romantic attachment style. A better understanding of caregiver correlates of child attachment quality will contribute to knowledge regarding the degree to which attachment theory can be applied to the ASD population (Bauminger et al., 2010), and may promote more holistic, relationally-sensitive intervention in ASD by better describing relational strengths and difficulties in ASD.

Submitted Paper:

Keenan, B.M., Newman, L.K., Gray, K, & Rinehart, N.J. (Submitted). Parents of children with ASD experience more psychological distress, parenting stress, and attachment-related anxiety. *Journal of Autism and Developmental Disorders*.

## 3.2 DECLARATION FOR THESIS CHAPTER THREE

**Declaration of the Candidate:** In the case of Chapter Three, the nature and extent of my contribution to the work was the following:

| Nature of contribution | Extent of contribution |
|---|---|
| Formulation of experimental design (in consultation with supervisors), review of the relevant literature, acquisition of ethics approval, recruitment and testing of participants, data analysis, and writing of paper. | 70% |

The following co-authors contributed to the work:

| Name | Nature of contribution |
|---|---|
| Louise Newman | Consultation in formulation of experimental design, discussion of ideas expressed in manuscript and critical review of manuscript. |
| Kylie Gray | Consultation in formulation of experimental design, discussion of ideas expressed in the manuscript and critical review of manuscript. |
| Nicole Rinehart | Consultation in formulation of experimental design, discussion of ideas expressed in the manuscript and critical review of manuscript. |

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the candidate and co-authors' contributions to this work.

**Candidate's Signature:** [redacted] **Date:** 11/04/16

**Main Supervisor's Signature:** [redacted] 11/04/16

## 3.3 ABSTRACT

The relationship between child attachment security and caregiver psychological distress, parenting stress, and romantic attachment style was examined amongst children with Autism Spectrum Disorder (ASD) and typically developing children, during middle childhood. Participants were 24 children with high-functioning (IQ>70) ASD (M=10.84 years, SD=2.01 years) and 24 typically developing children (M=10.60 years, SD=1.80), and their primary caregiver (90% mothers). Consisted with hypotheses, children with ASD reported similar levels of security to typically developing children, and parents of children with ASD reported more psychological distress and parenting stress, compared to typically developing dyads. Contrary to predictions, parents of children with ASD also reported more attachment-related anxiety. Lower levels of child attachment security were related to more psychological distress and attachment-related anxiety in caregivers, but only within typically developing dyads. The impact of emotion processing impairments on caregiver-child relationships in ASD is discussed, as well as future directions for research.

## 3.4 INTRODUCTION

The study of attachment in ASD has primarily focussed on characterising group differences in attachment security between children with and without ASD (Rutgers, Bakermans-Kranenburg, van IJzendoorn, & van Berckelaer-Onnes, 2004). This research has generally indicated that while children with ASD display clearly discriminated and enduring attachments to significant caregivers (Dissanayake & Crossley, 1996; Rogers, Ozonoff, & Maslin-Cole, 1991; Sigman & Mundy, 1989; Sigman & Ungerer, 1984), they may be less responsive, consistent, and comprehensible in their attachment behaviours with caregivers (Dissanayake & Crossley, 1996, 1997; Grzadzinski, Luyster, Spencer, & Lord, 2014; van Ijzendoorn et al., 2007; Willemsen-Swinkels, Bakermans-Kranenburg, Buitelaar, van IJzendoorn, & van Engeland, 2000). Research amongst young children has indicated increased rates of insecure attachment in children with ASD compared to typically developing and clinical comparison groups (Naber et al., 2007; Rutgers et al., 2004; van Ijzendoorn et al., 2007) when measured using observation-based paradigms such as the Strange Situation (Ainsworth, Blehar, Waters, & Wall, 1978), while research during middle childhood suggests no between-group differences in security when using questionnaire-based measures (Bauminger, Solomon, & Rogers, 2010; Chandler & Dissanayake, 2013; Wu et al., 2015). While this disparity regarding the group differences in attachment security requires further investigation, there remains a poor understanding of what this attachment quality means for children with ASD, that is, what are the correlates and consequences of attachment security for children with ASD?

There is growing appreciation for the importance of unpacking the developmental correlates of attachment quality for children with ASD (Dissanayake & Sigman, 2001; Rogers et al., 1991; Rogers, Ozonoff, & Maslin-Cole, 1993; Sivaratnam, Newman, Tonge, & Rinehart, 2015; Slade, 2009). This interest comes with the recognition that children with ASD exhibit early-emerging and biologically-driven impairments in social and emotional capacities, such as facial emotion recognition, social communication, reciprocity, and

theory of mind (American Psychiatric Association, 2013; Baron-Cohen, Leslie, & Frith, 1985; Cassel et al., 2007; Dawson et al., 2004; Nuske, Vivanti, & Dissanayake, 2013), that are central to typical processes underlying attachment formation and ongoing relating within child-caregiver relationships (Fonagy, Steele, Steele, Moran, & Higgitt, 1991). There may be a unique and complex interplay between biologically-based impairments in ASD and the environmental factors that direct attachment formation and quality (Sivaratnam et al., 2015). In beginning to unpack these relationships and processes, it is important to first understand how attachment quality in ASD relates to known correlates of attachment quality in typical populations. Understanding the caregiver correlates of attachment in ASD seems a particularly pertinent question given the unique challenges inherent in parenting a child with ASD (Falk, Norris, & Quinn, 2014; Lee, 2009) and suggestions that the interactive deficits displayed by children with ASD may make attunement and sensitivity to the child's signalling a more difficult task (Beurkens, Hobson, & Hobson, 2013; Hoppes & Harris, 1990; Oppenheim, Koren-Karie, Dolev, & Yirmiya, 2012; Siller, Swanson, Gerber, Hutman, & Sigman, 2014).

Child attachment quality has long been understood in the context of caregiver factors within typically developing dyads (Ainsworth et al., 1978; Bowlby, 1969/1982), and similar enquiry is beginning in ASD. For instance, studies of parenting sensitivity in ASD have generally indicated, consistent with findings in typically developing children, that children with ASD who have sensitive parents are more likely to be securely attached (Capps, Sigman, & Mundy, 1994; Koren-Karie, Oppenheim, Dolev, & Yirmiya, 2009). One notable exception is that of van Ijzendoorn and colleagues (2007) who reported that security was associated with parent sensitivity only within a typically developing group, and not within a group of children with ASD. Nonetheless, related concepts such as maternal insightfulness into the child's inner world (Hutman, Siller, & Sigman, 2009; Oppenheim, Koren-Karie, Dolev, & Yirmiya, 2008, 2009; Oppenheim et al., 2012), caregiver synchrony during play interaction (Kuhn, 2007; Siller & Sigman, 2002, 2008), emotional availability (Dolev, Oppenheim, Koren-Karie, & Yirmiya, 2009) and

responsiveness (Siller et al., 2014) have also been associated with better attachment and developmental outcomes for children with ASD, consistent with findings in typically developing children (Belsky, 1999; Koren-Karie, Oppenheim, Dolev, Sher, & Etzion-Carasso, 2002). Thus, despite experiencing biologically-based deficits in social interaction, emotion understanding, and theory of mind (American Psychiatric Association, 2013), available empirical evidence suggests that young children with ASD may benefit from more optimal caregiving in similar ways to typically developing children when it comes to their attachment quality.

Parents of children with ASD face numerous unique challenges that are not experienced by parents of typically developing children or children with other disorders (Lee, 2009), and research has begun to take this experience into account by considering novel factors that may form barriers to optimal parenting in these dyads (Dolev et al., 2009). Parents' resolution to their child's diagnosis (Marvin & Pianta, 1996) has been linked, along with insightfulness, to child security (Oppenheim et al., 2009, 2012). Parents who resolve their own feelings of grief or sadness regarding their child's disability, and are insightful into their child's inner world, are thought to give children with ASD a sense of containment and acceptance that promotes the development of security. Parents of children with ASD report significantly greater stress relative to parents of typically developing children (Bouma & Schweitzer, 1990; Hoffman, Sweeney, Hodge, Lopez-Wagner, & Looney, 2009; Montes & Halterman, 2007) or parents of children with other disabilities (Abbeduto et al., 2004; Baker-Ericzen, Brookman-Frazee, & Stahmer, 2005; Bouma & Schweitzer, 1990; Dabrowska & Pisula, 2010). Parenting stress is known to have negative implications for child attachment in typical dyads (Belsky, 1999), supposedly because stressed parents are less able to be consistently sensitive and responsive to their child's needs. However, when exploring parenting stress in ASD, Hoffman and colleagues (2009) noted that while parents of children with ASD showed significantly elevated parenting stress relative to parents of typically developing children, they continued to report emotional closeness with their child, suggesting that parenting stressors may not

compromise affective aspects of the parent-child relationship. It is worth noting that this finding only pertains to parents' own self-report of relationship quality, and the child's experience of their parent is yet to be explored in the context of parenting stress. Parents also exhibit greater mental health problems compared to other groups, including anxiety (Piven & Palmer, 1999; Ruiz-Robledillo & Moya-Albiol, 2015; Yirmiya & Shaked, 2005) and depression (Hodge, Hoffman, & Sweeney, 2011; Lee, 2009; Yirmiya & Shaked, 2005). Dolev and colleagues (2009) reported that psychological distress in parents was associated with greater levels of parental intrusiveness during parent-child play interactions, suggesting that more distressed parents may provide children with a less optimal style of caregiver interaction. Given these vulnerabilities to stress and mental health problems, parent-child dyads where a child has ASD may be at increased risk for disruptions to the attachment system. Indeed, there have been recent calls for greater exploration of parents' subjective experiences of caring for a child with ASD because of the implications this may have for healthy attachment formation in these dyads (Dolev et al., 2009; Siller et al., 2014; Slade, 2009).

Parents' own attachment style may have implications for parent-child interaction in ASD. Parents of children with ASD appear to report a similar degree of attachment security within their adult romantic relationships as parents of typically developing children (Lau & Peterson, 2011), however studies have suggested that caregivers' internal working models of attachment may have unique implications for the way in which caregivers and children with ASD interact. Seskin and colleagues (2010) studied attachment representations of parents of children with ASD and found that secure parents showed greater capacity to support symbolic play and reflective functioning in their children, and had children who exhibited better reciprocal social interaction skills. Direct links between parent attachment style and child attachment security are yet to be explored, but studies of typically developing dyads have clearly established that secure parents are more likely to have secure children (van IJzendoorn, 1995). It has been suggested that this intergenerational transmission of attachment quality warrants specific

exploration within ASD, due to the possibility that the social and emotional impairments of children with ASD may interrupt or alter this usual transmission of security from parent to child (van Ijzendoorn et al., 2007).

### 3.4.1 The Current Study

There have been a small number of good quality research studies conducted in ASD during middle childhood, and these have concluded that there are no differences in self-reported attachment security between ASD and typically developing groups (Bauminger et al., 2010; Chandler & Dissanayake, 2013; Wu et al., 2015). Nonetheless, the ways in which attachment security relates to known correlates of attachment security in typically developing children, particularly factors that describe the caregiver's experience within this complex and challenging parenting role, are poorly understood. Accordingly, the current study aims to explore child attachment quality and its relationship to several caregiver factors amongst children with high-functioning (IQ>70) ASD and typically developing children, and their primary caregivers, during middle childhood (i.e. 7-12 years). The first aim is to examine between-group differences in child attachment and caregiver factors (psychological distress, parenting stress, and romantic attachment style), and the second aim is to explore within-group patterns of relationships between child attachment and caregiver factors. Several hypotheses are proposed; (1) that children with high-functioning ASD will report similar attachment quality compared to typically developing children, (2) that caregivers of children with ASD will report greater psychological distress and parenting stress, but similar romantic attachment styles within their own adult relationships, compared to caregivers of typically developing children, and (3) that caregiver psychological distress, parenting stress, and attachment insecurity will be associated with poorer attachment quality in children with ASD and typically developing children.

## 3.5 METHOD

### 3.5.1 Participants

Participants were 24 children with a DSM-IV-TR diagnosis of high-functioning Autistic Disorder (n = 14) or Asperger's Disorder (n=10), hereafter collectively referred to as Autism Spectrum Disorder (ASD), and 24 typically developing children (TD), and their primary caregiver. Children with ASD ranged from 7.2-14 years of age (79% males), and typically developing children were 7.4-12.9 years of age (54% males). For children with ASD, clinical diagnosis was confirmed by reviewing diagnostic reports or letters from psychologists and/or paediatricians. Typically developing participants had no known diagnosis of any developmental or psychiatric disorder, as reported by their primary caregiver. Participants were excluded if they had a Full Scale IQ of less than 70 or if they were outside the 7-12 year-old age range when first entering the study (NB: 4 participants with ASD recruited from a previous study were older than 12 years by the time of participation in the current study, but were nonetheless included as their inclusion did not contribute to any significant differences in age between groups). Primary caregivers were identified by asking the contacting carer "*Who spends the most time caring for the child?*". In situations of 50:50 shared care, caregivers nominated which carer would participate based on convenience. As a result, identified primary caregivers were predominantly mothers (89.6%), while other caregivers were grandmothers, a father, and a step-mother.

Children with ASD and their caregivers were recruited on a voluntary basis from an existing research study (n = 11), as well as through online notice boards and community groups across metropolitan and regional Victoria and New South Wales. Typically developing children and their caregivers were recruited through Victorian public schools in metropolitan and regional areas and through a university online notice board.

## 3.5.2 Materials

### 3.5.2.1 Child Intellectual Functioning

Intellectual ability was assessed for children with ASD using the *Wechsler Intelligence Scale for Children, fourth edition, Australian version* (WISC-IV; Wechsler, 2005), and for typically developing children using the *Wechsler Abbreviated Scales of Intelligence, second edition* (WASI-II; Wechsler, 2011). These measures show good agreement (Wechsler, 2011). Some children with ASD had recently (< 2 years) had their intellectual ability assessed using the WISC-IV or *Wechsler Preschool and Primary School Intelligence, third edition* (WPSSI-III; Wechsler, 2004), and these scores were used in the current study. The full scale IQ score (FSIQ), verbal comprehension index (VCI), and perceptual reasoning index (PRI) were derived from Wechsler scales and examined in the current study.

### 3.5.2.2 Child Attachment

The *Security Scale* (Kerns, Klepac, & Cole, 1996) is a 15-item scale which was employed to assess children's perceptions of security in their relationship to an identified attachment figure, and has demonstrated sounds reliability and validity during middle childhood (Granot & Mayseless, 2001; Kerns, Abraham, Schlegelmilch, & Morgan, 2007; Kerns et al., 1996; Kerns, Tomich, Aspelmeier, & Contreras, 2000). Items employ Harter's (1982) "*some kids… other kids…*" format, believed to reduce defensive responding, in which children are provided with a description of two types of children, and are required to identify which child they are more alike (i.e. "*Some kids find it easy to trust their mum, BUT other kids are not sure if they can trust their mum*"), and to what degree (i.e. "*Really true for me*" or "*Sort of true for me*"). Each item is scored on a 4-point scale, with eight items reverse-scored. A Total security score is derived from 2 sub-scales; Availability and Dependency. The Availability subscale comprises 6 items which assess the extent to which

children view their attachment figure as available and responsive to their needs, and the Dependency subscale comprises 9 items assessing the extent to which the child is able and willing to use their attachment figure when distressed. Scores on each scale are averaged to give a continuous score. For the present study, two items were modified with the aim of making the language more concrete and hopefully more intelligible for children with ASD (e.g. on item 2 "butts in" was replaced with "interrupts", and on item 3 "count on" was replaced with "rely on").

The *Coping Strategies Questionnaire* (CSQ; Finnegan, Hodges, & Perry, 1996) was used to assess self-reported use of avoidant and preoccupied coping strategies within the child-caregiver relationship and has demonstrated good psychometric properties in middle childhood (Finnegan et al., 1996; Kerns, Brumariu, & Seibert, 2011; Kerns et al., 2000; Kerns, Tomich, & Kim, 2006). The CSQ comprises 20 items; 10 items assess avoidant coping strategies (i.e. a failure to seek comfort when distressed and a denial of affection for the mother), while 10 items assess preoccupied coping strategies (i.e. an excessive need for the caregiver in new or distressing situations and an inability to be soothed by the caregiver; Finnegan et al., 1996). While items were originally designed to assess avoidant and preoccupied coping strategies, rather than internal working models of attachment, the authors have since suggested that avoidant or preoccupied internal working models can be inferred from these scales given that avoidant and preoccupied coping strategies are likely to arise in the context of preoccupied or avoidant working models of attachment, respectively (Yunger, Corby, & Perry, 2005). Nonetheless, to avoid confusion, scales are referred to as "Avoidant coping" and "Preoccupied coping" hereafter. Items adopt the same "*some kids… other kids…*" response format as the Security Scale, and are scored 0-2, with 0 given to both non-avoidant/preoccupied response options, while 1 was given to the less avoidant/preoccupied response, and 2 given to the most avoidant/preoccupied response option. Total scores were averaged to give a continuous score for each scale, with higher scores reflecting a greater degree of self-reported avoidant or preoccupied coping.

#### 3.5.2.3 Caregiver Wellbeing

The *Kessler Psychological Distress Scale* (K-10; Kessler et al., 2002) is a 10-item questionnaire which screens for depressive and anxious symptomatology experienced in the last four weeks. Items are rated on a 5-point Likert scale (1 = *none of the time*, 5 = *all of the time*), with scores ranging from 10 to 50 and higher scores reflecting greater psychological distress. The K10 is widely used in clinical and research settings, and shows strong psychometric properties (Andrews & Slade, 2001; Kessler et al., 2002; Slade, Grove, & Burgess, 2011).

The *Parenting Stress Index – Short Form* (PSI-SF; Abidin, 1995) is a 36-item questionnaire, assessing parenting stress across three sub-scales; (1) parental distress (PD), which includes 12 items describing stress due to personal factors such as parental depression or lack of social support (i.e. "*I don't enjoy the things I used to*"), (2) parent-child dysfunctional interaction (P-CDI), which includes 12 items detailing stress arising from parents' negative/unrewarding perceptions of their interactions with their child (i.e. "*My child rarely does things for me that make me feel good*"), and (3) difficult child (DC), which comprises 12 items focussing on stress related to dissatisfaction with characteristics of the child (i.e. "*My child does a few things that bother me a great deal*"). Items are answered on a five-point scale (*1 = strongly agree, 5 = strongly disagree*) and are summed to give a Total Stress score, with higher scores reflecting greater self-reported stress. Scores can be converted to percentile rankings, with scores at or above the 90$^{th}$ percentile considered to indicate a clinical level of distress associated with the parent-child relationship. The PSI-SF is a widely used and well-validated instrument for measuring parenting stress in typical and clinical populations (Haskett, Ahern, Ward, & Allaire, 2006; McKelvey et al., 2009; Reitman, Currier, & Stickle, 2002).

#### 3.5.2.4 Caregiver Attachment Style

The *Experiences in Close Relationships-Revised* (ECR-R; Fraley, Waller, & Brennan, 2000) is a 36-item questionnaire assessing attachment perceptions within romantic adult relationships. The ECR-R comprises two scales; attachment-related anxiety (i.e. *"I'm afraid I will lose my partner's love"*), and attachment-related avoidance (i.e. *"I prefer not to show a partner how I feel deep down"*). Items are rated on a 7-point scale (1 = strongly disagree, 7 = strongly agree), with higher scores reflecting greater levels of avoidance/anxiety in romantic adult relationships. There is support for the reliability and validity of the ECR-R in adult populations (Fairchild & Finney, 2006; Sibley, Fischer, & Liu, 2005).

#### 3.5.2.5 Socioeconomic Status

An estimate of socioeconomic status was calculated for each dyad from postcodes, using the Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD) composite from the Australian Bureau of Statistics Socio-Economic Index for Areas data (Australian Bureau of Statistics, 2013).

### 3.5.3 Procedure

The study was approved by Human Research Ethics Committees of Monash University and the Victorian Government Department of Education and Early Childhood Development. Informed consent was obtained from parents/guardians of all participants, while children also provided informed written assent. Participants took part in the study at Monash University, their school or in their own home. The WISC-IV and WASI-II were administered according to standardised instructions. Children completed attachment questionnaires using pencil and paper, with the researcher reading items aloud for most participants, while some older participants (12 years or older) elected to read items

themselves under supervision by the researcher. Caregivers completed questionnaires and returned them to the researcher in person or via mail.

### 3.5.4 Data Analyses

Independent samples *t*-tests were used to compare child attachment and caregiver variables across ASD and typically developing groups, while $\chi^2$ analysis was used for categorical variables (i.e. gender, caregiver type). Pearson's correlations were used to explore associations among child and caregiver variables within each group.

## 3.6 RESULTS

Analyses were performed using Statistical Package for the Social Sciences (SPSS) version 22.0. Assumptions of normality of sampling distribution, linearity, and homogeneity of variance were satisfied and no outliers were detected. It should be noted that several siblings pairs participated in the current study (ASD = 1 sibling pair, TD = 4 sibling pairs). In accordance with standard administration procedures for each parent-report questionnaire, the caregivers of siblings reported on their parenting stress (PSI-SF) in relation to each child separately, but reported their overall psychological distress (K-10) and romantic attachment style (ECR-R) only once. As a result, between-group comparisons for K-10 and ECR-R measures necessarily show decreased sample size in order to ensure data are represented only once. The total sample was retained for within-group correlational analyses of caregiver and child variables because the caregiver's psychological distress and attachment style were deemed to have equal and unique relevance to each of his/her children. Nonetheless, correlations were conducted both with and without a randomised exclusion of one sibling from each sibling pair, and this made no difference to the statistical significance of findings reported below.

### 3.6.1 Sample Characteristics

Demographic and IQ variables were compared across ASD and TD groups to examine whether there was a need to control for any of these variables in subsequent analyses. There were no significant differences between groups with regard to age, gender, VCI, PRI, socioeconomic status, number of children in family or caregiver type (i.e. mother vs other) ($p$>.05), while the TD group recorded significantly greater FSIQ ($t$(46) = -2.70, $p$=.01). Pearson's correlational analysis indicated that demographic or IQ variables were not related to child attachment, nor were they related to caregiver variables ($p$>.05), with the exception of ECR-Avoidance scores which were related to greater child age in the ASD group ($r$ = .49, $p$=.02). Since groups were similar with regard to VCI, PRI, and general demographic variables, and these variables were generally not related to study variables, there was no need to control for the effects of any variables during the subsequent analyses.

### 3.6.2 Differences between Groups

Descriptive statistics for child attachment and caregiver variables are presented in Table 3.1. Independent samples $t$-tests were used to compare ASD and TD groups on child attachment and caregiver variables (psychological distress, stress, and attachment), and are presented in Table 3.1. No differences in child attachment were observed between ASD and TD groups, however parents of children with ASD reported significantly greater psychological distress on the K-10 ($t$(41) = 3.25, $p$<.01), significantly more parenting stress across all domains of the PSI-SF (PSI-Total; $t$(46) = 7.71, $p$<.01, PSI-PD; $t$(46) = 3.28, $p$<.01, PSI-PCDI; $t$(46) = 6.63, $p$<.01; PSI-DC; $t$(46) = 8.91, $p$< .01), and significantly greater attachment-related anxiety on the ECR-R ($t$(41) = 2.53, $p$ =.02). Caregivers did not differ in their report of attachment-related avoidance ($p$ >.05). Exploring the clinical significance of caregiver stress, 79% of caregivers of children with ASD reported PSI-SF Total Stress scores in the clinical range (i.e. ≥ 90$^{th}$ percentile), compared to 8% of

caregivers of typically developing children, a significant difference ($\chi^2$ = 24.47, df = 1, $p$ <.01).

Table 3.1

*Child Attachment and Caregivers Variables between groups, Mean (standard deviation)*

| Measure | Subscale | ASD (n = 24) | TD (n = 24) |
|---|---|---|---|
| Security Scale | Total | 48.29 (6.00) | 48.29 (5.97) |
| | Dependency | 28.38 (4.47) | 28.33 (3.07) |
| | Availability | 19.92 (2.57) | 19.96 (3.86) |
| CSQ | Preoccupied | 7.38 (5.48) | 6.13 (3.94) |
| | Avoidant | 2.13 (2.01) | 1.54 (1.74) |
| PSI-SF | Parental Distress | 33.17 (11.10) | 23.92 (8.21) |
| | Parent-Child Dysfunctional Relationship | 29.87 (7.12) | 17.88 (5.29) |
| | Difficult Child | 41.92 (8.93) | 22.13 (6.22) |
| | Total | 104.96 (19.22) | 63.96 (17.59) |
| | | ASD (n = 23) | TD (n = 20) |
| K-10 | Total | 20.13 (6.76) | 14.50 (4.05) |
| ECR-R | Attachment-related Anxiety | 50.44 (19.23) | 37.00 (14.98) |
| | Attachment-related Avoidance | 52.13 (25.00) | 43.10 (25.69) |

*NB: The reduced sample size for K-10 and ECR-R data reflects the reduced number of novel data points for these parent-centred measures where a single caregiver and two sibling participants have taken part in the study.*

### 3.6.3 Correlations amongst Variables

To explore the nature of distress, stress, and attachment in caregivers, Pearson's correlations were conducted amongst caregiver-related variables within each group, and are presented in Table 3.2. Amongst caregivers of children with ASD, psychological distress on the K-10 was related to more Parental Distress and Total Stress and on the PSI-SF, and greater attachment-related Anxiety and Avoidance on the ECR-R. Similarly, amongst caregivers of typically developing children, psychological distress on the K-10 was related to greater Parental Distress, Difficult Child and Total Stress scores on the PSI-SF, and greater attachment-related anxiety on the ECR-R, with a non-significant trend ($p$=.06) towards more attachment-related avoidance. Regarding associations between stress and attachment, there were relatively consistent positive associations between parenting stress on the PSI-SF subscales and anxiety and avoidance on the ECR-R for caregivers of typically developing children, while for caregivers of children with ASD only the Parental Distress subscale on the PSI-SF was related to attachment-related Anxiety and Avoidance on the ECR-R.

Table 3.2

*Pearson's Correlations among Caregiver Variables for ASD and Typically Developing (TD) Groups*

| Group | Measure | Subscale | K-10 | Parental Distress | PCDI | Difficult Child | PSI-SF Total | Anxiety |
|---|---|---|---|---|---|---|---|---|
| ASD | PSI-SF | Parental Distress | .807*** | – | – | – | – | – |
| | | PCDI | .148 | .310 | – | – | – | – |
| | | Difficult Child | -.200 | -.013 | .543** | – | – | – |
| | | Total | .428* | .686** | .802*** | .659*** | – | – |
| | ECR-R | Anxiety | .626** | .642** | .006 | -.256 | .256 | – |
| | | Avoidance | .638** | .597** | -.173 | -.235 | .171 | .669*** |
| TD | PSI-SF | Parental Distress | .551** | – | – | – | – | – |
| | | PCDI | .240 | .668*** | – | – | – | – |
| | | Difficult Child | .481* | .690*** | .724*** | – | – | – |
| | | Total | .502* | .910*** | .867*** | .892*** | – | – |
| | ECR-R | Anxiety | .495* | .512* | .701*** | .573** | .652** | – |
| | | Avoidance | .395† | .537** | .567** | .352 | .545** | .797*** |

PCDI = PSI-SF Parent-Child Dysfunctional Interaction subscale, † p = .06, * $p$ <.05, ** $p$ <.01, *** p < .001

To explore the relationship between child attachment and caregiver-related variables, Pearson's correlations were conducted within each group (see Table 3.3). Within the ASD group, no associations were observed between self-reported child attachment quality and parent-reported psychological distress, parenting stress or attachment. However, within the TD group, there were significant negative correlations observed between caregiver psychological distress and child-reported security, and between caregiver attachment-related anxiety on the ECR-R and child-reported security. These associations to child security seemed to relate particularly to the Availability subscale of the Security Scale. No associations in either group were observed between child attachment and parenting stress.

Table 3.3
*Pearson's Correlations between Child Attachment Variables and Caregiver Variables, for ASD and Typically Developing (TD) groups*

| Group | Measure | Scale | K-10 | Parental Distress | PCDI | Difficult Child | PSI-SF Total | ECR-R Anxiety | ECR-R Avoidance |
|---|---|---|---|---|---|---|---|---|---|
| ASD | Security Scale | | | | | | | | |
| | | Dependence | -.332 | -.223 | .200 | .160 | .019 | -.167 | -.141 |
| | | Availability | .016 | .151 | -.141 | -.089 | -.006 | .353 | .315 |
| | | Total | -.240 | -.101 | .088 | .081 | 0.12 | .027 | .030 |
| | CSQ | | | | | | | | |
| | | Preoccupied | -.218 | -.210 | .168 | .217 | .042 | -.282 | -.217 |
| | | Avoidant | .207 | .108 | .123 | -.111 | .057 | .252 | .186 |
| TD | Security Scale | | | | | | | | |
| | | Dependence | -.229 | -.171 | -.016 | -.061 | -.106 | -.204 | -.264 |
| | | Availability | -.592** | -.324 | -.168 | -.347 | -.325 | -.480* | -.233 |
| | | Total | -.501* | -.298 | -.117 | -.256 | -.265 | -.416* | -.287 |
| | CSQ | | | | | | | | |
| | | Preoccupied | .220 | -.068 | -.264 | -.231 | -.188 | -.148 | -.219 |
| | | Avoidant | -.246 | -.167 | -.021 | -.139 | -.135 | -.101 | -.028 |

* $p < .05$, ** $p < .01$

## 3.7 DISCUSSION

This study examined between- and within- group patterns of child attachment, and caregiver psychological distress, parenting stress and caregiver romantic attachment style, amongst children with ASD and typically developing children, and their primary caregiver, during middle childhood. Consistent with study hypotheses, children with ASD showed no differences in self-reported attachment security, preoccupied coping, or avoidant coping, relative to typically developing children, and caregivers of children with ASD reported greater psychological distress and parenting stress. Contrary to hypotheses, caregivers of children with ASD reported more attachment-related anxiety than caregivers of typically developing children. Lower levels of child attachment security were associated with higher levels of psychological distress and attachment-related anxiety in caregivers, but only amongst typically developing children. No such associations between child attachment and caregiver factors were observed amongst children with ASD. Findings suggest a unique relationship between children's perceptions of security and their caregiver's wellbeing and functioning within ASD dyads during middle childhood.

The current finding that children with ASD report no differences in their perceived attachment quality compared to typically developing children is consistent with the few previous studies that have employed self-report to assess attachment security in ASD during middle childhood (Bauminger et al., 2010; Chandler & Dissanayake, 2013; Wu et al., 2015). Current findings also extend upon previous research by examining the use of preoccupied and avoidant coping strategies, which are regarded as reflecting insecure working models of attachment (Yunger et al., 2005). Mean Security Scale and CSQ scores reported here for both groups bear striking similarity to those reported previously in typically developing samples (Brumariu & Kerns, 2008; Kerns et al., 2011; Kerns et al., 2006), adding weight to the suggestion that despite impairments in social interaction, theory of mind, and emotion understanding that characterise ASD, these children continue to report similar feelings of security within their relationship to their primary caregiver as typically developing children.

The finding that caregivers of children with ASD report significantly greater psychological distress and parenting stress relative to caregivers of typically developing children has been well-replicated elsewhere (e.g. Hoffman et al., 2009; Yirmiya & Shaked, 2005). Less studied has been the attachment style of these parents. Current findings indicate that caregivers of children with ASD report higher levels of attachment-related anxiety but no different attachment-related avoidance, compared to TD caregivers. This is in contrast to Lau and Peterson (2011) who previously reported no differences in romantic attachment style between parents of children with and without ASD. This inconsistency may arise from differences in methodology, as Lau and Peterson assessed participants' degree of identification with three attachment vignettes (secure, avoidant, and anxious), while the current study assessed two dimensions of attachment (anxiety and avoidance) across 36 items rated on a 7-point scale. The current methodology may offer greater sensitivity and specificity to detect patterns and variations in anxiety or avoidance amongst parents, nonetheless further replication of this finding is required to resolve these inconsistencies. The increased attachment-related anxiety reported by caregivers of children with ASD may be partly attributable to the phenotypic overlap between ECR-Anxiety scale items and general anxiety symptoms, which are reported more frequently amongst parents of children with ASD compared to other groups (Yirmiya & Shaked, 2005). Because both general anxiety and attachment-related anxiety have been associated with poorer child outcomes (van IJzendoorn, 1995), future research is needed to distinguish attachment-related worries from general anxiety in parents of children with ASD, and explore any attachment-specific impacts upon children.

Perhaps a novel finding in the current study was the observation that parenting stress on the PSI-SF was related to romantic attachment style amongst caregivers of typically developing children, but not amongst caregivers of children with ASD (with the exception of the Parental Distress scale of the PSI-SF). The Parental Distress scale is regarded as a general measure of the parent's own psychological wellbeing, and does not directly pertain to the relationship with the child (i.e. PSI-PCDI) or the child's challenging

characteristics (i.e. PSI-DC). With this in mind, it would seem that the current pattern of findings suggests that for caregivers of children with ASD, stressors that are more closely linked to the child-caregiver interaction are not related to the caregiver's own attachment insecurities, but these factors appear closely related for caregivers of typically developing children. One explanation for this pattern may be that for parents of typically developing children, their ability to cope with the demands of parenting may be strongly influenced by internal, psychologically-based, traits such as their attachment style, while parents of children with ASD may experience their attachment style as exerting less influence on their subjective coping because they face daily parenting challenges that are extreme, complex, and closely tied to their child's disorder. Indeed, studies of parenting stress regard the experience of parents of children with ASD as being shaped by external factors such as degree of child impairment (Abbeduto et al., 2004; Davis & Carter, 2008; Tomanik, Harris, & Hawkins, 2004) and social support (Falk et al., 2014). This finding is significant in suggesting that the aetiology of stress in parents of children with ASD may be different to that of parents of typically developing children, and highlights the need for parent-centred interventions to be individually tailored around the unique aetiological factors that underlie stress for parents of children with ASD.

Perceptions of security by children with ASD were unrelated to the psychological distress or attachment style of the child's caregiver. This finding was unexpected as it contrasts with both current and previous findings within typically developing dyads, and is seemingly inconsistent with previous findings in ASD suggesting that more optimal parent functioning, in terms of greater parenting sensitivity (Capps et al., 1994; Koren-Karie et al., 2009), insightfulness (Oppenheim et al., 2009), and responsiveness (Siller et al., 2014), is associated with better attachment quality for children with ASD. In the current study, parents of typically developing children who reported more psychological distress and more attachment-related anxiety had children who reported less attachment security, particularly in the domain of perceived parent availability. The fact that these relationships were not also reported for children with ASD is significant, and several

interpretations are possible. Firstly, it has been suggested that despite the challenges faced by parents of children with ASD, parents continue to report an emotional closeness with their child (Hoffman et al., 2009). Given that the factors measured in the current study (i.e. psychological distress, attachment style) are peripheral to the mechanisms thought to directly transmit security (i.e. parenting sensitivity, reflective functioning), it may be that parents are able to provide a caregiving environment that promotes child security in spite of the added stress or psychological burden that they may experience. This possibility could be explored in future through the concurrent assessment of caregiver attributes that are known to directly promote child security (i.e. sensitivity, reflective functioning), alongside other caregiving factors such as those studied here. This would allow examination of whether similar or different relationships between caregiver wellbeing, parenting, and child attachment are observed in ASD, relative to typical development.

A second possible interpretation for the observed patterns of findings is that, as van Ijzendoorn and colleagues (2007) have previously suggested, there is a true difference in the relationship between child attachment and caregiver factors within ASD. van Ijzendoorn and colleagues failed to find the expected associations between parenting sensitivity and child security that were observed in a typically developing group, and that have been reported elsewhere (Capps et al., 1994; Koren-Karie et al., 2009). They suggested that ASD-specific impairments in emotion processing, social communication, and theory of mind, may prevent children from recognising and benefitting from the parent's sensitivity in the same way as typically developing children. Current findings may reflect a similar phenomenon in which children with ASD experience difficulties recognising and comprehending their caregivers' mental states, and therefore cannot take this into account when reflecting on their own sense of security and the perceived availability of their caregiver. Children with ASD show well-documented deficits in processing emotional expressions by others (for a review see Nuske et al., 2013), and these difficulties may also be experienced within their attachment relationship. Emotion processing deficits may have implications for the caregiver-child cohesiveness and

synchrony given that, with age, children must use increasingly complex, and cognitively-based strategies to interpret and predict the caregiver's goals, motivations, and intentions, in order to better ensure the attainment of their own attachment needs from the caregiver (Kerns et al., 2006; Rogers et al., 1991). There is a need to further explore emotional processing capacities of children with ASD in the context of their attachment relationship in order to better understand the nature and impact of any impairment.

The current pattern of findings may have important implications for our understanding of the intergenerational transmission of attachment in ASD (van IJzendoorn, 1995; van Ijzendoorn et al., 2007). It has been widely established within typical dyads that attachment quality is transmitted across generations, from parent to child; secure parents are more likely to have secure children, supposedly due to the secure parent's capacity to provide more emotionally attuned, sensitive and responsive caregiving (van IJzendoorn, 1995). Contemporary mentalisation-based attachment literature recognises the importance of the child having some capacity to attend to and comprehend parent signalling in order to benefit from emotionally attuned and responsive care, and similarly the importance of the caregiver being able to accurately perceive child signalling in order to form an attuned response is also emphasised (Fonagy et al., 1991; Slade, 2009). If children with ASD are unable to perceive their caregiver's sensitive caregiving, and furthermore, if they are unable to signal their needs in a clear and comprehensible manner that can be interpreted by caregivers, there may be a disruption in the usual process by which these children might develop secure attachment (van Ijzendoorn et al., 2007). It may be that ASD dyads would benefit from interventions that focus on dyadic attunement, synchrony, and reflective functioning (Slade, 2009) as an adjunct to the more common focus on behaviour management, social skill development, and contingency-based learning strategies. Further research is warranted to examine the intergenerational transmission of attachment security in ASD in order to identify any unique barriers that may be faced within these dyads and to evaluate the usefulness of ASD interventions that incorporate an attachment focus.

Current findings must be interpreted in the context of several limitations. Firstly, the sample size studied is relatively small, and this may have limited the statistical power of the current analyses. Nonetheless, the current sample size approximates those utilised in similar research studies and features a greater representation of females than previously reported, thereby strengthening the generalisability of findings across genders. Secondly, the accuracy of self-report in assessing internal working models of attachment has been questioned (Dwyer, 2005). Internal working models are complex, largely unconscious (Bowlby, 1980), and may evoke defensive responding in insecure children (Cassidy, 1988). With specific regard to ASD, it could also be questioned whether these children can accurately report on their internal working models given their difficulties in areas of theory of mind and emotion processing. However, Chandler and Dissanayake (2013) have demonstrated good agreement between child- and parent- report on child attachment security using the Security Scale (Kerns et al., 1996), within a middle childhood sample of children with ASD, thereby providing some support for the validity of this measure within this population. In future, concerns regarding self-report may be overcome through the use of multimodal experimental designs which utilise self-report alongside projective or interview-based attachment measures (Haltigan, Ekas, Seifer, & Messinger, 2011), or by relating self-report to known correlates of attachment, to explore whether expected associations are observed (Chandler & Dissanayake, 2013).

The current study has contributed novel findings regarding the parenting correlates of child attachment amongst children with ASD. Findings suggest that while caregivers of children with ASD experience greater psychological distress, stress and attachment insecurity, their children report feeling equally secure as typically developing children. Furthermore, child security was related to caregiver distress and caregiver attachment-related anxiety only within typically developing dyads, but not within ASD dyads. The patterns of findings observed here need replication and expansion within a larger sample, however these preliminary findings may point to a mismatch between the caregiver and the child within ASD dyads. Parents are obviously challenged in many ways

in their experience of parenting a child with ASD, but children do not seem to reflect these challenges in their reported feelings of security. This may indicate that caregivers of children with ASD manage to provide their children with a secure caregiving environment in spite of their parenting challenges. Equally however, current findings may reflect a failure of children with ASD to recognise and take account of these caregiver factors in order to adaptively adjust their attachment behaviour. Insecure attachment is seen as adaptive within the context of an insecure caregiving environment because it serves as a strategy for maximising the attainment of the child's attachment needs (Ainsworth et al., 1978). Children with ASD may be less able to adapt in this way. Future research is needed to explore the impacts of caregiver-centred factors (i.e. stress, psychopathology, attachment style) and the impacts of child-centred factors (i.e. emotion processing, theory of mind) on the functioning of the attachment system in ASD.

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# CHAPTER FOUR

# SOCIAL, EMOTIONAL AND BEHAVIOURAL FACTORS ASSOCIATED WITH ATTACHMENT SECURITY IN CHILDREN WITH AND WITHOUT AUTISM SPECTRUM DISORDER DURING MIDDLE CHILDHOOD

## 4.1 PAPER COMMENTARY

Chapter 4 presents a paper that has been submitted for publication in *Research in Autism Spectrum Disorders*. This paper has been formatted (including spellings) to the specific requirements of the journal. The following is a copy of the manuscript that is under review. Page and table numbers have been re-numbered for ease of reading and to provide consistency throughout the thesis

The aim of this study was to examine how self-reported child attachment quality relates to autism symptoms, anxiety symptoms, and externalising problems (inattention, hyperactivity/impulsivity, defiance/aggression) in children with ASD and typically developing children, during middle childhood. This study sought to address certain gaps in previous research, while also extending upon emerging findings in the field.

A majority of research examining attachment relationships in ASD has focussed on young children with ASD, with a primary focus on quantifying rates of certain attachment classifications (i.e. secure vs insecure) in these children and comparing these rates to those observed in non-ASD groups (Rutgers et al., 2004). There has been limited study of what these attachment classifications mean for children with ASD, that is, what are the developmental correlates or implications of attachment quality in ASD (Bauminger et al., 2010; Dissanayake & Sigman, 2001; Rogers et al., 1993)? A better understanding of the correlates of attachment would support important theoretical questions such as whether attachment quality has the same developmental implications for children with ASD as for typically developing children (Chandler & Dissanayake, 2014; Dissanayake & Sigman, 2001).

Understanding the developmental correlates of attachment in ASD seems particularly important given the vast clinical heterogeneity seen in ASD. Attachment quality is recognised as an important moderator of social and emotional developmental trajectories in typically developing children (Bohlin & Hagekull, 2009; Bohlin et al., 2000; Ranson & Urichuk, 2008; Sroufe, 2005). Some have suggested attachment quality may also shape outcomes in ASD, within the obvious biologically-based constraints imposed by

the disorder (Oppenheim et al., 2008). Research that has examined attachment correlates in ASD, while limited, has suggested that insecurity may be associated with particular features of ASD, such as autism symptom severity (Naber et al., 2007; Rutgers et al., 2004; van Ijzendoorn et al., 2007) and broader social and cognitive outcomes (i.e. social reciprocity, joint attention; Capps et al., 1994; Hudry et al., 2013; Naber et al., 2008) during early childhood, with some suggestion that similar correlates may be observed during middle childhood (Baker et al., 2011; Bauminger et al., 2010; Wu et al., 2015).

In addition to the questions arising from existing literature, rationale for this study also arises from the findings of the two empirical papers preceding Study 3 in the current thesis. Qualitative findings of the first empirical paper (Chapter 2) highlighted an interaction between ASD impairments and attachment behaviours, such that certain impairments in emotion processing, reciprocity, and regulation that were reported within the ASD groups, were associated with a difficulties in the child's capacity to consistently use their caregiver as a secure base and co-regulator. Findings pointed to a relationship between autism symptoms and the functioning of the child-caregiver attachment relationship. Thus, this first study suggested a need to better understand these qualitatively-reported associations between autism impairments and attachment quality, and the current study endeavours to do so through the use of child- and parent-questionnaire-based methodology.

Findings of the second empirical paper of the current thesis (Chapter 3) suggested that while children with ASD report equivalent levels of attachment security as typically developing children, children with ASD may be unique in the way that their sense of attachment security relates to affective traits in their caregiver. The current study therefore sought to provide a more targeted examination of attachment quality in the context of the ASD phenotype, in order to unpack relationships between attachment quality and traits common to ASD. This paper examined autism symptoms and common comorbid problems for children with ASD (i.e. anxiety and externalising problems), alongside self-reported attachment quality.

Submitted Paper:

Keenan, B.M., Newman, L.K., Rinehart, N.J., Taffe, J.R., May, T.M., Gray, K.M. (Submitted). Social, emotional and behavioural factors associated with attachment security in children with and without Autism Spectrum Disorder during middle childhood.

## 4.2 DECLARATION FOR THESIS CHAPTER FOUR

**Declaration of the Candidate:** In the case of Chapter Four, the nature and extent of my contribution to the work was the following:

| Nature of contribution | Extent of contribution |
|---|---|
| Formulation of experimental design (in consultation with supervisors), review of the relevant literature, acquisition of ethics approval, recruitment and testing of participants, data analysis, and writing of paper. | 70% |

The following co-authors contributed to the work:

| Name | Nature of contribution |
|---|---|
| Louise Newman | Consultation in formulation of experimental design, discussion of ideas expressed in manuscript and critical review of manuscript. |
| Nicole Rinehart | Consultation in formulation of experimental design, discussion of ideas expressed in manuscript and critical review of manuscript. |
| John Taffe | Consultation in statistical analysis, discussion of ideas expressed in the manuscript and critical review of manuscript. |
| Tamara May | Consultation in formulation of experimental design, data collection, discussion of ideas expressed in manuscript and critical review of manuscript. |
| Kylie Gray | Consultation in formulation of experimental design, discussion of ideas expressed in manuscript and critical review of manuscript. |

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the candidate and co-authors' contributions to this work.

**Candidate's Signature:** [redacted] **Date:** 11/04/16

**Main Supervisor's Signature:** _____ 11/04/16

## 4.3 ABSTRACT

Autism Spectrum Disorder (ASD) is highly heterogeneous in terms of both the expression and severity of core symptoms, and the comorbid problems that may be experienced. The quality of a child's attachment to their caregiver is known to have strong associations with developmental variables in typically developing children, however little is known regarding how attachment relates to functioning in children with ASD. This study explored self-reported attachment quality and its relationship to autism symptoms, anxiety symptoms, and externalising problems, amongst 24 children with high-functioning ASD (IQ>70) and 24 typically developing children, aged 7-13 years. It was hypothesised that more optimal attachment quality would be associated with less severe autism symptoms and lower levels of anxiety and externalising problems. As hypothesised, lower levels of attachment security were associated with more severe autism symptoms and more problems with defiance/aggression, while the use of insecure preoccupied coping strategies within the attachment relationship was associated with greater anxiety symptoms. Contrary to hypotheses, problems with inattention and hyperactivity/impulsivity were not associated with attachment. Observed relationships were not moderated by group (i.e. ASD vs typically developing), suggesting similar relationships between attachment and social, emotional and behavioural functioning across groups. Theoretical and clinical implications are discussed, as well as future directions in ASD research.

Keywords: Autism Spectrum Disorder, Attachment, Middle Childhood, Autism Symptoms, Social-Emotional Functioning

## 4.4 INTRODUCTION

Early attachment experiences are highly significant in shaping developmental outcomes amongst typically-developing children (Ranson & Urichuk, 2008; Sroufe, 2005). Secure and organised patterns of attachment have demonstrated prospective and concurrent associations with better emotion regulation capacities, better quality of emotional interaction, and enhanced social functioning in typically developing children (Bohlin & Hagekull, 2009; Bohlin, Hagekull, & Rydell, 2000). Conversely, disorganised attachment and greater insecurity of attachment have associations with poorer socio-emotional outcomes, including anxiety, depression, and conduct problems later in development (Brumariu & Kerns, 2008; Brumariu & Kerns, 2010; Fearon, Bakermans-Kranenburg, van Ijzendoorn, Lapsley, & Roisman, 2010).

Children with Autism Spectrum Disorder (ASD) represent a group for whom attachment security may be particularly difficult to achieve (Dissanayake & Sigman, 2001; Hoppes & Harris, 1990; Rogers, Ozonoff, & Maslin-Cole, 1991; Slade, 2009; van Ijzendoorn et al., 2007). Children with ASD display early-emerging and enduring social interactive impairments in the areas of joint attention, reciprocity, theory of mind, affect processing, and social motivation (Baron-Cohen, Leslie, & Frith, 1985; Cassel et al., 2007; Dawson et al., 2004) that may disrupt attachment relationships. Indeed, meta-analysis of studies examining attachment classifications in children with ASD has indicated that young children with ASD display lower levels of attachment security than comparison groups, with a moderate effect size ($r = .24$; Rutgers, Bakermans-Kranenburg, van IJzendoorn, & van Berckelaer-Onnes, 2004). Given the positive developmental outcomes associated with secure attachment in typically developing children, security may also be associated with more optimal functioning in ASD. Equally however, the severity of autism symptoms may limit the attainment of attachment security (Dissanayake & Sigman, 2001). A better understanding of the clinical profile of attachment security in ASD may support therapeutic planning and intervention (Chandler & Dissanayake, 2014).

The study of attachment in ASD is theoretically and clinically important, but should not be misinterpreted. Research exploring attachment in ASD does not aim to suggest causation. Instead, such research recognises the significant role for attachment quality in shaping developmental trajectories in typically developing children, and aims to better understand the nature of any associations in children with ASD. Attachment security may well promote better outcomes in children with ASD (Chandler & Dissanayake, 2014), but equally, less impaired children may be better able to form secure attachments (Oppenheim, Koren-Karie, Dolev, & Yirmiya, 2008). An enhanced understanding of the factors associated with attachment quality in ASD may help begin to address broad but theoretically important questions of whether attachment develops in the same way in ASD (Chandler & Dissanayake, 2014; Rogers et al., 1991) and whether it serves the same function (Dissanayake & Sigman, 2001; Rogers, Ozonoff, & Maslin-Cole, 1993; van Ijzendoorn et al., 2007).

### 4.4.1 The Correlates of Attachment in ASD

The relationship between attachment security and autism symptoms has received some investigation during early childhood. In a meta-analytic study of attachment research conducted in very young children with ASD, Rutgers and colleagues (2004) identified greater autism symptom severity as one of two key factors, along with intellectual impairment, that increased the likelihood that a child with ASD would exhibit insecure attachment. Subsequent studies conducted amongst young children with autism have also found the severity of autism symptoms to be associated with insecurity (van Ijzendoorn et al., 2007), even after controlling for developmental level (Naber et al., 2007). In contrast, Koren-Karie, Oppenheim, Dolev and Yirmiya (2009) found no differences in security when comparing young children across two diagnostic categories of differing symptom severity (i.e. Autistic Disorder vs PDD-NOS). This finding may be attributable to the loss in sensitivity inherent in comparing discrete diagnostic categories rather than using a continuous measure of symptom severity. Regarding communication impairment in ASD,

better language skills have been concurrently associated with higher levels of attachment security in young children with ASD (Capps, Sigman, & Mundy, 1994; Rogers & Dilalla, 1990; Rogers et al., 1991, 1993).

Attachment quality has also been linked to broader social outcomes in children with ASD. Securely-attached children with ASD have been rated as having better social skills (Rogers et al., 1993), better joint attention skills (Capps et al., 1994), being more socially responsive and interactive during play (Hudry et al., 2013; Naber et al., 2008; Willemsen-Swinkels, Bakermans-Kranenburg, Buitelaar, van IJzendoorn, & van Engeland, 2000) and showing more symbolic play (Marcu, Oppenheim, Koren-Karie, Dolev, & Yirmiya, 2009) than those classified as insecurely attached. Early security may also have later functional outcomes, with Dolev and colleagues (2014) reporting that security in young children with ASD predicted placement in a less restrictive school setting later in childhood. Although research in ASD is limited available evidence suggests that, consistent with findings in typically developing populations, more optimal attachment has positive developmental associations for young children with ASD.

### 4.4.2 Attachment in ASD during Middle Childhood

There have been few studies exploring the correlates of attachment in ASD beyond early childhood, despite its clinical relevance within this development stage. Child-caregiver attachment relationships become increasingly cognitively and emotionally complex during middle childhood (Kerns, Tomich, & Kim, 2006), and this may pose unique challenges to children with ASD who have deficits in social and emotional interaction and understanding. It has been suggested that while young children with ASD may demonstrate secure patterns of attachment during early childhood, when child-caregiver interactions are largely behavioural in nature (i.e. characterised by proximity seeking, caregiver preference), they may struggle to maintain a sense of security beyond early childhood, when relationships become more complex (Yirmiya & Sigman, 2001). As the

attachment relationship becomes more sophisticated with age, and the attainment of security requires a good ability to understand and infer the caregiver's thoughts, goals and intentions, children with ASD may face unique challenges. Children with more severe autism symptoms may face greater challenges in attaining a secure internal working model of the caregiver beyond early childhood (Dissanayake & Sigman, 2001; Rogers et al., 1993).

Middle childhood may also be a clinically complex time in attachment terms, given the high rates of comorbid psychiatric disorders that are seen at this time. As many as 70-94% of children with ASD also meet criteria for at least one other psychiatric diagnosis (Leyfer et al., 2006; Mattila et al., 2010; Mukaddes & Fateh, 2010; Simonoff et al., 2008), exceeding rates seen in typically developing children (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). Most prevalent are Attention Deficit Hyperactivity Disorder (ADHD, 28-78%; Lee & Ousley, 2006; Leyfer et al., 2006; Mattila et al., 2010; Simonoff et al., 2008), anxiety disorders (29-42%; Mattila et al., 2010; Simonoff et al., 2008), and Oppositional Defiant Disorder (28%; Simonoff et al., 2008). Subclinical behavioural and emotional problems are also more frequent in ASD compared to typically developing groups (Gjevik, Eldevik, Fjaeran-Granum, & Sponheim, 2011; Leyfer et al., 2006; Mattila et al., 2010), and have been associated with greater functional impairment in ASD (Gotham, Brunwasser, & Lord, 2015; Sukhodolsky et al., 2008).

Behavioural and emotional problems in typically developing children are known to be shaped, at least in part, by attachment experiences (Brumariu & Kerns, 2010; Jacobvitz & Sroufe, 1987; Kerns, 2008). Understanding the degree to which autism symptoms, as well as other common comorbid behavioural and emotional problems, may be associated with attachment amongst older children with ASD is important in gaining a more holistic understanding of ASD across development. Such increased understanding will also inform interventions and supports for children with ASD and their families.

Available research into attachment during middle childhood is limited, and highlights a need to better understand this developmental stage in ASD. Bauminger,

Solomon and Rogers (2010) reported that friendship quality amongst high-functioning children (IQ>70) with ASD, aged 8-12 years, was directly associated with more positive parent-child attachment quality, measured using the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987). The authors also found friendship quality to be indirectly associated with higher levels of attachment security, measured on the Security Scale (Kerns, Aspelmeier, Gentzler, & Grabill, 2001), once the moderating effect of theory of mind skills was taken into account. Similarly, Wu and colleagues (2015) sampled high-functioning children with ASD aged 12-15 years and found that fear of being laughed at was inversely related to parent-child attachment quality on the IPPA. Baker, Seltzer and Greenberg (2011) studied a large sample of older children and young adults (10-22 years of age) with ASD and reported that poorer perceived closeness within the parent-child relationship, as reported by the parent, was associated with higher rates of parent-reported child behavioural problems. Hoffman (2009) found that parents who reported less closeness with their child on the Attachment subscale of the Parenting Stress Index (PSI; Abidin, 1995), also rated their child as displaying more behavioural and emotional problems (i.e. distractibility/hyperactivity, demandingness, mood, adaptability).

While available evidence in middle childhood seems to go some way to supporting the notion that attachment security or relational quality may be associated with better social and behavioural functioning in children with ASD, there are notable limitations to this evidence. For instance, studies have tended to compare child-report of attachment with child-report of social functioning (Bauminger et al., 2010; Wu et al., 2015) or have compared parent-report of closeness with parent-report of child functioning (Baker et al., 2011; Hoffman, Sweeney, Hodge, Lopez-Wagner, & Looney, 2009), leading to potential difficulties in interpretation. Where observation-based measures have been included in the study design (Bauminger et al., 2010; Beurkens, Hobson, & Hobson, 2013), these measures have not shown associations to questionnaire-based measures of attachment, perhaps because observable child-parent interactions take on less relevance to inferring

children's internal working models as the child ages (Dwyer, 2005). Finally, available studies have frequently sampled children across a wide age-range (i.e. 4-14 years; Beurkens et al., 2013), making the specific study of middle childhood difficult.

### 4.4.3 The Current Study

The primary aim of the current study was to examine how self-reported attachment quality relates to autism symptoms, anxiety symptoms, and externalising problems (inattention, hyperactivity/ impulsivity, defiance/aggression), in a sample of high-functioning (IQ>70) children with ASD during middle childhood (7-12 years), compared to a sample of same-age typically-developing children. It was hypothesised that more optimal attachment quality (i.e. more security, less use of insecure strategies) will be associated with less severe autism symptoms, lower levels of anxiety, and fewer externalising problems (i.e. inattention, hyperactivity/impulsivity, defiance/aggression) in both children with ASD and typically developing children.

## 4.5 MATERIALS AND METHODS

### 4.5.1 Participants

Participants were 24 high-functioning (IQ > 70) children with a DSM-IV-TR diagnosis of Autistic Disorder or Asperger's Disorder, hereafter referred to collectively as Autism Spectrum Disorder (ASD), aged between 7 and 14 years (M = 10.84, SD = 2.01), and 24 typically developing children, aged between 7 and 13 years (M = 10.60, SD = 1.80). Participants with ASD were 17 males and 7 females, while typically developing participants were 13 males and 11 females. For each participant, a primary caregiver was identified by asking "who spends the most time caring for the child?". In cases of 50:50 shared care,

families nominated a primary caregiver that would participate in the study. Across groups, there were 45 mothers, 3 grandmothers, 1 step-mother, and 1 father as primary caregiver.

Participants were recruited through Victorian public schools, online noticeboards, and community groups across metropolitan and regional Victoria and New South Wales. DSM-IV-TR (APA, 2000) diagnosis of ASD was confirmed through review of diagnostic reports from psychologists or paediatricians. Participants were excluded if they had a full-scale IQ of less than 70. All typically developing participants were rated as below the clinical cut-off on the Social Responsiveness Scale, ruling out the possibility of undetected autism in this group.

## 4.5.2 Measures

### 4.5.2.1 Intellectual Functioning

The Wechsler Intelligence Scale for Children, fourth edition, Australian version (WISC-IV; Wechsler, 2005) was used for children with ASD, and the Wechsler Abbreviated Scale of Intelligence, second edition (WASI-II; Wechsler, 2011) was used for typically developing children due to study time constraints. There is good agreement between the two scales (Wechsler, 2011). The WISC-IV derives a full scale IQ (FSIQ) score from four sub-scales; Verbal Comprehension Index (VCI), Perceptual Reasoning Index (PRI), Working Memory Index (WMI), and Processing Speed Index (PSI), while the WASI-II derives a comparable FSIQ from two sub-scales; the VCI and PRI. Where a participant had recently (< 2 years) completed a WISC-IV or the Wechsler Preschool and Primary School Intelligence scale, third edition (WPSSI-III; Wechsler, 2004), IQ scores were obtained from these reports.

#### 4.5.2.2 Child Attachment Quality

The Security Scale (Kerns, Klepac, & Cole, 1996) is a 15-item self-report questionnaire assessing children's internal working models of their primary caregiver. Items take a "some kids… other kids" format (Harter, 1982), and describe two possible states of mind with regard to the caregiver (e.g. "some kids find it easy to trust their mum, BUT others kids think it's hard to trust their mum") with children required to indicate which type of kid they are more like, and to what degree (i.e. "really true for me" or "sort of true for me"). The Security Scale has been widely used within middle childhood and has demonstrated good internal consistency and test-retest reliability (Granot & Mayseless, 2001; Kerns et al., 1996). Scores correlate with projective measures of attachment (Granot & Mayseless, 2001; Kerns, Tomich, Aspelmeier, & Contreras, 2000) and measures of maternal secure base behaviours (Kerns, Abraham, Schlegelmilch, & Morgan, 2007; Kerns et al., 2001).

The Coping Strategies Questionnaire (CSQ; Finnegan, Hodges, & Perry, 1996) is a self-report questionnaire comprising two scales capturing the child's use of preoccupied and avoidant coping strategies when relating to their caregiver in situations that may challenge or activate the attachment system (i.e. separation, new environments). Using the same response format as the Security Scale, preoccupied coping items measure the tendency to display an excessive need for the caregiver, while avoidant coping items measure the failure to rely on the caregiver in distressing situations. While the CSQ items assess patterns of behaviour (i.e. coping strategies), rather than mindsets regarding the caregiver (i.e. internal working models), the authors have advised that internal working models can be inferred from coping strategies because behaviours typically reflect internal schemas (Yunger, Corby, & Perry, 2005).

The CSQ was originally developed as a 36-item questionnaire, however a shorter 20-item version (10 items for each scale; Brumariu & Kerns, 2008) was used in the current study due to time constraints. Scores on the brief version of the CSQ are correlated

with the full-version CSQ (rs >.95) and have shown negative correlation with Security Scale scores (rs = -.33 to -.51; Brumariu & Kerns, 2008). The scale demonstrates good internal consistency, with alphas of .76 and .75 reported for preoccupied and avoidant scales, respectively (Brumariu & Kerns, 2008; Kerns, Brumariu, & Seibert, 2011).The CSQ shows concurrent associations with projective measures of attachment (Kerns et al., 2000) and child-rated parenting attributes (Yunger et al., 2005).

#### 4.5.2.3 Autism Symptomatology

##### *1.5.2.3.1 Social Symptoms*

The Social Responsiveness Scale (SRS; Constantino, 2002) is a 65 item questionnaire which measures parent-reported autism symptoms on a 4-point scale. It is intended for use with children ranging in age from 4 to 18 years. The SRS derives a Total score from 5 sub-scales; Social Awareness, Social Cognition, Social Communication, Social Motivation, and Autistic Mannerisms. The scale is widely used and has demonstrated good internal consistency ($r$ = .93-.97; Constantino, 2002; Constantino & Gruber, 2005) and test-retest reliability ($r$ = .83, Constantino et al., 2003). The scale displays convergent validity with the Autism Diagnostic Interview-Revised (Constantino et al., 2003). The SRS was employed in the current study, within both ASD and typically developing groups, as a measure of social impairment.

##### *1.5.2.3.2 Communication Symptoms*

The Children's Communication Checklist, second edition (CCC-2; Bishop, 2003, 2006) is a 70-item questionnaire which screens for communication difficulties in children aged 4-16 years. The scale comprises 10 sub-scales which are organised into general communication difficulties (A: speech, B: syntax, C: semantics and D: coherence), pragmatic language (E: inappropriate initiation, F: stereotyped language, G: use of context, and H: nonverbal communication), and behaviours associated with ASD (I: social

behaviour and J: interests). The CCC-2 yields one composite score, the General Communication Composite (GCC), which evaluates overall communication skills (higher scores indicate better ability), and one index score, the Social Interactive Difference Index (SIDI), which identifies social and pragmatic difficulties that are disproportionate to structural language abilities.

For the purposes of the current study, the GCC and SIDI were calculated in order to describe communication symptoms across the groups, and the GCC was used in subsequent analyses as a global measure of communication skill for each group. The CCC-2 has been widely used in ASD (Bishop & Baird, 2001; Geurts et al., 2004; Norbury, Nash, Baird, & Bishop, 2004; Volden & Phillips, 2010). Reliability estimates for subscales range from .66 to .80 (Bishop, 2003; Norbury et al., 2004). Subscales have been shown to distinguish clinical and non-clinical samples (Bishop & Baird, 2001; Geurts et al., 2004; Norbury et al., 2004; Volden & Phillips, 2010), and are correlated with other measures of language impairment (Volden & Phillips, 2010).

#### *1.5.2.3.3 Restricted and Repetitive Behaviours*

The Repetitive Behaviours Questionnaire, second edition (RBQ-2; Leekam et al., 2007) is a 20-item parent-report questionnaire used to assess repetitive or restricted/stereotyped patterns of behaviour and/or interests in children. A Total Score is derived from 4 sub-scales; Repetitive Motor Movements, Rigidity/Adherence to Routine, Preoccupation with Restricted Patterns of Interests, and Unusual Sensory Interest. Good internal consistency of subscales has been reported for both typically developing children ($\alpha$ = 85 to .51; Arnott et al., 2010; Leekam et al., 2007), and children with ASD ($\alpha$ = .86; Lidstone et al., 2014), as well as good across-sample validity (Leekam et al., 2007)..

### 4.5.2.4 Anxiety Symptoms and Externalising Problems

#### *1.5.2.4.4 Anxiety Symptoms*

Child- and Parent- report versions of the Spence Children's Anxiety Scale (Spence, 1998) were used in the current study (SCAS-C and SCAS-P, respectively). The scales comprise 42 and 38 items respectively, using a four-point response scale ranging from 0 to 3, with higher scores indicating a higher level of anxiety. A Total anxiety score is derived from 5 sub-scales; Social Anxiety, Separation Anxiety, Panic/Agoraphobia, Obsessive-Compulsive Disorder (OCD), and Generalised Anxiety Disorder (GAD). Subscales comprise items corresponding to anxiety disorder diagnostic criteria in the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV; American Psychiatric Association, 1994). The SCAS scales have been used in research with children with ASD (Magiati, Chan, Tan, & Poon, 2014; May, Cornish, & Rinehart, 2015; Russell & Sofronoff, 2005). SCAS scales have shown good internal consistency ($\alpha$ = .92) and 12 week test-retest reliability (r = .63) in typically developing children (Spence, Barrett, & Turner, 2003), and good internal consistency (r >.85) in children with ASD (Magiati et al., 2014). Convergent validity for SCAS scales has been established with other measures of anxiety (Spence et al., 2003).

#### *1.5.2.4.5 Externalising Problems*

The Conners Third Edition, Parent Short Form (Conners 3; Conners, 2003) is a 43-item questionnaire which assesses parent-rated externalising symptoms in children aged 6 to 18 years, across 6 sub-scales; Inattention, Hyperactivity/Impulsivity, Learning Problems, Executive Functioning, Defiance/Aggression and Peer Relations. Acceptable psychometric properties have been reported, including alphas of between .77 and .97, and test-rest reliability of between .71 and .98 (Conners, 2003). Three subscales were examined in the current study; Inattention, Hyperactivity/Impulsivity, and Defiance/Aggression.

#### 4.5.2.5 Socioeconomic Status

Residential postcodes were used to estimate family socioeconomic status, using the Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD) composite from the Australian Bureau of Statistics Socio-Economic Index for Areas data (Australian Bureau of Statistics, 2013).

### 4.5.3 Procedure

The study was approved by the Monash University Human Research Ethics Committee and the Victorian Government Department of Education and Early Childhood Development ethics committee. Parents/guardians provided informed written consent and children provided informed written assent to participate. Participants completed assessments and questionnaires at Monash University, their school, or in their own home. The WISC-IV and WASI-II subtests were administered according to standardised instructions. Children completed questionnaires using pencil and paper in the presence of the researcher, while parents/guardians completed questionnaires in their own time and returned these to the researcher in person or via mail.

### 4.5.4 Analysis

Statistical analyses were conducted using IBM SPSS Statistics, version 20. Group comparisons of demographic and behavioural variables were performed using independent samples t-tests for continuous variables and Chi square tests for categorical variables. Hierarchical regression analysis was performed to examine whether attachment variables (Security Scale total scores, Preoccupied Coping scores, Avoidant Coping scores) were associated with behavioural variables (autism symptoms, anxiety symptoms, and externalising problems), while controlling for the effects of age, gender and FSIQ.

In the interests of retaining statistical power within the current analysis, regression analyses were conducted with the whole sample, with ASD status added as an independent variable. An interaction term (ASD status x attachment variable) was included in order to determine whether any relationships between behavioural variables and attachment were moderated by group. Statistical significance was defined as $p < .05$.

## 4.6 RESULTS

Descriptive data for the ASD and typically developing groups is presented in Table 4.1. Participating caregivers in the ASD group were 20 mothers, 3 grandmothers, and 1 step-mother, while caregivers in the typically developing group were 23 mothers and 1 father. There were no differences between groups (ASD, typically developing) in terms of age ($t(1, 46) = 0.45$, $p = .66$), child gender ($\chi_2$ (1, n = 48) = .80, $p = .37$), family SES ($t(1, 46) = 0.53$, $p = .60$), caregiver type (i.e. mother vs other; $\chi 2$ (1, n = 48) = .89, $p = .35$) or number of children in family ($t(1, 46) = -.84$, p =.41). Nine of the 24 children with ASD (38%) were reported by the caregiver to be currently taking psychostimulant medication. Some children were taking multiple medications, and those reported were methylphenidate (n = 5), fluoxetine (n = 2), melatonin (n = 2), and atomexetine, clonidine, and fluvoxamine (n = 1 for each). No typically developing children were taking psychostimulant medication. Independent samples t tests indicated no difference between medicated and unmedicated children with ASD on security scores ($t(1, 22) = -1.14$, $p = .27$), preoccupied coping scores ($t(1, 22) = 2.02$, $p = .06$), or avoidant coping scores ($t(1, 22) = 0.42$, $p = .68$).

Table 4.1

*Sample Characteristics for ASD and Typically Developing Groups*

| | ASD | | | Typically Developing | | |
|---|---|---|---|---|---|---|
| | M | SD | Range | M | SD | Range |
| Chronological age (years) | 10.84 | 2.01 | 7.20–14.00 | 10.60 | 1.80 | 7.40-12.90 |
| IRSAD Score | 1016.13 | 48.54 | 923.00–1110.00 | 1006.04 | 79.73 | 903.00-1130.00 |
| Children in family | 2.00 | 0.98 | 1-4 | 2.21 | 0.72 | 1-4 |
| Age of diagnosis (years) | 5.65 | 1.89 | 2.50-10.00 | - | - | - |
| Gender, % males | | | 70.80% | | | 54.20% |
| Caregiver Type, % mother | | | 83.30% | | | 95.80% |

IRSAD, Index of Relative Socio-Economic Advantage and Disadvantage

To determine whether any sample characteristics were directly related to attachment variables, relationships were explored between the sample characteristics (age, SES, number of children in family) and attachment variables (security, preoccupied coping, avoidant coping) within each group, using Pearson's correlations (see Appendix B). No significant correlations were found ($p$>.05). To determine whether there were any significant differences on attachment variables across genders, independent samples t-tests were conducted for each attachment variable, within the ASD group and within the typically developing group. Levels of preoccupied coping were significantly higher amongst typically developing females, compared to typically developing males ($t$(1, 22) = 2.64, p = .03). No other gender differences were observed in relation to the attachment variables (p>.05).

Descriptive statistics for IQ and behavioural variables are presented in Table 4.2. Intellectual functioning was examined across groups using independent samples t-tests. No significant differences between the groups in terms of VCI ($t(1, 46) = -1.65$, $p = .11$) and PRI ($t(1, 46) = -1.09$, $p = .28$) were found, however FSIQ was significantly lower in the ASD group ($t(1, 46) = -.2.70$, $p = .01$). To examine whether children's intellectual functioning was associated with the attachment variables, Pearson's correlations were conducted on VCI, PRI, and FSIQ, and the attachment variables, see Appendix C. No significant associations were observed within each group ($p>.05$) suggesting IQ was unrelated to attachment variables within each group.

Table 4.2
*Descriptive Statistics for Behavioural Variable Raw Scores and Composite Score (where indicated) in ASD and Typically Developing (TD) Groups*

| Measure | Subscale | ASD<br>n = 24<br>M(SD) | TD<br>n = 24<br>M(SD) |
|---|---|---|---|
| Social Responsiveness Scale | | | |
| | Total | 94.29 (29.42) | 26.79 (16.55) |
| | Social Awareness | 12.50 (3.05) | 5.08 (2.93) |
| | Social Cognition | 18.04 (6.00) | 4.08 (3.20) |
| | Social Communication | 30.75 (10.98) | 8.08 (6.30) |
| | Social Motivation | 14.79 (5.49) | 5.88 (4.79) |
| | Autistic Mannerisms | 18.21 (7.60) | 3.58 (3.28) |
| Children's Communication Checklist-2 | | | |
| | Global Communication Composite | 36.04 (17.88) | 81.46 (14.88) |
| | Social Interactive Deviance Composite | -8.00 (9.68) | 0.83 (10.07) |
| Repetitive Behaviours Questionnaire-2 | | | |
| | Total | 34.38 (8.59) | 23.42(3.86) |
| | Repetitive Motor Movements | 1.62 (0.54) | 1.07 (0.15) |
| | Rigidity/Adherence to Routine | 1.81 (0.51) | 1.22 (0.32) |
| | Preoccupation/Restricted Patterns | 1.69 (0.51) | 1.23 (0.27) |
| | Unusual Sensory Interests | 1.49 (0.45) | 1.11 (0.19) |
| Spence Children's Anxiety Scale, parent report | | | |
| | Total | 30.29 (14.11) | 18.04 (7.36) |
| | Separation Anxiety | 6.38 (3.20) | 3.92 (2.70) |
| | Social Phobia | 6.42 (3.50) | 5.46 (2.47) |
| | OCD | 3.71 (3.06) | 0.96 (1.08) |

| | | | |
|---|---|---|---|
| | Panic/Agoraphobia | 3.08 (2.93) | 0.63 (0.77) |
| | Physical Injury Fears | 4.58 (2.90) | 3.46 (2.32) |
| | GAD | 6.42 (2.98) | 3.50 (1.62) |
| Spence Children's Anxiety Scale, child report | | | |
| | Total | 29.63 (13.36) | 23.92 (10.21) |
| | Separation Anxiety | 4.54 (2.89) | 4.67 (3.21) |
| | Social Phobia | 5.25 (3.51) | 4.54 (2.65) |
| | OCD | 5.67 (2.93) | 3.79 (2.30) |
| | Panic/Agoraphobia | 4.71 (3.11) | 2.67 (2.24) |
| | Physical Injury Fears | 3.46 (2.90) | 3.46 (1.89) |
| | GAD | 6.00 (2.78) | 4.79 (2.12) |
| Conners 3 | | | |
| | Inattention | 7.96 (4.27) | 3.04 (3.68) |
| | Hyperactivity/Impulsivity | 7.67 (4.10) | 2.42 (2.50) |
| | Defiance/Aggression | 1.50 (2.47) | 0.75 (1.42) |

ASD, Autism Spectrum Disorder; TD, Typically Developing; OCD, Obsessive-Compulsive Disorder; GAD, Generalised Anxiety Disorder.

### 4.6.1 Autism Symptoms and Attachment

Hierarchical regression analysis was used to assess whether attachment variables (security scale total score, preoccupied coping score, and avoidant coping score) predict child autism symptoms, while controlling for ASD status, age, gender and FSIQ (see Table 4.3). Autism symptoms were first summarised by calculating an 'autism symptom composite' score for each participant, derived from the mean of SRS(total) score, CCC-2 General Communication Composite score (reversed so that larger scores indicate greater impairment), and RBQ(total) score. It should be noted that regression analyses were also carried out with ASD status x attachment score as a predictor for all of the regression analyses presented below, however this model did not improve prediction and the interaction term was non-significant ($p$>.05) on all occasions, therefore regression analyses without interaction terms are presented throughout the current study. Attachment variables (security scale total score, preoccupied coping score, avoidant coping score) were entered at Step 1 to examine the combined prediction offered by these variables, and the model did not offer significant prediction ($F(3, 44)=0.98$, $p=.41$). ASD status, age, gender, and FSIQ were added at Step 2, and this model significantly predicted autism composite scores ($F(7, 40)=20.53$, $p<.001$) explaining 78.2% of variance in autism symptom composite scores. As indicated, security scale total scores were significantly associated with autism symptom composite scores, such that lower reported levels of security were associated with more reported autism symptoms. Preoccupied and Avoidant coping scores were not associated with autism composite scores.

Table 4.3

*Hierarchical regression analysis of Autism Composite scores, and Parent- and Child- Reported Spence Children's Anxiety Scale scores, on Attachment Variables, ASD status, Age, Gender, and Full Scale IQ (FSIQ)*

| Variable | Autism Composite Score | | Spence Children's Anxiety Scale, parent-report, total score | | Spence Children's Anxiety Scale, child-report, total score | |
|---|---|---|---|---|---|---|
| | *B* | $\Delta R^2$ | *B* | $\Delta R^2$ | *B* | $\Delta R^2$ |
| Step 1 | | <-0.01 | | 0.15 | | 0.17 |
| Security Scale | -0.49 | | -0.24 | | -0.62* | |
| Preoccupied Coping | 1.14 | | 1.18 | | 0.69 | |
| Avoidant Coping | 0.80 | | 0.29 | | -1.72 | |
| Step 2 | | .74 | | .35 | | 0.17 |
| Security Scale | -0.95* | | -0.18 | | -0.60 | |
| Preoccupied Coping | 0.12 | | 1.13** | | 0.68 | |
| Avoidant Coping | -2.09 | | -0.32 | | -2.15* | |
| ASD | 38.10*** | | 12.07** | | 5.96 | |
| Age (years) | -0.35 | | -0.26 | | 0.40 | |
| Female | -3.32 | | -4.26 | | -2.08 | |
| FSIQ | -0.37* | | 01.4 | | 0.03 | |

* $p < .05$; ** $p < .01$; *** $p < .001$; Autism Composite Score, the mean of SRS Total score, CCC-2 GCC score (reverse scored), and RBQ-2 Total score; FSIQ, Full-Scale IQ

### 4.6.2 Anxiety Symptoms and Attachment

Prior to exploring interrelations between attachment and anxiety symptomatology, parent- and child- reported anxiety symptoms on the Spence Children's Anxiety Scale were compared to assess the level of agreement across informants. This was conducted to determine whether a composite of parent-reported and child-reported anxiety symptoms could be examined, Pearson's correlations indicated SCAS-P and SCAS-C scores were significantly positively correlated within the typically developing group ($r(22) = .42$, $p = .04$), but not within the ASD group ($r(22) = .11$, $p = .60$). Given this poor agreement amongst the ASD group, SCAS-C and SCAS-P scores were examined separately in regression analyses of Spence Children's Anxiety Scale scores on attachment variables, while controlling for ASD status, age, gender, and FSIQ (see Table 4.3). For the model predicting SCAS-P scores, entry of the three attachment variables at Step 1 explained 20.3% of the variance in SCAS-P scores, $F(3, 44)=3.74$, $p<.05$. After addition of ASD status, age, gender and FSIQ at Step 2, the model explained 44.3% of the variance in SCAS-P scores ($F(7, 40)=4.55$, $p<.01$). As indicated, Preoccupied coping was a significant predictor of SCAS-P scores in the final model. For the model predicting SCAS-C scores, entry of the three attachment variables at Step 1 explained 22.5% of the variance in SCAS-C scores, $F(3,44)=4.23$, $p = .01$). After addition of ASD status, age, gender, and FSIQ at Step 2, the model explained 29.7% of variance in SCAS-C cores ($F(7, 40)=2.42$, $p<.05$). As indicated, Avoidant coping was a significant predictor of SCAS-C scores in the final model, such that higher levels of self-reported anxiety were predicted by lower reported use of avoidance.

### 4.6.3 Externalising symptoms and Attachment

With regard to externalising symptoms, given that the Conners 3 measures symptoms across a range of qualitatively different subscales (i.e. Inattention, Hyperactivity/Impulsivity, Defiance/Aggression), these subscale scores were examined in

separate regression analyses (see Table 4.4). The model for Hyperactivity/Impulsivity was non-significant at Step 1 ($F(3, 44)=0.98$, $p=.46$), but significant at Step 2 ($F(7, 40)=5.34$, $p<.001$), explaining 48.3% of variance in Hyperactivity/Impulsivity scores. The model for Inattention was non-significant at Step 1 ($F(3, 44)=0.55$, $p=.65$), but significant at Step 2 ($F(7, 40)=5.20$, $p<.001$), explaining 47.6% of variance in Inattention scores. The model for Defiance/Aggression was significant at Step 1 ($F(3, 44)=3.23$, $p=.03$), with the three attachment variables explaining 18.1% of the variance in Defiance/Aggression cores. The model was significant at Step 2 ($F(7, 40)=2.81$, $p=.01$), explaining 32.9% of the variance in Defiance/Aggression scores. As indicated in Table 4.4., no attachment variables were associated with externalising symptoms in each of the final models presented.

Table 4.4
Hierarchical Regression Analysis of Conners 3 subscales; Hyperactivity/Impulsivity, Inattention, and Defiance/Aggression, on Attachment Variables, ASD status, Age, Gender, and Full Scale IQ (FSIQ)

| Variable | Hyperactivity/Impulsivity | | Inattention | | Defiance/Aggression | |
|---|---|---|---|---|---|---|
| | *B* | $\Delta R^2$ | *B* | $\Delta R^2$ | *B* | $\Delta R^2$ |
| Step 1 | | -0.01 | | 0.15 | | 0.13 |
| Security Scale | 0.08 | | 0.15 | | -0.09 | |
| Preoccupied | 0.22 | | -0.03 | | 0.11 | |
| Coping | | | | | | |
| Avoidant Coping | 0.19 | | 0.01 | | 0.21 | |
| Step 2 | | .39 | | .35 | | 0.21 |
| Security Scale | 0.08 | | 0.02 | | -0.09 | |
| Preoccupied | 0.17 | | -0.26 | | 0.12 | |
| Coping | | | | | | |
| Avoidant Coping | -0.09 | | -0.41 | | 0.21 | |
| ASD | 4.57*** | | 4.33** | | 0.04 | |
| Age (years) | -0.19 | | -0.10 | | -0.19 | |
| Female | -2.32* | | 0.99 | | -0.99 | |
| FSIQ | -0.02 | | -0.13** | | -0.03 | |

** p < .05; ,** p < .01; *** p < .001*

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## 4.7 DISCUSSION

The current study represents a novel examination of the associations between self-reported attachment security, autism symptoms, anxiety symptoms, and externalising problems, amongst children with high-functioning ASD and typically developing children, during middle childhood. There was partial support for the study hypotheses that more optimal self-reported attachment quality would be associated with less severe autism symptoms and lower levels of anxiety symptoms. Children who reported higher levels of attachment security were rated as having less severe autism symptoms, while children who reported more use of insecure preoccupied coping strategies within their attachment relationship were rated as displaying higher levels of anxiety. Children who reported more avoidance rated themselves as less anxious. Problems with inattention or hyperactivity/impulsivity were unrelated to the child's reported attachment quality, and while the combined effects of attachment variables predicted defiance/aggression, there was no specific relationship once the effects of other variables were controlled for. Significant associations were not moderated by whether or not the child had ASD, suggesting that within the current study attachment quality was associated with social, emotional and behavioural functioning in similar ways for children with ASD and typically developing children. While this study was largely exploratory in nature and further replication and expansion of these findings is required, results suggest that attachment security may be important in understanding the presentation of children with ASD during middle childhood, just as it is important in understanding the development of typical children.

Current findings regarding autism symptom severity are consistent with previous research in ASD that has shown higher levels of attachment security to be associated with less severe autistic impairment in early childhood (Naber et al., 2007; Rutgers et al., 2004; van Ijzendoorn et al., 2007), and better social functioning during middle childhood (Bauminger et al., 2010; Wu et al., 2015). Importantly, Bauminger, Solomon and Rogers

(2010) have previously demonstrated that theory of mind, a common area of impairment for children with ASD (Baron-Cohen et al., 1985), may be important in understanding the relationships between attachment quality and social functioning in ASD. They found that attachment security, measured using the Security Scale (Kerns et al., 1996), was associated with better self-reported friendship quality only amongst children who displayed poorer theory of mind skills. The authors suggested that secure internal working models may play an indirect, compensatory mechanism, by supporting children with lower theory of mind skills to attain more positive friendship quality. While theory of mind was not specifically measured in the current study, present findings certainly support the suggestion that taking into account the heterogeneity of impairment in ASD may be important in understanding how attachment relates to developmental factors. There may be important insights to be gained from studying security in the context of specific cognitive and affective impairments in ASD, such as theory of mind or emotion processing capacities, in order to better understand the complex interrelationships that may exist between attachment security, autism symptoms, and broader social and behavioural functioning in this clinically heterogeneous group (Sivaratnam, Newman, Tonge, & Rinehart, 2015).

Children who reported more use of insecure preoccupied coping strategies were rated by caregivers as being more anxious. This is finding is consistent with previously reported associations in typically developing children during middle childhood (Brumariu & Kerns, 2008; Brumariu & Kerns, 2010; Finnegan et al., 1996; Yunger et al., 2005), where insecure-preoccupation tends to be the pattern of attachment insecurity most frequently associated with increased anxiety symptoms. Central to attachment theory is the suggestion that insecurity of attachment gives rise to anxiety (Bowlby, 1973), either through direct causation or by conferring increased vulnerability (Brumariu, Kerns, & Seibert, 2012). Current findings suggest that this association may also hold true for children with ASD, as the association was observed irrespective of group membership. When children reported on their own anxiety symptoms, an inverse relationship was observed for avoidant coping, such that more avoidance predicted lower report of anxiety

symptoms. This pattern may speak to the manner in which avoidant children respond to affective material, with previous research indicating that children with avoidant attachments are more likely to minimise or deny the experience of negative affect (Dwyer, 2005). There is a high rate of comorbid anxiety disorders detected in children with ASD (i.e. up to 40%; Mattila et al., 2010; Simonoff et al., 2008; Sukhodolsky et al., 2008; van Steensel, Bogels, & Perrin, 2011; White, Oswald, Ollendick, & Scahill, 2009). Empirically supported treatments for anxiety in ASD primarily feature the use of cognitive-behavioural therapy for high-functioning individuals (Lang, Regester, Lauderdale, Ashbaugh, & Haring, 2010; Moree & Davis, 2010; Sukhodolsky, Bloch, Panza, & Reichow, 2013). Given the current findings, it remains to be seen whether interventions within the parent-child relationship, specifically those focussed on parent-mediated interventions to support children who display preoccupied coping strategies within this relationship to learn more effective emotion co-regulation strategies, may also be helpful in ameliorating broader anxiety symptoms in children with ASD.

Problems with inattention or hyperactivity/impulsivity were not predicted by attachment quality, and while problems with defiance and aggression were predicted by the combined effects of the attachment variables at Step 1, this disappeared once other relative demographic variables were accounted for at Step 2. These findings suggest no significant relationship between externalising problem behaviours and attachment in the current sample. This is inconsistent with previous research that has found suboptimal attachment quality to be associated with problems with behavioural regulation in typically developing children (Bohlin et al., 2000; Fearon et al., 2010; Kerns et al., 2006; Lyons-Ruth, 1996; Thompson, 1998) and other clinical groups (Clarke, Ungerer, Chahoud, Johnson, & Stiefel, 2002; Schmidt Neven, Anderson, & Godber, 2002). Findings also seem inconsistent with the limited available evidence with ASD literature, such as the findings of Baker, Seltzer and Greenberg (2011), who reported that parent-rated child behavioural problems were associated poorer parent-perceive child-caregiver relational quality. Certain aspects of the current research design may have contributed to a failure to observe

the predicted relationships across the sample. For instance, in this relatively small sample size there was a low level of problems with defiance/aggression reported by parents of both children with ASD and typically developing children, perhaps leading to floor effects which obscured any relationship that may exist in a larger or clinic-based sample. Regarding problems with inattention and hyperactivity/impulsivity, rates were high within the ASD group and yet no predicted associations were observed. It may be that for the current sample, such problems are well-managed within the one-on-one context of the child-caregiver attachment relationship and therefore are not found to be associated with lower levels of preceived attachment security. Thus, while the current study extends upon the research of Baker and colleagues through the specific study of felt security, the use of a more well-define age range, and avoiding shared-method variance, there are other limitations of the current study which require attention in future research in order to clarify the relationship between attachment and behavioural problems in ASD.

A key finding of the current study was that the factors associated with attachment quality were the same across the groups, despite children with ASD displaying more impairment across the social, repetitive behaviour, communication, anxiety and externalising problem behaviour domains assessed. Whether or not a child had ASD did not impact upon the factors associated with that child's attachment security. This finding is consistent with suggestions of Rogers, Ozonoff and Maslin-Cole (1991, 1993), who highlight that the social-emotional impairments of ASD do not preclude the capacity for the development of a normative attachment relationship, and suggest that attachment quality may have a similar developmental function in ASD as in typical development (Bauminger et al., 2010). One explanation of this pattern of findings may be that secure internal working models support a child with ASD to develop better emotion regulation capacities and social skills in similar ways to that suggested by attachment theory (Bowlby, 1969/1982), and demonstrated in studies of typically developing children (Bohlin & Hagekull, 2009; Bohlin et al., 2000; Chandler & Dissanayake, 2014; Kerns et al., 1996).

Obviously, it is also possible that more severe autism symptoms may impede the development of an enriched, and secure internal working model for these children (Dissanayake & Sigman, 2001; Oppenheim et al., 2008). Current findings are nonetheless important in beginning to unpack the developmental correlates of attachment in ASD, which will inform future investigations into broader questions regarding the function of the attachment system in ASD, as well as the developmental course of attachment in ASD (Dissanayake & Sigman, 2001).

As discussed earlier, current findings need to be considered in the context of certain limitations. Firstly, the ASD diagnosis of children was not independently evaluated by the researcher. Independent confirmation using a clinical tool such as Autism Diagnostic Observation Schedule (Lord, Leventhal, & Cook, 2001) would allow greater confidence regarding the clinical composition of the ASD group at the time of participation. While caregivers were not selected based on gender the self-nominated sample of caregivers in the current study was overwhelmingly female, meaning current findings cannot be generalised to father-child attachments. It has been suggested that a child's attachment to their father becomes increasingly important during middle childhood (Steele & Steele, 2005), as fathers are considered to play an important role in supporting children to explore and engage with their broader social world. Furthermore, in the context of poor child-mother attachment quality, security with the father has been shown to be associated with children's behavioural problems and competence (Boldt, Kochanska, Yoon, & Nordling, 2014). Assessing children's attachment quality with both parents may be helpful in future in order to capture the complex interplay between parental attachment and outcomes in children with ASD. Secondly, the sample size used in the current study was relatively small and this may have limited the power of the statistical analysis in identifying associations between the study variables. Nonetheless, the exploratory nature of the study design highlights possible targets for further research. Thirdly, there have been criticisms of the effectiveness of self-report measures of attachment in accurately capturing complex and largely unconscious internal working

models during middle childhood (Dwyer, 2005). With specific regard to ASD, it has been suggested that children may be less able to accurately self-report on the internal affective states given their impairments in emotion recognition and understanding (Chandler & Dissanayake, 2014; Lopata et al., 2010; Russell & Sofronoff, 2005).

Current findings highlight several avenues for future research. Firstly, the importance of multi-modal, multi-informant assessment of attachment and behavioural functioning is clearly highlighted. The use of projective (i.e. doll story completion task; Granot & Mayseless, 2001; Kerns et al., 2011) or interview-based (i.e. Child Attachment Interview; Shmueli-Goetz, Target, Fonagy, & Datta, 2008) methods of assessing attachment, used concurrently with self-report measures, may be helpful in order to address questions regarding the validity of self-report in ASD. Secondly, because children with ASD frequently demonstrate clinical elevations in internalising and externalising problems, it may be useful in future to incorporate a clinical comparison group of children without ASD, but who have a clinical diagnosis of ADHD or anxiety disorder, in order to compare and contrast attachment associations with clinical-range mental health issues in children with and without ASD. This would help avoid possible floor effects observed within the current sample of typically-developing children, and to provide a more direct examination and isolation of unique patterns of associations that may be observable in ASD. Finally, a longitudinal approach to the study of attachment correlates in ASD will be important. Early prospective longitudinal research designs would allow for the study of the emergence of attachment patterns in the context of emerging ASD impairments in infants and young children with ASD. Such studies would contribute to discussions regarding how attachment develops in ASD and the degree of interaction between attachment processes and ASD processes, which is likely to be complex and bidirectional (Sivaratnam et al., 2015; Slade, 2009).

### 4.7.1 Conclusions

Children with ASD represent a highly heterogeneous and clinically complex group. Their impairments and difficulties have often been considered solely within the context of their biologically-based, neurodevelopmental disorder, with interventions directed at ameliorating social-cognitive deficits through skill-based training and early intervention. The child's relational context has rarely been considered, despite attachment quality being identified as an important component of a typically developing child's bio-psycho-social presentation. The current study aimed to better understand the associations between attachment quality and child functioning in ASD during middle childhood, and while the exploratory, correlational nature of the current research study does not allow for conclusions regarding causality or temporal associations between these variables, current findings demonstrate that there are concurrent associations between attachment quality and functioning in ASD, and these associations are similar to those observed in a typically developing sample. Findings suggest that attachment quality may be an important component of the holistic clinical picture of ASD. Clinical assessment and treatment planning for children with ASD should consider the attachment quality of the child, as this may highlight important avenues for clinical intervention. As has been highlighted by others (Sivaratnam et al., 2015; Slade, 2009), there is clearly a need to more closely examine the likely bi-directional nature of relationships between attachment quality, autism symptoms, and broader social and emotional functioning in ASD during middle childhood.

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# CHAPTER FIVE

# GENERAL DISCUSSION

This thesis sought to examine the attachment quality of cognitively high-functioning primary-school aged children with ASD, and the relationship of attachment quality to child social, emotional and behavioural characteristics, and caregiver emotional and relational characteristics. Both qualitative and quantitative methodologies were used to explore points of similarity and difference between children with ASD and typically developing children. This study further defines and validates the profile of attachment quality in ASD by examining attachment quality alongside a range of psychosocial correlates that are heterogeneously impacted in ASD during middle childhood, including child autism symptom severity, child internalising and externalising problems, and caregiver wellbeing. Findings of the current thesis contribute to a more holistic clinical conceptualisation of children with ASD, which takes account of relational factors in the context of biologically-based impairments inherent in ASD.

The following chapter features a discussion and integration of the findings of the three empirical papers of the current thesis. Firstly, key findings are summarised and discussed in terms of the original research aims and existing literature. Secondly, there is a discussion of the implications of the current findings, with regard to theoretical notions of ASD and attachment, clinical practice, and future research directions. Finally, study limitations are discussed and concluding remarks are offered.

## 5.1 OVERVIEW OF FINDINGS

In addressing the gaps in previous research and seeking to contribute to new directions in attachment research within the ASD population, this thesis sought to explore the nature of child-caregiver attachment relationships in children with high-functioning ASD during middle childhood, and examine the child social, emotional and behavioural characteristics, and caregiver emotional and relational characteristics, associated with attachment quality in these children. To pursue this overarching goal, several specific aims were outlined and addressed across three empirical papers. The first study (Chapter 2)

took a qualitative approach to explore caregiver's perspectives of children's attachment behaviours within the child-caregiver attachment relationship during middle childhood, contrasting the descriptions and experiences of caregivers of children with ASD with the descriptions and experiences offered by caregivers of typically developing children. The second study (Chapter 3) examined the levels of self-reported attachment security and insecurity between children with ASD and typically developing children, as well as exploring how children's self-report of security, insecure-preoccupation and insecure-avoidance related to caregiver's experience of psychological distress, parenting stress and romantic attachment style. Finally, the third study (Chapter 4) examined the associations between self-reported attachment quality, ASD symptoms, and externalising and internalising problems in ASD. The following sections feature discussion of the findings from these three empirical papers, grouping findings according to the four specific aims outlined at the beginning of this thesis. For easy reference, a summary of the current findings is presented in Table 5.1.

Table 5.1

*Summary of Key Findings*

| Study | Key Findings |
|---|---|
| **Study 1:**<br>A Qualitative Study of Attachment Relationships in ASD During Middle Childhood | • Children with ASD displayed a range of normative attachment behaviours;<br>  ○ Discriminated attachment figure<br>  ○ Preference for caregiver over stranger<br>  ○ Distress upon unexpected separation<br>• Children with ASD displayed some atypical attachment behaviours;<br>  ○ Inconsistent use of the caregiver as a secure base and safe haven<br>  ○ Difficulty using the caregiver as a source of affect co-regulation<br>• ASD-associated impairments in affect processing, reciprocity and sharing, and emotion co-regulation were important in understanding atypical attachment behaviours in children with ASD<br>• Caregivers of children with ASD had unique experiences;<br>  ○ Experiencing their child's behaviour as often contradictory or unpredictable<br>  ○ Experiencing their child as lacking empathy or awareness of the caregiver's emotional |

| | |
|---|---|
| **Study 2:**<br>Parents of Children with ASD Experience More Psychological Distress, Parenting Stress, and Attachment-Related Anxiety | • Children with ASD reported equivalent levels of attachment security, preoccupied-coping and avoidant-coping to typically developing children.<br>• Parents of children with ASD reported significantly higher levels of parenting stress, psychological distress and attachment-related anxiety<br>• Parenting stress was associated with attachment-related anxiety and avoidance, but only amongst parents of typically developing children.<br>• Child attachment security was inversely associated with caregiver psychological distress and caregiver attachment-related anxiety, but only amongst typically developing dyads. |
| **Study 3:**<br>Social, Emotional and Behavioural Factors Associated with Attachment Security in Children with and without Autism Spectrum Disorder During Middle Childhood | • Lower levels of attachment security predicted higher levels of autism symptoms, regardless of group membership (i.e. ASD vs typically developing)<br>• Higher levels of preoccupied coping were associated with higher levels of parent-reported anxiety symptoms, regardless of group membership<br>• Higher levels of avoidant coping were associated with lower levels of child-reported anxiety, regardless of group membership |

### 5.1.1 Aim 1: To explore the quality of child-caregiver attachment relationships in children with ASD during middle childhood

This first aim was pursued using qualitative and quantitative methods in the first (Chapter 3) and second (Chapter 4) empirical studies reported here, respectively. Previously, studies of attachment in ASD during middle childhood have primarily employed quantitative measures, and have generally reported no differences in attachment security between ASD and non-ASD groups (Bauminger et al., 2010; Chandler & Dissanayake, 2014; Wu et al., 2015). However, such quantitative approaches may overlook the more subtle yet important ways in which children with ASD may differ from typically developing children with regard to their attachment behaviours and interactions with their caregivers. It has also been previously highlighted that there is a need to use multiple methods when studying attachment in ASD (Haltigan, Ekas, Seifer, & Messinger, 2011). With these considerations in mind, the first (Chapter 3) and second (Chapter 4) empirical studies address this first aim.

Qualitative findings from Study 1 indicated that, consistent with early childhood studies (Capps et al., 1994; Dissanayake & Crossley, 1996; Rogers et al., 1991; Shapiro et al., 1987; Sigman & Mundy, 1989; Sigman & Ungerer, 1984), middle childhood-aged children with ASD were described as displaying clearly discriminated attachments to their caregivers, conveyed through a range of normative attachment behaviours. Nonetheless, qualitative findings also indicated that children with ASD were described as displaying impairments in more sophisticated aspects of functioning within the attachment relationship, such as the consistent and flexible use of their caregiver as a secure base to facilitate confident and safe exploration of their environment. In particular, children with ASD were described as less able use their caregiver to co-regulate their anxiety in novel environments or to help them process affective information. ASD-associated impairments in affect processing, reciprocity and sharing, and emotion co-regulation emerged as important in understanding the difficulties experienced by children within the attachment

relationship. The caregiver's experience of these atypical behaviours was also important to consider, as caregivers expressed distress at their child's apparent emotional non-responsiveness or lack of empathy, and reported difficulty inferring their child's mental state from his or her patterns of behaviours or responses.

While these qualitative findings do not offer conclusions regarding the attachment classification or degree of security displayed by children with ASD, findings are significant in highlighting the interplay between biologically-based ASD symptomatology and relationally-based attachment processes. Irrespective of whether children with ASD develop secure internal working models of their attachment figure to the same degree as typically developing children, current qualitative findings suggest that ASD-associated impairments impact the functioning of the child-caregiver attachment relationship. Further study is required however it may be that ASD impairments limit or alter opportunities for these children to learn social and emotional skills in this relational context.

Quantitative findings from study 2 indicated that there were no significant differences between rates of self-reported security amongst children with ASD and typically developing children. This was consistent with previous research using self-report measures of attachment quality during middle childhood (Bauminger et al., 2010; Chandler & Dissanayake, 2014; Wu et al., 2015). The current study also extended on previous findings by examining self-reported use of insecure-preoccupied and insecure-avoidant coping strategies within attachment relationship, with findings indicating no group differences between children with ASD and typically developing children.

Taking findings of Study 1 and 2 together, it would seem that while caregivers of children with ASD describe children as displaying impairments in the way they make use of the child-caregiver attachment relationship, children themselves report normative levels of attachment security. Several interpretations of this pattern of findings are possible. Firstly, it may be that while children with ASD display interactive impairments that adversely impact upon the cohesiveness and success of their attachment behaviours

within the attachment relationship, children themselves do not perceive their caregivers as any less available or feel any less able to depend on their caregiver for support (i.e. availability and dependence; the two subscales that comprise the Security Scale). Their caregivers may be particularly adept at adjusting their responsiveness in order to continue to create a sensitive and responsive caregiving environment that is supportive of the development of security. This would be consistent with previous suggestions that despite high levels of stress, parents of children with ASD report emotion warmth in their relationship with their children (Hoffman et al., 2009). Alternatively, it may be that children with ASD do experience challenges to their sense of security, and these challenges can be observed qualitatively, through discussion of their attachment behaviours, but are not able to be accurately captured through the use of self-report measures. There has been caution suggested around the use of self-report with children with ASD (Ozsivadjian, Hibberd, & Hollocks, 2014), with some suggesting that children with ASD display difficulties with emotion understanding and processing which lead to them having insufficient insight into their own emotional and cognitive states to report accurately on their state of mind with regard to their caregiver (Lickel, MacLean, Blakeley-Smith, & Hepburn, 2012). This possibility would benefit from further evaluation in research that employs multiple, concurrent measures of internal working models of attachment (Haltigan et al., 2011), such as the use of projective measures alongside questionnaire-based measures, or the comparison of attachment ratings alongside known correlates of attachment (Chandler & Dissanayake, 2014), such as that conducted in the third empirical paper presented here (Chapter 5).

Perhaps the most significant conclusion drawn from a comparison study 1 and study 2 findings is that there may be important ways in which attachment relationships differ between ASD and typically developing groups, regardless of any differences in overall attachment classification. For instance, current findings suggested that impairments in emotion processing and monitoring seemed to contribute to children with ASD being less able to consistently monitor the availability of the caregiver in unfamiliar

environments, leading to exploration occurring outside of a relational context (i.e. wandering off), or exploration being curtailed due to an inability to gain confidence from the caregiver (i.e. excessive proximity maintenance). Normative 'secure base' and 'safe haven' behaviour is known to facilitate social learning and emotion regulation in typically developing dyads (Ainsworth, 1973). Therefore, if this normative process is adversely impacted by the biologically-based impairments that characterise ASD, there may be secondary impacts on the learning opportunities experienced by children with ASD, beyond those naturally conferred by their biologically-determined impairment.

Qualitative findings also highlight the importance of understanding the child-caregiver relationship as a bidirectional relationship, with the caregiver's experience also playing a role in the relationship. Caregivers of children with ASD reported being distressed and challenged by their child's behaviours, experiencing a lack of empathy from their child, and being less able to infer their child's inner thoughts or intentions. This raises questions of whether child-caregiver attachment relationships where the child has ASD may be characterised by unique and complex reciprocal processes that do not play out to the same extent within typically-developing dyads. For instance, caregivers of children with ASD who are challenged by their child's presentation may necessarily respond or adjust to these challenges in ways that further shape the child's behaviour and the nature of the caregiver-child relationship. With qualitative findings highlighting interplay between ASD impairments, caregiver experience, and attachment behaviours, there seems a need to better understand these complex and likely reciprocal processes in order to best capture the development and functioning of attachment system in ASD.

In the past, ASD impairments have been largely considered in terms of how they impact the functioning of the child in a social-cognitive context, that is, how children are impaired in their capacity to interact with peers, function in academic settings, and master adaptive skills required for independent functioning (Baron-Cohen, Leslie, & Frith, 1985; Harms et al., 2010; Nuske et al., 2013). ASD impairments have rarely been considered within the context of the attachment relationship, such as how ASD-associated

impairments impact attachment relationships, or how attachment quality shapes the development of these children. Recently, there has been increasing discussion of the need to better understand how biologically-based interactive impairments in ASD may interact with relationally-driven attachment processes (Dissanayake & Sigman, 2001; Rogers et al., 1991; Sivaratnam et al., 2015; Slade, 2009). Current findings certainly highlight a need to further explore this bi-directional interaction.

### 5.1.2 Aim 2: To investigate the relationship between attachment quality and autism symptoms, across social, communication and repetitive behaviour domains

This aim was addressed in the third empirical study (Chapter 5) which sought to extend upon previous findings that suggested a relationship between the severity of ASD symptoms and attachment quality amongst children with ASD. Previous studies focussed primarily on very young children with ASD (Rutgers et al., 2004). When older samples were examined, they failed to specifically study autism symptom severity, instead studying specific aspects of broader social functioning (Bauminger et al., 2010; Wu et al., 2015), or they failed to use measures that directly tapped children's internal working models of attachment (Baker et al., 2011; Hoffman et al., 2009). Because there is vast heterogeneity in ASD with regard to the nature and extent of symptom severity, and because core aspects of ASD impairment such as social reciprocity and emotion processing skills have central relevance to the development of attachment in typically developing children, there is a need to better understand how ASD symptoms relate to attachment quality. The third empirical paper of this thesis sought to address this gap.

Findings from study 3 indicated that higher levels of self-reported attachment security were associated with less severe autism symptoms. This was consistent with studies conducted in early childhood reporting autism symptom severity to be associated with lower rates of secure attachment classification when using observation-based

measures such as the Strange Situation to measure attachment classifications (Naber et al., 2007; Rutgers et al., 2004; van Ijzendoorn et al., 2007) and studies conducted in middle childhood that reported positive associations between aspects of children's social functioning and their self-reported attachment quality (Bauminger et al., 2010; Wu et al., 2015).

The relevance of ASD symptoms to attachment quality beyond early childhood has been much discussed. Attachment relationships become more sophisticated and emotionally complex with age, as the development of an enriched internal working model of attachment increasingly depends on emotional understanding and intersubjectivity. Children with ASD may therefore face unique challenges to the development and maintenance of a secure internal working model of attachment with age. While there were no between-group differences in attachment quality (Study 2), the finding that individual differences in autism symptom severity were associated attachment security suggests that autism symptoms are important to understanding attachment during middle childhood. It may be that autism symptoms convey some challenge to the development of a secure internal working model of attachment during middle childhood, consistent with the above notions. However given findings are correlational a causal relationship cannot be established from the current findings. Nonetheless, results are important because they highlight that an association between attachment quality and autism symptoms can be seen during middle childhood. As will be discussed later in the current chapter, in the context of clinical implications, this finding highlights attachment quality as an important factor in the biopsychosocial conceptualisation of a child with ASD, just as it is for typically developing children.

### 5.1.3 Aim 3: To examine the relationship between attachment quality and common comorbid emotional and behavioural problems in ASD

This third aim was pursued in the third empirical paper (Chapter 5) of the current thesis which examined attachment quality in the context of common comorbid emotional and behavioural problems in ASD (i.e. anxiety, inattention, hyperactivity, defiance and aggression), amongst children with ASD and children with typical development. ASD is a clinically complex and heterogeneous disorder, which features a high rate of comorbid psychiatric disorders (i.e., ADHD, anxiety disorders, depression; Gargaro et al., 2011; Leyfer et al., 2006; Mattila et al., 2010; Sukhodolsky et al., 2008) as well as a range of common emotional and behavioural problems (Brereton, Tonge, & Einfeld, 2006; Lainhart, 1999) that persist across development into adulthood (Gray et al., 2012). Attachment quality has been identified as a predictor of emotional and behavioural problems in typically developing (Brumariu & Kerns, 2010; Lyons-Ruth, Easterbrooks, & Cibelli, 1997; Pierrehumbert et al., 2000) and other clinical (Goldberg, Gotowiec, & Simmons, 1995) groups. Given these factors, there is a need to better understand the relationships between comorbid problems and attachment quality in ASD.

The finding that greater self-reported use of insecure-preoccupied coping strategies within the attachment relationship was associated with higher levels of parent-reported anxiety, regardless of whether the child had ASD or not, is consistent with patterns previously reported in typically developing children during middle childhood (Brumariu & Kerns, 2008; Brumariu & Kerns, 2010; Finnegan, Hodges, & Perry, 1996). Insecure-preoccupied styles of attachment have been closely linked to anxiety symptoms in typically developing populations, with attachment theory suggesting a direct causal link (Bowlby, 1973), while empirical evidence has suggested that insecure-preoccupation confers increased vulnerability to developing an anxiety disorder (Brumariu et al., 2012).

Thus, in addition to highlighting that anxiety symptoms may show similar relationships to attachment insecurity in ASD as they do in typically developing children, the current findings suggest that attachment style may be an important factor to consider when attempting to understand the aetiology, development and treatment options for a child with ASD who also displays problems with emotion regulation or anxiety.

### 5.1.4 Aim 4: To examine the relationship between attachment quality and caregiver factors, including parenting stress, psychological distress, and romantic attachment style in ASD

This fourth aim of the thesis was proposed given the unique challenges and experiences of caregivers of children with ASD, and the relative lack of information regarding how caregiver's experiences relate to children's attachment quality. The second empirical paper (Chapter 3) addressed this aim by examining the interrelationships between child attachment, caregiver psychological distress, caregiver parenting stress and caregiver romantic attachment style.

Findings indicated that caregivers of children with ASD reported higher levels of psychological distress, parenting stress, and attachment-related anxiety, compared to caregivers of typically developing children. Findings are consistent with vast ASD literature attesting to increased levels of mental health problems (i.e. Hodge et al., 2011; Yirmiya & Shaked, 2005) and parenting stress (i.e. Bouma & Schweitzer, 1990; Hoffman et al., 2009; Montes & Halterman, 2007) in parents of children with ASD, and highlight the emotional burdens faced by these caregivers. The current finding of elevated levels of attachment-related anxiety in caregivers of children with ASD contrasts with Lau and Peterson (2011), who found that parents of children with ASD report similar levels of romantic attachment security as parents of typically developing children. Differences between current and previous findings regarding attachment quality in caregivers of children with ASD may be attributable to the different methodology used, with current

methodology offering greater sensitivity (Brennan, Clark, & Shaver, 1998). This finding requires further replication, but suggests that the challenges faced by caregivers of children with ASD may also extend to challenges within adult, interpersonal and relational contexts.

Current findings also highlight the unique nature of parenting stress in ASD, since parenting stressors in the ASD group were not related to caregiver attachment-related anxiety or avoidance, despite this association being observed in caregivers of typically developing children. This pattern of findings is consistent with previous research that has found parenting stress to be associated with child-centric factors such as degree of child impairment (Abbeduto et al., 2004; Davis & Carter, 2008; Tomanik et al., 2004), in particular child behavioural and emotional problems (Davis & Carter, 2008; Herring et al., 2006). It may be that these ASD-specific factors may exert such impact on the experience of caregivers of children with ASD, that links with their own attachment insecurities or affective vulnerabilities cannot be seen. This is in contrast to non-ASD samples, where adult attachment insecurity (i.e. avoidance or anxiety) has been associated with parenting difficulties and higher levels of parenting stress (for a review, see Jones, Cassidy, & Shaver, 2015). While this finding warrants further investigation in a larger and more closely characterised sample of caregivers, it contributes to better understanding of the nature of parenting stress in ASD and highlights the need to understand the unique nature of the ASD dyad when targeting interventions to address parenting stress.

Interestingly, lower levels of child attachment security were associated with higher levels of psychological distress and attachment-related anxiety in caregivers, but only amongst typically developing children. No associations between child attachment and caregiver factors were observed amongst children with ASD. Despite their caregivers facing unique challenges and experiencing more distress, children with ASD did not report their attachment quality as any different. Several interpretations of this pattern of findings are possible. Firstly, it may be that ASD dyads achieve security despite the many challenges they face. That is, caregivers may be able to provide adequate emotional

attunement and responsiveness despite experiencing poorer wellbeing than caregivers of typically developing children. This would be consistent with previous suggestions that caregivers are able to maintain an emotionally attuned attachment to their child despite experiencing significant parenting challenges (Hoffman et al., 2009). Alternatively, it may be that the emotion processing impairments in ASD interrupt the usual link between the caregiving environment and children's perceptions of security. Such a pattern has been previously suggested by van IJzendoorn and colleagues (2007) who proposed that biologically-based impairments of ASD may disrupt the intergenerational transmission of attachment quality in ASD. The authors proposed that the attachment quality of children with ASD is less able to be directly shaped by qualities of the caregiving environment because children with ASD are less able to detect, understand, and internalise social and emotional cues from the caregiver. The second empirical paper therefore has significant theoretical implications for understanding attachment theory in ASD, and this theme will be discussed further in next section of the current chapter, in the context of theoretical implications of the study.

## 5.2 IMPLICATIONS OF THE RESEARCH FINDINGS

### 5.2.1 Theoretical Implications

Kanner's (1943) earliest descriptions of autism featured discussion of whether these children were capable of forming affective attachments to others. Since then, there has been ongoing discussion of the validity and application of attachment theory in ASD (Bauminger et al., 2010; Dissanayake & Sigman, 2001; Rogers et al., 1991, 1993; Rutgers et al., 2004; Slade, 2009; van Ijzendoorn et al., 2007). The current thesis offers some insights into this discussion.

At the most elementary level, the current findings add to substantial existing literature (i.e. Sigman & Mundy, 1989; Sigman & Ungerer, 1984) which has established

that children with ASD display clearly discriminated and affect-based attachments to important caregivers. In doing so, the current findings refute early theories suggesting that children with autism are unable to form attachments (Bettelheim, 1967; Kanner, 1943), and support the notion that the social-emotional impairments that characterise ASD do not preclude the capacity for attachment (Rogers et al., 1991, 1993).

Current findings also have implications for later theoretical models of autism. It has been suggested that while children with ASD are able to form discriminated attachments to their caregivers, they may be less able to form secure attachments (Baron-Cohen, 1989; Rogers et al., 1991; Rogers & Pennington, 1991). Children with ASD display characteristic impairments in intersubjectivity and emotion processing skills, and these skills are thought to be essential to development enriched internal working models of attachment. For instance, some have theorised that while children with ASD may display a basic, behavioural form of attachment at a very young age (Dissanayake & Sigman, 2001; Rogers et al., 1991; Yirmiya & Sigman, 2001), these same children may struggle to develop a secure, enriched, and cognitively complex internal working model of attachment with age. Supporting this theory, current qualitative findings suggest that while children with ASD show a range of normative attachment behaviours, these were primarily those behaviours that are not reliant on the child having a sophisticated internal representation of the caregiver (i.e. displaying caregiver preference, proximity seeking with distress). As predicted by the above theory, children with ASD in the current research were often described as displaying impairments in more complex aspects of child-caregiver interaction such the use of the caregiver to regulate their anxiety and help them process affective cues, and the capacity to derive a sense of internalised security from their caregiver in unfamiliar settings. Caregiver descriptions of these difficulties suggested the children's emotion processing deficits (i.e. emotion monitoring, understanding, and reciprocity) may underlie their difficulties. However, the finding that children with ASD reported similar levels of felt security as typically developing children would seem to be in conflict with the above theory. Thus, while there are qualitative impairments in the

functioning of the attachment relationships in ASD, these did not translate to quantitative between-group differences in attachment security.

Central to discussions of attachment theory in ASD is the question of whether attachment relationships develop in a similar way for children with ASD compared to typically developing children (Bauminger et al., 2010). This is an important question as it may help address broader questions regarding the capacity of infants and children with ASD to make use of early social and affective cues, and may inform how secure attachment development can be fostered. With regard to attachment theory, findings of study 2 are consistent with suggestions that attachment representations amongst children with ASD develop differently compared to typically developing populations. In particular, the findings may offer some insights into a central tenant of attachment theory in ASD; the intergenerational transmission of attachment (Hesse, 1999; Main, 1999). A key observation central to attachment theory is that securely attached parents frequently raise securely-attached children, supposedly because possessing a secure internal working models of attachment supports increased emotional attunement, sensitivity, and responsive parenting that in turn fosters a secure attachment in the child (Ainsworth, 1967). Findings of study 2 are consistent with a possible role for ASD-associated impairments, such as emotion processing impairments, in disrupting the usual intergeneration transmission of attachment that has been characterised in typically developing dyads (van Ijzendoorn et al., 2007). This may have important theoretical implications for understanding how attachment develops in ASD, and may have consequent implications for how attachment quality is targeted within interventions with children with ASD.

Another key theoretical notion in discussions of ASD and attachment pertains to the question of whether or not attachment quality has the same developmental implications in ASD as in typical development (Chandler & Dissanayake, 2014; Dissanayake & Sigman, 2001). Again, the current thesis took a largely exploratory approach, and the correlational nature of the study design cannot offer conclusions

regarding the potential direction of effects. Despite this, the findings of the third empirical paper offer some insights. Attachment quality was associated with similar developmental correlates regardless of whether or not the child had ASD. This may be interpreted as offering support for the notion that attachment quality has similar developmental correlates in ASD as in typical development. If further research findings indicate that attachment quality shapes development in similar ways in ASD as in typical development, this would have implications for how attachment theory is applied to an ASD population, particularly in terms of directing treatment planning. This will be further discussed later in the chapter, in the context of clinical implications of the current findings.

### 5.2.2 Clinical Implications

The pattern of relationships found between child attachment quality, core ASD impairments, comorbid emotional and behavioural problems, and the caregiver experience, raise potential clinical implications for assessment and intervention with children with ASD and their families.

Current findings highlight attachment quality as an important factor to be considered in the holistic clinical assessment of children with ASD. In addition to their core impairments, children with ASD exhibit complex clinical presentations including high rates of comorbid emotional and behavioural difficulties (i.e. hyperactivity, inattention, and anxiety; Gargaro et al., 2011; Leyfer et al., 2006; Mattila et al., 2010; Sukhodolsky et al., 2008), as well as increased caregiver stress and burden (Abbeduto et al., 2004; Dabrowska & Pisula, 2010; Tomanik et al., 2004). In this complex clinical milieu, current findings highlight that the relational context of the child may be an important factor to consider when evaluating the clinical presentation and potential treatment avenues for a child with ASD. This is not to suggest that attachment quality has a role in the aetiology of primary ASD deficits or the comorbid emotional and behavioural problems faced by these children (Oppenheim et al., 2008). Instead, it may be that attachment security forms one of a range of biological, social and psychological factors

that interact with one another to shape the nature and degree of social, emotional and behavioural difficulties faced by children with ASD. In clinical terms, attachment quality may form an important aspect of the clinician's biopsychosocial conceptualisation of a child with ASD (Basu & Parry, 2013).

Findings from the current thesis contribute clinical knowledge to the issue of differential diagnosis of ASD and attachment disruption. There has been recent clinical discussion of the fact that there are different pathways that may lead to the phenomenological appearance of ASD, and there is recognition of the need to distinguish between these pathways (Basu & Parry, 2013; Phelps et al., 2012). The early deficits that characterise ASD can mirror those that are seen in cases of attachment disruption, such as impaired social interaction, deficits in communication, and poor emotion regulation (Newman & Mares, 2007; Rutter et al., 2007b; Rutter et al., 2007c). Nonetheless, there are meaningful differences in the nature of impairments in these conditions that allow for accurate differential diagnosis by skilled and informed clinicians (Phelps et al., 2012). By characterising the phenomenology of attachment relationships in ASD, the current thesis supports clinical understanding of what attachment behaviours look like in a community-based sample of children with high-functioning ASD, and how these behaviours, although atypical in many cases, differ from behaviours observed in the context of attachment disruption (Rutter et al., 2007c). Further research in this field will be important in promoting accurate differential diagnosis between ASD and disorders arising from attachment disturbance.

It has been suggested that in the current climate of increasing community awareness of ASD, health professionals may face increasing pressures to assess for, and diagnose, ASD (Phelps et al., 2012). In this climate, some have cautioned against clinicians viewing children who present for assessment of social-communication difficulties through an ASD "lens" that negates adequate consideration of other contextual factors related to the child and the family (Stiefel, Shields, Swain, & Innes, 2008). By highlighting the

profile of attachment quality and its correlates in ASD, the current thesis advocates for thoughtful and holistic assessment of children with ASD.

Qualitative findings highlight new avenues for clinical intervention in ASD. Currently, the most commonly implemented and empirically supported intervention in ASD is based on the principles of Applied Behaviour Analysis (ABA; Reichow, Barton, Boyd, & Hume, 2012) and primarily targets social, academic, self-care, and behavioural skills through the use of high-dose, structured, repeated learning experiences and positive reinforcement (Lovaas, 1987). Recently, there has been a focus on considering the effectiveness of parent-mediated approaches that focus on enhancing parental responsiveness to children's social communications and signalling (Kasari et al., 2014), rather than directing child behaviour as per ABA-based interventions. Indeed, parent-mediated approaches aimed at increasing parent responsivity have shown efficacy with children with ASD (Green et al., 2010; Kasari, Gulsrud, Paparella, Hellemann, & Berry, 2015; Siller, Hutman, & Sigman, 2013).

In line with this recent focus on parent-mediated approaches and parent responsivity, current findings highlight potential value in an attachment-oriented, mentalisation-based approach to intervention in ASD (Slade, 2009). Caregivers of children with ASD frequently described their children as displaying difficulty judging the caregiver's mental or emotional state, while caregivers themselves reported difficulty inferring the thoughts or intentions underlying their child's atypical behaviour. This capacity for mentalisation is highlighted within contemporary attachment literature as crucial to the development of secure attachment, as it enables the parents to respond more sensitively, and co-regulate and mirror the infant's emotions more effectively (Fonagy et al., 2002; Slade et al., 2005). In turn, a capacity for reflective functioning promotes child security (Beebe et al., 2010; Grienenberger, Kelly, & Slade, 2005; Slade et al., 2005) and the development of core social and emotional skills (Fonagy et al., 1991; Meins et al., 1998; Meins et al., 2002). Attachment- and mentalisation- based approaches that aim to enhance parental reflective capacity have been most commonly trialled during very early

childhood, and targeted at populations deemed to be at high-risk of parenting difficulties and attachment disruption (Marvin, Cooper, Hoffman, & Powell, 2002; Pajulo et al., 2012; Salomonsson, Sorjonen, & Salomonsson, 2015; Schechter et al., 2006; Suchman, DeCoste, Castiglioni, Legow, & Mayes, 2008; Suchman et al., 2010). There is preliminary evidence of the effectiveness of such interventions in promoting parental reflective functioning (Pajulo et al., 2012; Suchman et al., 2008; Suchman et al., 2010). Such an approach may have clinical value in ASD, since there may be a biologically-based deficit in mentalisation within these dyads (Baron-Cohen, 1995; Slade, 2009).

Emerging intervention literature in ASD has begun to examine the role of parental responsive behaviours in fostering positive social and emotional development in young children with ASD. Siller, Hutman and Sigman (2013) trialled an intervention, Focused Playtime Intervention (FPI), aimed at enhancing responsive parental behaviours during parent-child play interactions in parents of young children with ASD, and found post-treatment gains in responsive parent behaviour, and 12-month follow-up gains in child expressive communication amongst children who started the intervention with less advanced language skills. Expanding on this, the authors examined child attachment outcomes in a later study (Siller et al., 2014), and found that children with ASD who received the FPI intervention displayed greater gains in attachment-related behaviours, compared to children with ASD who received a control intervention. While these intervention studies did not specifically target parental reflective function, they suggest that interventions that aim to support parent-child attunement may have positive attachment-related implications for children with ASD. In the future, interventions focussed on helping caregivers to build reflective capacity in the face of the unique challenges of ASD may support children with ASD to better "access" early social and emotional learning opportunities within the child-caregiver attachment relationship, and provide a caregiving environment that best supports optimal socio-emotional development within the obvious limitations posed by their biologically-based disorder (Oppenheim et al., 2008).

## 5.3 LIMITATIONS

The findings of the current thesis need to be interpreted within the context of several limitations. Specific limitations as they pertain to each study have been discussed within each empirical paper, however the most significant, broad-ranging limitations inherent in the current thesis will be summarised and discussed here. These are: the limitations of correlational research, the limitations of self-report attachment measures, the limited information collected with regard to demographic and diagnostic factors for children and caregivers, and the poor representation of male caregivers.

It is acknowledged that a key overarching limitation of the current thesis is the correlational nature of the studies presented, as this design limits the conclusions that can be drawn from the data. In this thesis, specific child attachment variables were studied alongside specific child social and emotional characteristics and caregiver psychological characteristics. These measures were conducted at one time point only, and reflect only a finite number of broad-ranging child or parent variables that may be important to the study of attachment and ASD. While such correlational analysis allows for conclusions regarding relationships between study variables, this study design did not allow for conclusions to be made regarding causality, direction of effects, or indeed whether other variables (i.e. theory of mind) may also be important to the relationships observed. A nuanced interpretation of the current study findings is therefore important. With this in mind, the current thesis has contributed to the description of an area of study that has received little previous empirical attention, and points to several important future directions in the field, as will be discussed later in this chapter.

The measurement of attachment during middle childhood has long been recognised as an empirical challenge (Dwyer, 2005; Kerns, 2008; Kerns & Seibert, in press). Prior to middle childhood, attachment quality is typically demonstrated through overt attachment behaviours which can be captured through observation-based

paradigms, such as the gold-standard Strange Situation Paradigm (Ainsworth et al., 1978). Beyond middle childhood, increasing cognitive development and reflective capacity means that attachment representations can be evoked through interview-based measures, such as the Adult Attachment Interview (George, Kaplan, & Main, 1985). Middle childhood represents a challenging developmental period for the measurement of attachment representations since overt displays of attachment behaviour are less frequent and typically require a significant stressor that would make empirical study unfeasible, and children at this age may lack sufficient cognitive sophistication to engage in formal interview-based approaches. Existing projective and interview-based methods are time-consuming and require substantial training. An acceptable compromise for middle childhood has been the use of questionnaire-based measures (Dwyer, 2005; Kerns & Seibert, in press), which capture attachment representations through the use of items aimed to reduce defensive responding. As discussed within each empirical paper, the questionnaire-based attachment measures used in the current thesis have received support for their reliability and validity (Granot & Mayseless, 2001; Kerns, Abraham, Schlegelmilch, & Morgan, 2007; Kerns, Klepac, & Cole, 1996; Kerns et al., 2000). Nonetheless, there have been certain criticisms of questionnaire-based measures including that they rely on significant self-insight, may fail to capture the full complexity of individual differences in attachment representations (Dwyer, 2005), and may evoke defensive responding in insecure children (Cassidy, 1988).

The use of questionnaire-based measures of attachment with children with ASD may have unique limitations due to the unique deficits of this population and lack the same empirical evaluation as has been demonstrated in typically developing populations. Children with ASD may be less able to report on their own affective or cognitive states, given their impairments in emotion understanding (Chandler & Dissanayake, 2014; Lopata et al., 2010; Russell & Sofronoff, 2005). Consistent with this suggestion, poor agreement between child and parent ratings of child anxiety (May, Cornish, & Rinehart, 2015; Russell & Sofronoff, 2005) and depression (Lopata et al., 2010) has been reported

with the use of questionnaire-based measures with children with ASD during middle childhood (ages 7-13), with suggestions that children with ASD may underreport their symptoms compared to parents. Nonetheless, other have reported good agreement; Ozsivadjian, Hibberd and Hollocks (2014) found good agreement between child and parent ratings of anxiety and depression in a sample of boys with high-functioning ASD, aged 11-15 years of age, while Magiati, Chan, Tan, and Poon (2014) reported agreement on ratings of anxiety in a mixed sample of cognitively high- and low- functioning children with ASD (M = 12.83 years, SD = 2.5 years). In these diverse findings, one study has examined the child-parent agreement with regard to attachment representations. Chandler and Dissanayake (2014) studied boys (aged 8-12 years) with high-functioning ASD and reported good agreement between child- and parent- ratings on the dependency sub-scale of the Security Scale, suggesting children with ASD report on their of child attachment security using the Security Scale, suggesting children with ASD may be reporting in ways consistent with their parents' perceptions. Thus, while there is evidence in support of the validity of self-report on the Security Scale in ASD, the complexities associated with the use of self-report measures in ASD must be taken into consideration when interpreting the current findings. Further evaluation of the validity of these measures, alongside projective or interview-based measures, would offer greater clarity around this issue.

In recognition of the complex, bi-directional nature of attachment relationships, attachment literature typically features extensive recording of demographic, social, economic, and psychological factors of both children and caregivers, in order to put the attachment relationship within a rich context. While certain demographic factors were recorded and taken into account (i.e. child age, caregiver type, SES), the current thesis does not feature the same level of detail with regard to child and caregiver characteristics as may be reported elsewhere. This warrants consideration, particularly given that the experience of the caregiver emerged as central to the understanding of the observed relationships in both study 1 (Chapter 3) and study 2 (Chapter 4) within the current thesis.

Patterns of findings within these first two studies may have been better understood with more detailed information regarding the caregivers. With specific regard to children with ASD, a limitation of the current study is that ASD diagnosis was not independently verified by the researcher. Instead, diagnosis was confirmed through review of diagnostic reports by a psychologist or paediatrician, provided by caregivers. Independent confirmation by the researcher, using a clinical tool such as the ADOS, would have allowed for greater confidence regarding the composition of the ASD group at the time of the study, while also providing richer clinical information regarding the range and nature of autism symptoms for each child.

While recruitment of caregivers was not based on gender, the resultant sample of caregivers featured an underrepresentation of male caregivers, with only one male participating across the sample. This limitation of sampling means that the observed results cannot be generalised to male caregivers or father-child attachment relationships. A child's attachment to their father becomes increasingly important during middle childhood, as fathers play a central role in fostering the engagement of children in their broader social world (Steele & Steele, 2005) and father-child attachment quality has been associated with children's social competence and behavioural problems at this time (Boldt, Kochanska, Yoon, & Nordling, 2014). Given that the increasing social demands of middle childhood, it may be a vulnerable time for children with ASD. Considering attachments to male caregivers may shed further light on the complex relationship between attachment quality and psychosocial functioning in ASD during middle childhood.

## 5.4 FUTURE DIRECTIONS

The study of attachment in ASD remains in its early stages, and while findings from the current thesis have been helpful in beginning to unpack relationships between core ASD symptomatology, comorbid problems, attachment behaviours, internal attachment representations, and the caregiver experience, further research is certainly required. The

current study represents a largely exploratory, correlational approach to the study of attachment during middle childhood. There is need for replication and expansion of the current findings, perhaps within a larger sample of children with ASD, whose diagnosis has been defined and described in detail. There is also a need for a more targeted approach to the future study of attachment variables alongside the social, emotional, behavioural and caregiver factors identified here. For instance, patterns of findings within the current thesis suggest a role for emotion processing impairments and intersubjective understanding in shaping the nature and quality of attachment behaviours and attachment perceptions in ASD. Consistent with this, Bauminger and colleagues (2010) suggested that an aspect of intersubjective understanding, theory of mind, may be an important moderator of the relationships between attachment quality and broader social functioning. Thus, with current and previous findings suggesting the involvement of emotion processing skills and intersubjectivity in attachment in ASD, there is a need for further research to examine the relationship between attachment quality, emotion processing, intersubjective skills, and broader psychosocial outcomes.

As has been previously suggested (Bauminger et al., 2010), there is a need for longitudinal studies of attachment quality in ASD, in order to examine the development of attachment quality over time, and to determine whether attachment security has similar or distinct implications for developmental trajectories in ASD, as those that have been well-characterised in typical development. Using a longitudinal, prospective approach, Haltigan and colleagues (2011) studied infants 'at risk' of developing ASD (as they had an older sibling with ASD). While the authors found no differences in the security of attachment displayed by infant siblings of a child with ASD (ASD-sib) compared to infant siblings of a typically-developing child (COMP-sib), differences were noted with regard to how attachment security was expressed. While this represents a preliminary finding, since the study was conducted at an age (15 months) when ASD-sibs cannot be assessed with regard to their own ASD status, there is clearly empirical value to this approach as it circumvents the challenge of not being able to reliably identify and diagnose autism in

very young children. Current findings highlight the reciprocal, bi-directional nature of attachment interactions in ASD. Therefore, it seems clear that a longitudinal, prospective study of attachment relationships in ASD would provide rich clinical detail regarding the concurrent development and trajectory of attachment processes alongside biologically-based ASD processes

There is need for further research to examine caregiver-centred factors in the context of child attachment in ASD. Empirical studies of family processes in ASD have typically focussed on the impact of child-centred factors (i.e. challenging behaviours, burden of care) on caregiver wellbeing, parenting behaviours and family stress (Baker et al., 2011; Davis & Carter, 2008; Tomanik et al., 2004). While this has clinical significance given the unique challenges that caregivers face, it has been argued that there remains a need to take account of the transactional nature of child-caregiver relationships (Baker et al., 2011). Baker and colleagues highlight the importance of capturing the bi-directional nature of child-caregiver relationships, and how each party may influence the other. Examining the attachment quality of children with ASD, alongside caregiver-centred factors such as parenting stress, sensitivity, and reflective functioning, will support a more comprehensive understanding of attachment relationships in ASD.

Future research is needed to examine the utility of attachment-focussed or mentalisation-based interventions in ASD. Mentalisation-based interventions have shown clinical utility in building reflective functioning capacities in caregivers of non-ASD children (Pajulo et al., 2012; Suchman et al., 2008; Suchman et al., 2010). Preliminary studies in ASD have demonstrated that interventions aimed at promoting responsive parental behaviours in caregivers of children with ASD have positive impacts on attachment behaviour in children with ASD (Siller et al., 2014). As Baker, Seltzer, and Greenberg (2011) highlight, there is a need for intervention in ASD to take into account the reciprocal, transactional processes that occur between child and caregiver and shape interactions within the ASD dyad. An attachment- or mentalisation- based approach or orientation to therapeutic intervention in ASD may be better suited to target these

complex and reciprocal relational processes in ASD, compared to a child-focused intervention that primarily targets skill acquisition.

## 5.5 CONCLUDING REMARKS

In conclusion, the current thesis has highlighted the child-caregiver attachment relationship as a multifaceted, bi-directional, and clinically important aspect to the holistic understanding of ASD during middle childhood. Findings of the current thesis have contributed to vast literature which has debunked early, simplistic descriptions of ASD as a disorder featuring an incapacity for affective attachments, while also extending upon contemporary research by exploring broad-ranging links between attachment quality and core ASD symptomatology, comorbid problems, and the caregiver experience.

There have been several paradigm shifts in the conceptualisation of ASD since it was first defined. Harmful early psychogenic theories of autism incorrectly placed blame on parents by suggesting a "refrigerator mother" cause of autism. Subsequent to this, there was widespread recognition and focus on the neurobiological underpinnings of ASD, with research revealing strong genetic and biological risk factors and identifying areas of neurobiological impairment. A neurobiological focus in ASD has been helpful in developing evidence-based procedures for early detection and appropriate interventions. However, some have suggested that with this neurobiological focus, there has been insufficient consideration of the role of non-biological factors in the lives and development of children with ASD (Basu & Parry, 2013). Perhaps due to the harm caused by early psychogenic theories, there has been some reluctance to re-evaluate the role of the relational environment in ASD, for fear of misinterpretation or renewed stigmatisation of parents of children with ASD. However, with advances in contemporary attachment literature and increased appreciation of the role that the caregiving environment plays in shaping developmental trajectories, it may be time for a more holistic view of children

with ASD; a view which takes account of the complex and interacting impacts of genetics, biology, and environment, in the clinical conceptualisation of children with ASD.

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# APPENDICES

## 7.1 APPENDIX A

**Disturbances of Attachment Interview_ SCORING**

**1)** Does s/he have one special adult that s/he prefers? Who is it? How does s/he show that he prefers that person? Could you give me a specific example? Are there any other adults that are special, like this? Who does he prefer most of all?

**0 Clearly differentiates among adults**
**1 Sometimes or somewhat differentiates among adults**
**2 Rarely or minimally differentiates among adults**

**2)** When s/he falls down and hurts himself/herself what does s/he do? Is s/he one to sit where s/he is and wait for you or other caregivers to come or does s/he come over and tell you when s/he is hurt? Does she ever go to people that she doesn't know well for comfort? Does she ever go to someone unfamiliar for comfort even when someone familiar is available?

**0 Clearly seeks comfort preferentially from a preferred caregiver**
**1 Sometimes or somewhat seeks comfort preferentially from a preferred caregiver**
**2 Rarely or minimally seeks comfort preferentially from a preferred caregiver**

0 **[The following item is rated but does not count in scoring]**
**0 Actively seeks comfort from an available caregiver when hurt or upset.**
**1 Sometimes or somewhat seeks comfort from an available adult caregiver when hurt or upset.**
**2 Rarely or minimally seeks comfort from an available caregiver when hurt or distressed; sits and cries or does not cry at all when hurt or distressed.**

**3)** When s/he does come to you/or the preferred caregiver (or when you go to him/her) does s/he accept being comforted or is s/he one to take a while to calm down?

**0 Clearly responds to comfort from caregivers when hurt, frightened, or distressed**
**1 Sometimes or somewhat responds to comfort from caregivers when hurt, frightened, or distressed**
**2 Rarely or minimally responds to comfort from caregivers when hurt, frightened, or distressed**

**4)** Does s/he share things back and forth with you, let's say, talk with you or show you that s/he's excited about something or is s/he one to not really share back and forth? Does s/he take turns talking or gesturing with you?

**0 Clearly responds reciprocally with familiar caregivers**
**1 Sometimes or somewhat responds reciprocally with familiar caregivers**
**2 Rarely or minimally responds reciprocally with familiar caregivers**

**5)** How are his/her moods? Is s/he generally happy or is s/he one to be more irritable or sad or serious? Would you say s/he is like that most of the time or some of the time? How much of the time is s/he sad, serious, or irritable.

**0** **Clearly regulates emotions well with ample positive affect and developmentally expectable levels of irritability and/or sadness.**
**1** **Sometimes or somewhat has difficulty regulating emotions with less positive affect and more irritability and/or sadness than is expected developmentally**
**2** **Rarely or minimally regulates emotions well; instead, has little positive affect and definitely elevated levels of irritability and/or sadness.**

**6)** When you are in a place that is not familiar for [child], what does s/he do? Does s/he check back with you or s/he one to just go off without checking back? Does s/he tend to wander off without any particular purpose? If s/he finds him/herself separated from you does s/he get upset or does it seem to not really bother him/her?

**0** **Clearly checks back with caregiver after venturing away, especially in unfamiliar settings.**
**1** **Sometimes or somewhat checks back with caregiver after venturing away, especially in unfamiliar settings.**
**2** **Rarely or minimally checks back with caregiver after venturing away, especially in unfamiliar settings.**

**7)** How does s/he behave around adults that s/he doesn't know? Does s/he tend to be friendly or is s/he one to stand back and observe or to approach? Does s/he tend to be sort of shy around strangers or is s/he one to go right up to people s/he doesn't know? (If yes, why do you think s/he does this?) Does s/he cry or cling to you or does she just seem wary/cautious? Does s/he do this all the time or some of the time? Is his/her reaction sort of mixed so that at some times s/he is friendly but other times she might cry or s/he is friendly with some unfamiliar adults but not with others? Could you give me a specific example of a time when s/he was around an adult that s/he didn't know?
If shy, does s/he seem to be shy at first and then tend to warm up or does s/he stay shy? Has she been consistently shy over time or has that been variable? For example, was she at one time more shy or less shy than she is now? (For **Adopted/Foster children**: Has s/he been the same in terms of shyness since you have known him/her or has her/his level of shyness changed at all?)

**0** **Clearly exhibits reticence with unfamiliar adults**
**1** **Sometimes or somewhat exhibits reticence with unfamiliar adults**
**2** **Rarely or minimally exhibits reticence with unfamiliar adults**

**8)** Do you think s/he would be willing to go off with a stranger? Why do you think so? Could you give me a specific example? Do you think s/he would do this some of the time or most of the time? Has this way of interacting with strangers changed? Was s/he more/less willing at an earlier age to go off with someone s/he didn't know?

**0** **Clearly is not willing to go off readily with relative strangers.**
**1** **Sometimes or somewhat is willing to go off readily with relative strangers.**
**2** **Willing to go off readily with relative strangers.**

**9)** Is s/he one to get him/herself is risky situations? Could you give me a specific example? Is s/he one to run out into traffic or maybe pull stuff off of the stove? Does s/he seem to try to provoke you with his/her dangerous behavior? Does s/he do this with everyone or does s/he do this mostly around one particular person? Why do you think s/he does it?

**0 Clearly does not engage in a pattern of self-endangering behavior that is more pronounced in the presence of one particular caregiver.**
**1 Sometimes or somewhat engages in a pattern of self-endangering behavior that is more pronounced with one particular caregiver.**
**2 Definitely engages in a pattern of self-endangering behavior that is more pronounced with one particular caregiver.**

**10)** Does s/he tend to cling to you or stay right up under you? When does this seem to happen? Does it seem to happen if there is an adult around who she doesn't know? Or does it tend to happen at other times, too? Could you give me a specific example?
**0 Clearly does not engage in a pattern of excessive clinging to a particular caregiver in unfamiliar settings or with unfamiliar people.**
**1 Sometimes or somewhat engages in a pattern of excessive clinging to a particular caregiver in unfamiliar settings or with unfamiliar people.**
**2 Definitely engages in a pattern of excessive clinging to a particular caregiver in unfamiliar settings or with unfamiliar people.**

**11)** Does s/he tend to watch you or other caregivers a lot of the time, like watching to see what your or their moods are? Does she ever seem to be a bit afraid of any caregivers, or to do exactly what they want, in a sort of automatic way?
**0 Clearly does not engage in a pattern of fearful, inhibited, and hypervigilant behavior with any particular caregiver.**
**1 Sometimes or somewhat engages in a pattern of fearful, inhibited, and hypervigilant behavior with any particular caregiver.**
**2 Definitely engages in a pattern of fearful, inhibited, and hypervigilant behavior with any particular caregiver.**

**12)** Does s/he seem to know when you or other caregivers are sad or mad or upset? What will s/he do? Could you give me a specific example? Does s/he ever seem worried about you (or other caregivers) or worried for you (or other caregivers)? Could you give me an example? Does s/he seem almost preoccupied by how you (or other caregivers) are doing? Why do you think s/he does this? Do you ever think that it may be a bit too much for a child his/her age?
**0 Clearly does not engage in a pattern of controlling or role inappropriate behavior suggesting excessive preoccupation with caregiver's emotional well-being.**
**1 Sometimes or somewhat engages in a pattern of controlling or role inappropriate behavior suggesting excessive preoccupation with caregiver's emotional well-being.**
**3 Definitely engages in a pattern of controlling or role inappropriate behavior suggesting excessive preoccupation with caregiver's emotional well-being.**

| **DISTURBANCES OF ATTACHMENT INTERVIEW (DAI)** | |
|---|---|
| **Disturbances of Non-attachment**<br>**0 = behavior clearly present; 1 = behavior somewhat or sometimes present; 2 = behavior rarely or minimally present** | **SCORE** |
| 1. Differentiates among adults | |
| 2a. Seeks comfort preferentially | |
| 2b. Actively seeks comfort when hurt/upset | |
| 3. Responds to comfort when hurt/frightened | |
| 4. Responds reciprocally with familiar caregivers | |
| 5. Regulates emotions well | |

| | |
|---|---|
| 6. Checks back with caregiver in unfamiliar setting | |
| 7. Exhibits reticence with unfamiliar adults | |
| 8. Unwilling to go off with a relative stranger | |
| **Secure Base Distortions**<br>**0 = pattern not present; 1 = pattern sometimes present; 2 = pattern definitely present** | **SCORE** |
| 9. Self-endangering | |
| 10. Excessive clinging | |
| 11. Fearful, inhibited, hypervigilant w/caregiver | |
| 12. Pattern of controlling, role inappropriate behavior | |
| **DAI Sum Score** | **SCORE** |
| Non-attachment/Inhibited (Items 1-5) | |
| Non-attachment/Disinhibited (Items 1, 6-8) | |
| Indiscriminate Behavior (Items 6-8) | |
| Secure Base Distortions (Items 9-12) | |

Add items 1, 2a, 3, 4, 5. The sum is the score for Non-attachment/Inhibited.
Add items 1, 6, 7, 8. The sum is the score for Non-attachment/Disinhibited.
Add items 6, 7, 8. The sum is the score for Indiscriminate Behavior.
Items 9, 10, 11, 12 are separate types of Secure Base Distortions.

## 7.2 APPENDIX B

Table 1

*Pearson's Correlation Coefficients (r) between Sample Characteristics and Attachment Variables within ASD and Typically Developing Groups*

| Group | | IRSAD | Number of Children in Family | Security Scale, Total | CSQ, Preoccupied | CSQ, Avoidant |
|---|---|---|---|---|---|---|
| ASD | Age, years | 0.12 | -0.22 | -0.28 | -0.33 | 0.23 |
| | IRSAD | | 0.03 | 0.32 | 0.19 | -0.27 |
| | Number of Children in Family | | | 0.16 | 0.12 | -0.11 |
| | Security Scale, Total | | | | 0.12 | -.50* |
| | CSQ, Preoccupied | | | | | -0.25 |
| TD | Age, years | -.41* | 0.17 | 0.03 | -0.18 | 0.27 |
| | IRSAD | | -0.3 | -0.09 | -0.35 | 0.351 |
| | Number of Children in Family | | | -0.3 | 0.13 | -0.024 |
| | Security Scale, Total | | | | -0.22 | -0.221 |
| | CSQ, Preoccupied | | | | | -.447* |

ASD, Autism Spectrum Disorder; TD, Typically Developing

## 7.3 APPENDIX C

Table 1

*Pearson's Correlation Coefficients (r) between IQ Variables and Attachment Variables within ASD and Typically Developing Groups*

| Group | | VCI | PRI | Security Scale, Total | CSQ, Preoccupied | CSQ, Avoidant |
|---|---|---|---|---|---|---|
| ASD | FSIQ | 0.80** | .75** | -0.19 | -0.13 | 0.00 |
| | VCI | | 0.34 | -0.22 | -0.31 | 0.11 |
| | PRI | | | -0.28 | -0.12 | -0.06 |
| TD | FSIQ | 0.76** | 0.79** | -0.21 | -0.19 | 0.21 |
| | VCI | | 0.25 | -0.14 | -0.20 | 0.20 |
| | PRI | | | -0.32 | -0.02 | -0.10 |

** $p < .01$; ASD, Autism Spectrum Disorder; TD; Typically Developing; FSIQ, Full-Scale IQ; VCI, Verbal Comprehension Index; PRI, Perceptual Reasoning Index