

The Relationship between Childhood Attachment, Parenting Styles and Social Development in Autism Spectrum Disorder

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COMPULSORY DECLARATION

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Table of Contents

List of Figures	6
List of Tables	6
Abstract.....	7
Introduction.....	9
Attachment.....	13
Attachment in ASD.....	15
Parenting	18
Parenting styles in ASD.....	20
Social Development	23
Theory of Mind.....	23
Relationships between Attachment and Parenting, and Social Development.....	24
Rationale	25
Aims	26
Research Questions and Hypotheses.....	27
Method.....	28
Research Design.....	28
Participants.....	28
Measures	31
Demographic questionnaire.....	31
Screening for language comprehension deficits.....	31
ASD symptoms.....	32
Attachment.....	32
Parenting styles.....	33
Theory of Mind.....	34
General Intellectual functioning.....	35
Working Memory.....	36
Procedure	37
Screening and recruitment.....	37
Data collection from parents.....	37
Data collection from the children.....	38
Ethical Considerations	38
Data Management and Statistical Analysis.....	40
Results.....	44
Sample Characteristics: Demographics	44
Sample Characteristics: Outcome Variable (Theory of Mind)	45

Group Differences: Parenting Styles.....	47
Interaction by group.....	49
Interaction by parenting styles.....	50
Group differences: Attachment.....	51
Interaction by Group.....	54
Interaction by Attachment.....	55
Correlations between Parenting and Attachment in ASD and in Neurotypical children.....	56
Parenting Style as a Predictor of Theory of Mind.....	57
Attachment as a Predictor of Theory of Mind.....	61
Discussion.....	65
Parenting Style in ASD and Neurotypical children.....	65
Authoritative parenting.....	65
Authoritarian and Permissive parenting.....	66
Attachment in ASD and Neurotypical children.....	69
Secure attachment.....	69
Ambivalent attachment.....	71
Avoidant attachment.....	72
Relationship between Parenting and Attachment in ASD and in Neurotypical Children.....	73
Differences in Theory of Mind.....	77
Parenting Style as a Predictor of Theory of Mind.....	77
Attachment as a Predictor of Theory of Mind.....	81
Limitations and Directions for Future Research.....	85
Self-report Measures.....	85
Specificity of the Variables Used.....	85
Cultural Relevance of ToM Battery.....	86
ASD Severity.....	87
Age of Participants.....	87
Co-morbid ADHD.....	88
Multiple researchers.....	89
Sample Size and Matching.....	89
Conclusion.....	90
References.....	92
Appendix A: Diagnostic Criteria for Autism Spectrum Disorder.....	110
Appendix B: Demographic questionnaire.....	112
Appendix C: Parent Interview Guides and ASCQ.....	117
Appendix D: PSDQ.....	119

Appendix E: Ethical Approval for the broader protocol from the Psychology Department Ethics Board at UCT.....	122
Appendix F: Ethical Approval for the broader protocol from the Western Cape Education Department	123
Appendix G: ASD group recruitment letter/Information Sheet	124
Appendix H: Control group recruitment letter/Information Sheet.....	127
Appendix I: ASD group consent form	130
Appendix J: Control group consent form.....	132
Appendix K: ASD group assent form for broader protocol.....	133
Appendix L: Control group assent form for broader protocol	134

List of Figures

Figure 1. Diagram indicating entry of variables into separate regression models.	43
Figure 2. Estimated marginal means for ASD and neurotypical groups across Parenting Styles.....	49
Figure 3. Estimated marginal means for ASD and neurotypical groups across Attachment Classifications.	53

List of Tables

Table 1. Demographic Sample Characteristics Across Groups	44
Table 2. Descriptive Characteristics of ToM _Z Across Groups.....	46
Table 3 Descriptive Characteristics of Parenting Style Across Groups.....	48
Table 4 Mixed Design ANOVA Results for Parenting Style.....	48
Table 5 Parenting Style: Interaction by Group	50
Table 6 Parenting Style: Interaction by Parenting Style	51
Table 7 Descriptive Characteristics of Attachment Across Group	52
Table 8 Mixed Design ANOVA Results for Attachment	53
Table 9 Attachment: Interaction by Group	54
Table 10 Attachment: Interaction by Attachment.....	55
Table 11 Bivariate Correlation Matrix for neurotypical group	56
Table 12 Bivariate Correlation Matrix for ASD group	56
Table 13 Parenting Style: Zero Correlation Matrix	58
Table 14 Regression Model 1: Model Summary of the Predictors of ToM (Parenting Style).....	59
Table 15 Bootstrap for Coefficients (Model 1 Predicting ToM from Parenting Style)	60
Table 16 Attachment: Zero Correlation Matrix	61
Table 17 Regression Model 2: Model Summary of the Predictors of ToM (Attachment)	63
Table 18 Bootstrap for Coefficients (Model 2 Predicting ToM from Attachment)	64

Abstract

Although social deficits are a defining feature in Autism Spectrum Disorder (ASD), not enough is known about the origin and impact of these impairments. Current research agrees that deficits in Theory of Mind (ToM) contribute to the social disconnectedness evident in children with ASD. Furthermore, studies in neurotypical populations have found significant links between attachment security and ToM acquisition, and some have posited parenting behaviours as predictors of social development. Less is known about these construct in children with ASD. This study aimed to form a foundational view of the relationships between parenting style, attachment, and Theory of Mind development in a sample of ASD children compared to a sample of neurotypical children. 80 parent-child pairs were included in the study. The sample was comprised of 40 verbal children with an ASD diagnosis and 40 neurotypical children. Children between the ages of 6 and 16 years were included in the study. Parenting style and attachment were measured using scaled response parent-report questionnaires while ToM was assessed using the *University of Cape Town Theory of Mind Battery*. ASD diagnoses were confirmed using the *Autism Diagnostic Observation Schedule, Second Edition (ADOS2)*.

Results showed that while both the ASD group and the neurotypical group reported significantly more Authoritative parenting than the other two styles (Authoritarian and Permissive), there was also more of the less positive parenting styles reported in the ASD group. Furthermore, none of the three parenting styles in question were significant predictors of Theory of Mind. The results further indicated that the ASD group reported less secure attachment, and also more insecure attachment (Ambivalent and Avoidant) than the neurotypical group. Attachment classification, specifically insecure attachment, showed to be a significant predictor of Theory of Mind. Associations between parenting style and

attachment showed different patterns in the ASD sample compared to the neurotypical sample. Results, limitations, and further directions were also discussed.

Introduction

This study focused on the possible link between parenting style and attachment classification in children with Autism Spectrum Disorder (ASD) compared to neurotypical children. Furthermore, the study explored the impact of parenting and attachment on social development, specifically the development of ToM, in an ASD sample compared to a neurotypical sample.

ASD is a neurodevelopmental disorder featuring impairment of social functioning (American Psychiatric Association [APA], 2013). These deficits in social communication and social interaction appear early in childhood development and are pervasive. Historically, deficits have been noted prior to three years of age, at a stage when social and language development may be atypical (American Psychiatric Association [APA], 2000). As development progresses, the exact presentation of ASD-related social difficulties tends to differ due to the changing nature of social demands and expectations with age. Deficits in social skills may even become concealed by learned behaviours in later development. These deficits manifest on a continuum in ASD populations, allowing for a great deal of variability in both severity and type of symptom presentation within the spectrum (APA, 2013).

Kanner (1943) was one of the first to explore the social deficits of ASD as disturbances of affective contact and described ASD individuals as ‘strangers’ to the world from birth. Kanner (1943) proposed that this state of isolation is driven by a strong, innate desire for aloneness and for keeping sameness or a general intolerance for personal contact and for change. It is also possible that the apparent neglect for social contact in ASD is a result of a genuine disinterest in other people (Fein, Pennington, Markowitz, Braverman, & Waterhouse, 1986). Difficulty making affective contact is evident early in childhood development; appearing as concerns regarding caregiver attachment, and later in development, manifesting as deficits in peer relations (Lord, 1984). The persistence of these

social deficits throughout the lifespan of and across several contexts for these children implicates social disturbances as a defining feature in ASD. In clinical settings, a formal ASD diagnosis considers difficulties in social-emotional reciprocity and in non-verbal communicative behaviours, as well as a decreased ability to develop, maintain, and understand relationships (APA, 2013). ASD is also characterized by deficits in non-social domains, such as repetitive and restrictive behaviours (see Appendix A for DSM-5 diagnostic criteria). However, disturbances in social functioning are a core feature in ASD populations and will thus be the focus of this study (APA, 2013).

Children with ASD frequently fail to exhibit appropriate and cooperative social behaviour. Presentations vary across the spectrum but some examples of the social difficulties apparent in ASD include a reduced capacity for sharing of thoughts and emotions; a failure to initiate or reciprocate conversations or appropriate social interactions; and an unusual social approach that is often odd or includes inappropriate behaviour. These behavioural disturbances are unique to ASD and are not better explained by the presence of a different social disorder. Children on the spectrum tend to show deficits in their ability to identify emotions and display more odd social behaviours than both neurotypical children and children with other social difficulties (APA, 2013; Downs & Smith, 2004).

In addition, ASD-diagnosed children were significantly different from neurotypical children in terms of their deficits in non-verbal communication, used to facilitate joint attention. For example, a child with ASD may fail to show a toy to his/her parent in order to create an interaction and share an awareness of the toy (Mundy, Sigman, Ungerer, & Sherman, 1986). Non-verbal communication, such as appropriate eye contact, correct interpretation and use of gesturing or facial expression, is consistently disturbed in ASD children. This disturbance results in a reduced level of social connectedness and an isolation often referred to as 'autistic aloneness' (Kanner, 1943). These disturbances present

differently throughout development. Infants on the spectrum may not display appropriate anticipatory posturing when being picked up, indicating a failure to interpret and understand the intentions of others (Baranek, 1999). As development progresses, these children may often fail to understand the non-verbal behaviours of others and respond inappropriately; sometimes adopting strange gestures or facial expressions and averting eye-contact (APA, 2013; Richer & Coss, 1976).

Children with ASD frequently lack an understanding of how to relate to other people and the ability to adjust their behaviours to meet the expectations of differing social contexts (Volkmar et al., 1987). They often display an absence of shared play and deficits in joint-attention behaviours (Mundy & Sigman, 1989; Whitaker, 2004). Kanner (1943) suggested that their disinterest in others may result in their failure to respond to the expressions of others. Analysis of typical infant development reveals that even within the first few days of life, an infant is already showing preferences and responses that orient towards the caregiver. These responses are almost reflexive in nature and serve to signal the caregiver to partake in an important social interaction. It is suggested that these necessary behaviours are disrupted in ASD (Shultz, Klin, & Jones, 2018). In fact, Frith et al. (2003) have hypothesised that the process of acquiring social cognition is disrupted in ASD in the early years of life due to decreased importance of social stimuli and a resultant focus on socially irrelevant features of the world (Frith et al., 2003). For example, Frith et al. (2003) measured visual fixation in individuals with high functioning autism and matched controls. Visual fixation was confined to the regions of eyes, mouth, body, and other objects. The results from the study showed that reduced eye fixation time was a good predictor of Autism. In addition, increased attention on mouths was positively correlated with improved social functioning while increased focus on objects showed correlations with autistic social deficits (Klin, Jones, Schultz, Volkmar, & Cohen, 2002).

This dearth in interconnectedness results in difficulty initiating and maintaining friendships across the lifespan of these children (Travis & Sigman, 1998). Kanner (1943) observed that while children with ASD may begin to play in a group setting, falsely highlighting their improvement in the eyes of their parents, there is a marked difference in the quality of their interaction when compared to neurotypical children. These individuals do not play *with* the other children but rather *alongside*, lacking the affective and reciprocal interaction necessary for relationship formation. Furthermore, these innate social deficits in ASD may become masked as a child comes to learn socially appropriate rules and is able to apply them even though they still lack social insight (APA, 2013). Downs and Smith (2004) found that high-functioning children with ASD were able to develop cooperative social behaviours while consistently falling short in the domains of emotion identification and the display of socially appropriate behaviour. Thus, there are some learned strategies that, only in part, attempt to compensate for intuition and insight.

The formation of an attachment between an infant and a primary caregiver is one of the first displays of social behaviour. Kanner (1943) noted commonalities regarding the parent-child relationship in children with ASD in his work with specific case studies; commenting on a dearth in warm-heartedness. His statements were controversial but his overarching premise maintained that the ‘aloneness’ of these children from the very beginning of life opposes the attribution of an ASD clinical picture solely to that of parent relations. Kanner (1943), therefore, argued for the affective inabilities of ASD to be viewed, in the most part, as innate deficits. The exact etiology of this disorder is still unknown, but research continues to show that disturbances in parent-child attachment are prevalent in ASD (Van Ijzendoorn et al., 2007). Attachment theory and the disturbance of attachment formation in ASD are therefore of interest and are discussed below.

Attachment

Bowlby (1944, 1969a) initiated the exploration into the way in which children's early interactions with their parents shape the development of their personalities. He was convinced that early life experiences play a significant role in determining the course of a child's development and that a child's initial caregiver attachments set the stage for future adult relationships (Ainsworth & Bowlby, 1991). Thus, the relationship between the child and primary caregiver plays an important role in the social and emotional development of the child. In his earliest works, Bowlby (1944) found that those children labelled as 'affectionless' tended to have experienced prolonged maternal separation or a deprivation of maternal care.

Bowlby (1958, 1969b) argued that the infant's intention to attach to a primary caregiver is innate and driven by a biological basis for survival. He postulated that attachment is formed by certain behaviours in children toward their caregivers, such as proximity seeking when feelings of discomfort arise. An infant tends to express a range of behaviours, such as clinging, crying, and smiling, designed to elicit an attachment response; initially, in general and later, directed toward the person of attachment, usually the caregiver (Ainsworth & Bowlby, 1991).

Continued research into the effects of early maternal separation lead Bowlby (1960b) to observe a type of 'separation anxiety' that is experienced when a child is separated from a caregiver for too long. Children became distressed in an initial response to maternal separation. This response gradually turned to despair and eventually resulted in detachment; particularly if separation lasted longer than a week. The child's attachment to the caregiver thereafter appeared to have an anxious quality (Ainsworth & Bowlby, 1991).

Mary Ainsworth, fuelled by her interest in Bowlby's work, dedicated herself to gaining empirical evidence for attachment theory through her longitudinal evaluation of

mothers and infants. Observations took place within the mothers' and the infants' home environment during early infancy, as well as in strange situations after the formation of attachments. Results from her studies indicated that maternal sensitivity, that is consistent, appropriate, and prompt maternal responses to infant signals for food and comfort (e.g., crying), leads to secure attachment which in turn allows the infant to engage in exploration (Ainsworth, Blehar, Waters, & Wall, 1978; Ainsworth & Bell, 1970; Ainsworth, 1979).

Ainsworth's strange situation procedure became a tool for evaluating attachment and assisted in confirming three predominant styles of attachment: the *secure* attachment ideal and a further two types of insecure attachment; *anxious-ambivalent* and *anxious-avoidant* (Ainsworth & Bowlby, 1991). Observations showed that *securely* attached infants viewed their primary caregiver as a 'secure base' from which they could explore the surrounding environment and retreat to when presented with any apparent uncertainty or threat. Securely attached children believe that their caregiver is available, reliable, and trustworthy, and therefore are not overwhelmed by separation; however, they seek out caregiver contact and they are readily soothed when needed (Ainsworth, Bell, & Stayton, 1971; Ainsworth, 1979; Benoit, 2004; Main & Cassidy, 1988).

The *anxious-ambivalent* insecure attachment style, also known as anxious-resistant attachment, displays a clinginess and fixation towards the caregiver that hinders these children's freedom to explore their environment (Ainsworth et al., 1971; Benoit, 2004). There is an absence of security in their attachment that causes them to fear and dread separation. Separations from the primary caregiver cause a great deal of distress for these children and they are not easily soothed when reunited. They frequently offer an ambivalent response after separation where they can alternate between behaving with resistance and rejection toward the caregiver or with dependence and fixation. This ambivalent picture is often representative

of the unpredictable pattern of caregiver responsiveness during infancy (Ainsworth et al., 1971; Benoit, 2004).

Differently, *anxious-avoidant* insecure attachment style is characterised by infant independence from their caregiver, where there is no display of overt attachment behaviours; these children do not seek contact or comfort from their caregiver and they do not become distressed or frustrated by separations. When reunited from separations, these children avoid their caregivers. This picture is representative of the insensitive, unavailable, and rejecting caregiver responsiveness these children experienced during infancy. The proximity-avoidant behaviour observed in these children has been likened to a primitive type of defence like the repression or ‘detachment’ that Bowlby recognised in children after longer separations from caregivers (Ainsworth et al., 1971; Ainsworth & Bell, 1970; Ainsworth, 1979; Benoit, 2004; Bowlby, 1960a).

In addition, Main and Solomon (1986) first observed a type of insecure attachment that did not appear to fit the classification criteria for any of the three identified attachment categories. Termed *disorganised attachment*, this type of attachment was defined as a failure of the infant to adapt to his/her environment by developing a consistent, organised emotion regulation response to stressful situations. These children may even display very short instances of absence in an organised response classification. They tend to present with contradictory behaviours, sometimes freezing for extended periods of time and fearing their parent. This often results in a poor ability to manage stress and an increased risk for externalising problem behaviours (Main & Solomon, 1986; Van Ijzendoorn, Schuengel, & Bakermans–Kranenburg, 1999).

Attachment in ASD. It has been widely established that the relationship between the child and primary caregiver plays an important role in the social and emotional development of the child (Bowlby, 2008). Infants typically develop some type of attachment within the

first 6 to 8 months of life (Hazan & Shaver, 1994). However, the social and communication deficits outlined in ASD appear to be present early in life and may therefore serve to disrupt the formation of caregiver attachments (Fodstad, Matson, Hess, & Neal, 2009). Van Ijzendoorn et al. (2007) found that at 2 years of age, children with ASD showed less involvement with their parents than neurotypical children. Similarly, Osterling, Dawson, and Munson (2002) found that children with ASD could be differentiated from neurotypical children and children with intellectual disability (ID) based on social disturbances as early as 1 year of age. In their study, children with ASD looked at others and oriented to their own names less frequently than neurotypical children and children with ID. Therefore, abnormalities that may interrupt the formation of a parent-child attachment are present in ASD children within the first 12 months of life. These also include: visual disengagement; deficits in imitating behaviours, social smiling, responsiveness and social interest; significant passivity; reduced activity levels; and delayed expressive and receptive language (Zwaigenbaum et al., 2005).

Poor attachment to a caregiver has been recognised in children with ASD from infancy and is frequently observed as reduced to absent comfort seeking behaviours (Rutgers, Bakermans-Kranenburg, Ijzendoorn, & Berckelaer-Onnes, 2004; Rutgers, Van IJzendoorn, Bakermans-Kranenburg, & Swinkels, 2007a). It has thus been widely anticipated that children with ASD have attachments deficits. However, research has shown inconsistent results regarding attachment in children with ASD concerning both security of attachment and quality or organisation of attachment when compared to neurotypical children. Studies dedicated to attachment in ASD are sparse and some research stands to confirm that secure attachment is possible in ASD (Filippello, Marino, Chilà, & Sorrenti, 2015).

Capps, Sigman, and Mundy (1994) used a modified Strange Situation procedure and found that almost half of the sample of 15 children with ASD was classified as securely

attached, but the entire sample showed disorganized attachment patterns. Van Ijzendoorn et al. (2007) found that children with ASD showed a tendency to display less attachment security and more disorganised attachment when compared to neurotypical children. In addition, attachment security could be predicted by the severity of ASD-associated social impairments (Van Ijzendoorn et al., 2007).

A meta-analysis reviewed ten studies involving observations of attachment security, using the Strange Situations Procedure, in children with ASD (Rutgers et al., 2004). Results indicated that despite the social deficits associated with ASD, most of the studies observed attachment behaviours in these children, indicating that secure attachment is possible in ASD. However, the review showed that samples of children with ASD with lower mental development had less secure attachment with their parents than children without ASD. Similarly, Teague, Newman, Tonge, and Gray (2018) showed that, compared to families of children with other developmental disabilities, families with an ASD child had greater attachment insecurity and greater parental stress. In contrast, Keenan, Newman, Gray, and Rinehart (2016) found that children with ASD were not less securely attached than neurotypical children. However, parents of ASD children did report more stress and greater attachment-related anxiety than parents of neurotypical children.

A systematic review was conducted in 2015 in order to assess the effect of ASD on attachment development (Kahane & El-Tahir, 2015). The review noted that while secure attachment can be present in children with ASD, it is not as common as in neurotypical children. Furthermore, increasing severity of ASD and associated co-morbidities were related to reduced security and organisation of attachment. Specifically, deficits in joint attention and symbolic play were risk factors for insecure and disorganised attachment. Similarly, a study conducted in 1984 showed evidence that, in ASD, the children who showed increased attachment behaviours also demonstrated greater levels of symbolic play skills (Sigman &

Ungerer, 1984). Hence, innate social deficits in ASD may play an important role in the formation or disturbance of attachment.

In addition, many of these studies have implicated parental sensitivity as a possible factor in determining attachment security (Capps et al., 1994; Kahane & El-Tahir, 2015). The impact of parenting on attachment has been comprehensively studied in typical development, but the relationship between parenting and attachment in ASD is not well researched.

Parenting

Differences in parenting are related to differences in the types of attachment security that develop in children (Ainsworth, 1967). Parental sensitivity has specifically, but not exclusively, been implicated as influential in determining childhood attachment (Wolff & Ijzendoorn, 1997). Sensitivity is defined as a parent's ability to receive, understand, and act timely and attentively in response to their child's attachment behaviours (Ainsworth et al., 1978). The relationship between parenting and attachment may be due to the tendency of infants to show attachment signals towards a protective adult at a time of need (Bowlby, 1969a). This behaviour is thought to have stemmed from an evolutionary, genetic predisposition (Bowlby, 1969a). In addition, there is an influential effect of attachment styles across generations as parents' internal working models of attachment relationships tend to influence their children's (George, Kaplan, & Main, 1985; Hesse, 1999).

Four styles of parenting have been distinguished based on two independent constructs: responsiveness and demandingness (Aunola, Stattin, & Nurmi, 2000; Baumrind, 1971a; Baumrind, 1971b; Baumrind, 1989; Maccoby & Martin, 1983). Demandingness is the level of supervision and control in parenting, where parents show an expectation of maturation and development from their children. Responsiveness is the amount of warmth, connection, recognition, acceptance, and affection shown by parents toward their children.

Authoritative Parenting refers to a style of parenting that is both demanding and responsive. These parents show an active interest and involvement in their children's lives. There exists a relationship characterized by openness, back and forth communication, and trust; together with parental monitoring, direction, and control. This parenting style values both discipline and the child's autonomy and will (Baumrind, 1966; Maccoby & Martin, 1983). The positive impact of this style of parenting has been shown to result in strong school performance and good school engagement and in the development of adaptive achievement strategies during adolescence (Aunola et al., 2000; Steinberg, Lamborn, Darling, Mounts, & Dornbusch, 1994; Steinberg, Lamborn, Dornbusch, & Darling, 1992).

Authoritarian Parenting is characterised as demanding but not responsive. For these parents there is a lack of communal trust and participation in their children's worlds. There is a high level of parental control and discipline, often perceived as criticism by the children of these parents (Barber, 1996; Baumrind, 1971b; Maccoby & Martin, 1983). This style of parenting has been associated with passivity and low levels of school interest in children (Pulkkinen, 1982; Steinberg et al., 1994). Unlike authoritative parenting, authoritarian parenting discourages children from exploring and problem solving, as they learn instead to rely on parental control and decision making (Hess & McDevitt, 1984).

Permissive Parenting is responsive but not demanding. These parents express warmth and acceptance towards their children but lack any expectations of their children. There is little to no parental control and children of these parents are left to act autonomously without monitoring (Baumrind, 1989, 1991; Maccoby & Martin, 1983).

Neglectful Parenting lacks both demandingness and responsiveness resulting in a style of parenting that is both without encouragement, collaboration or support, and without supervision and discipline. These parents are generally disengaged in their parenting (Maccoby & Martin, 1983). Both permissive and neglectful parenting, in their lack of

parental control, have been associated with children's low school achievement and an inability to self-regulate their behaviour, resulting in greater levels of impulsivity (Aunola et al., 2000; Barber, 1996; Maccoby & Martin, 1983).

Parenting styles in ASD. The body of research exploring parenting in ASD is limited and results are varied. Additionally, there is contention around this topic as some past research has been aimed at promoting parental blame.

Studies have found that maternal sensitivity and insightfulness foster the development of secure attachments in children with ASD (Kahane & El-Tahir, 2015). Similarly, Capps et al. (1994) found that mothers of securely attached children with ASD displayed greater levels of maternal-sensitivity than those of insecurely attached children with ASD. These findings are consistent with studies done on neurotypical children and suggest that an authoritative parenting style characteristic of greater sensitivity may support social and attachment development in children with ASD.

In contrast, a study by Van Ijzendoorn et al. (2007) on attachment and sensitivity did not find the expected link between parenting and attachment in ASD samples. They tested 55 toddlers and their parents. The sample consisted of neurotypical children, children with ASD, children with ID, and children with language delay without ASD. Van Ijzendoorn et al. (2007) investigated whether social deficits in ASD, such as emotion recognition difficulties, might produce inadequate perception and interpretation of parental sensitivities and responsiveness, thus hindering the expected association between parental sensitivity and attachment security. In their study, social deficits associated with ASD were strongly associated with lower attachment security. This suggests a basis of poor social information processing as responsible for the differences in attachment security in children with ASD (Rutgers et al., 2004). Therefore, symptoms of ASD appear to disrupt the usual relationship between parenting and attachment development (Van Ijzendoorn et al., 2007).

In addition, Van Ijzendoorn et al. (2007) explored parental sensitivity as a factor that may play a role, not in the cause, but in the course of ASD and possibly attachment (Cantwell & Baker, 1984). Their study concluded that parents of children with ASD showed equal sensitivity to parents of children without ASD. The children with ASD showed less involvement and interaction and more attachment disorganisation than children in the other groups. Interestingly, there was a correlation between parental sensitivity and security of attachment, but only for parents and children in the groups without ASD. These results once again suggest that ASD may disrupt the link between parenting and attachment (Van Ijzendoorn et al., 2007).

Seskin et al. (2010) highlighted the importance of parents' own attachment statuses and their state of mind when nurturing attachment development in children with ASD. Children with ASD whose parents were securely attached in their own relationships, were better at initiating and responding to various social, imaginative, and communicative behaviours. Their research suggests a link between parental attachment, more specifically the related parenting behaviours, and the development of attachment in children with ASD (Seskin et al., 2010). It is furthermore important to consider that parents of children with ASD tend to experience more parenting stress than parents of neurotypical children or those diagnosed with other disabilities such as Down syndrome, cerebral palsy, and developmental delay (Estes et al., 2013; Hayes & Watson, 2013; Sinha, Verma, & Hershe, 2016). Furthermore, 'problems with child behaviour', such as ASD related executive functioning difficulties, are a significant predictor of parenting-related stress in parents of children with ASD (Estes et al., 2013; Hutchison, Feder, Abar, & Winsler, 2016). In turn, parental stress creates increased focus on their children's negative behaviour traits and leads to the adoption of less positive-parenting styles (Reed & Osborne, 2014). It is therefore possible that the specific context created by the social deficits associated with ASD, can affect

parental behaviour and overall parenting style (Moilanen, Rasmussen, & Padilla-Walker, 2015; Smetana, 2017).

Based on the premise that children with ASD have severe and persistent deficits in social development, which may have an impact on parenting and may affect the development of attachment, a study was conducted involving 89 toddlers and their parents (Rutgers et al., 2007b). The sample compared children with ASD, ID, language delay without ASD, and neurotypical children. Results were consistent with previous studies in showing that children with ASD were less securely attached than the other groups. In addition, it was shown that parents of neurotypical children reported higher rates of authoritative parenting than the parents of the ASD children and other groups. This indicates that the parents of children with ASD reported less authoritative parental behaviour than parents of neurotypical children. In addition, there was a greater degree of overprotectiveness and lesser expectation placed on a child that is viewed to have a disability such ASD (Sanders, 2006).

Interestingly, Lin, Bourque, Zeanah, and McFatter (2018) point out the coexistence of ASD symptomology and enriching experiences of parenting a child with ASD. They found that experiences of enrichment were not affected by the child's ASD symptom severity. However, parental experiences of enrichment were inversely correlated with parenting self-efficacy and parents' perceived levels of stress.

The impact of parenting styles and attachment on social development in children with ASD is grossly under researched, yet social development is an emerging theme throughout studies regarding parenting and attachment in ASD (Rutgers et al., 2004; Rutgers et al., 2007b; Seskin et al., 2010). It is therefore useful to consider the trajectory of social development in ASD. For the purpose of the proposed study, the constructs of theory of mind and empathic behaviours will be used as measures of social development.

Social Development

Theory of Mind. ‘Theory of Mind’ (ToM) is the ability to assign mental states to one’s self and to other people (Premack & Woodruff, 1978). That is the ability to infer what other people know, think, intend, feel, want, or believe, even though these states of mind may not be directly observable and may be different to one’s own. These inferences can then be used to predict the behaviour and intentions of others, thus becoming a necessary element in social functioning (Baron-Cohen, Leslie, & Frith, 1985; Goldman, Margolis, Samuels, & Stich, 2012; Premack & Woodruff, 1978).

ToM underpins specific competencies that play an active role in successful adaptive social functioning, such as pretend play and the understanding of pretense; the ability to understand false-beliefs; and the ability to predict emotions (Bergen, 2002; Harris, Johnson, Hutton, Andrews, & Cooke, 1989; Leslie, 1987; Lillard, 1993; Wellman, Cross, & Watson, 2001). Research has shown that familial social context, such parental occupation, maternal education and maternal income, is significantly associated with the development of ToM, specifically perception understanding (Cutting & Dunn, 1999; Pears & Moses, 2003).

Studies conducted on neurotypical children confirm the relationship between ToM development and social development because the ability to accurately predict the behaviour of others is necessary for social functioning (Astington & Jenkins, 1999; Bosacki & Wilde Astington, 1999; Jenkins & Astington, 2000; Verfaillie & Daems, 2002). Therefore, ToM deficits in children with ASD may represent a core feature in the disturbance of social development (Baron-Cohen, 2000).

Research indicates that children with ASD have impaired ToM abilities that are specific to ASD; ToM development in ASD is often either delayed or follows an atypical course (Baron-Cohen et al., 1985; Hoogenhout & Malcolm-Smith, 2014; Yirmiya, Erel, Shaked, & Solomonica-Levi, 1998). However, a delayed developmental trajectory, following

the same sequence of development as neurotypical children, is shown more often in high functioning children with ASD (Hoogenhout & Malcolm-Smith, 2014). Children with ASD fail to infer the beliefs of others and have been described as treating people as though they were objects (Baron-Cohen et al., 1985; Wing & Gould, 1979). Deficits in symbolic play have been associated with ToM deficits in ASD and these children tend to struggle with imaginative skills that underlie the ability to infer mental states that are not directly observable (Lam & Yeung, 2012). Measures of ToM impairment have been positively correlated with social deficits in ASD, possibly implicating ToM as a mediator of ASD-related social impairment (Lerner, Hutchins, & Prelock, 2011). Additionally, attachment insecurity was shown to be related to ToM differently in children with ASD compared to neurotypical children (Sivaratnam, Newman, & Rinehart, 2018).

Relationships between Attachment and Parenting, and Social Development

It has been widely established that there is a link between parenting style and attachment classification in neurotypical children (Cummings & Cummings, 2002). Research has implicated parental sensitivity specifically as a factor in determining attachment security (Capps et al., 1994; Kahane & El-Tahir, 2015). Furthermore, evolutionary perspectives highlight the innate, proximity seeking behaviours of children in initiating that parent-child bond (Bowlby, 1958, 1969b). Cummings and Cummings (2002) posited attachment as a particular relational perspective on parenting. They emphasised that the affective ties between parent and child have implications for the child's life-long development.

These developmental implications include the social development of the child. Research has found that early attachment security either predicted or was significantly associated with ToM acquisition and performance (Arranz, Artamendi, Olabarrieta, & Martín, 2002; Meins, Fernyhough, Russell, & Clark-Carter, 1998; Symons & Clark, 2000). It has been suggested that this link may be due to the inclination of parents with securely

attached children to interact with their children in a manner that values their minds as individuals and their perspectives as unique (Meins et al., 1998). Research conducted on maternal sensitivity defined it as the mother's responsiveness to infant behaviours and her ability to appropriately understand the mental-states behind infant behaviour and make comments in line with these mind states. It was found that this notion of maternal sensitivity significantly predicted attachment security in neurotypical children (Meins, Fernyhough, Fradley, & Tuckey, 2001). Similarly, studies have shown that a mother's use of language that appropriately reflected the infant's mental states is an early, possibly the earliest, social predictor of ToM development (Mcquaid, Bigelow, McLaughlin, & MacLean, 2008; Meins et al., 2002; Ontai & Thompson, 2008). It therefore appears that parenting and attachment security play a significant role in enabling children to learn about differing mental states, i.e., ToM, and skills necessary for social development (Guajardo, Snyder, & Petersen, 2009; Hughes, Deater-Deckard, & Cutting, 1999). Additionally, it should not be neglected that there exists a transactional relationship between ToM and social development. ToM skills both change and are changed by social contexts, familial relations, and language (Hughes & Leekam, 2004; Laranjo, Bernier, Meins, & Carlson, 2010; Peterson, Slaughter, Moore, & Wellman, 2016). Therefore, known ToM deficits in children with ASD may represent a key element in the disturbance of social development in ASD (Baron-Cohen, 2000).

Rationale

In spite of the prevalence of ASD, the exact etiology and underlying associated mechanisms are still unknown. It is well identified that social deficits are a defining feature in ASD but not enough is known about the root and progression of these impairments (APA, 2000). Social disturbances are evident in ASD as early as infancy, when problems with parent-child attachments are brought to light (Ainsworth & Bowlby, 1991; Kanner, 1943).

Research regarding neurotypical children identifies a strong link between parental style and attachment security (Cummings & Cummings, 2002); but less is known about this association in ASD samples and some studies even suggest that such associations do not hold in ASD (Van Ijzendoorn et al., 2007). This study aimed to investigate the link between parenting and attachment in children with ASD compared to neurotypical children.

Furthermore, current research agrees that deficits in ToM contribute to the social disconnectedness and isolation evident in children with ASD (Lerner et al., 2011). Studies have found significant links between attachment security and ToM acquisition (Meins et al., 2002), and some have posited parenting behaviours as predictors of social development (development of ToM) in neurotypical populations (Jenkins & Astington, 2000; Pears & Moses, 2003). However, these studies have sought to isolate parenting behaviours and fail to distinguish between parenting styles. Importantly, there exists a dearth in research exploring these relationships in ASD populations. Travis and Sigman (1998) concluded that there is a need for more research into the impact of social deficits on relationships in ASD in order to create a better understanding of the disorder and to better inform interventions. This study aimed to fill in the gaps in knowledge regarding the relationship between parenting and attachment and the association between these constructs and social development, in ASD populations. These variables were also investigated in a matched, neurotypical control group that formed a baseline for comparison.

Aims

The aim of this study was to investigate the differences in parenting style and attachment classification in children with ASD and neurotypical children. The link between parenting style and attachment classification in ASD compared to neurotypical children was explored. Furthermore, the study aimed to explore the association between parenting and

attachment with social development, specifically the development of ToM, in an ASD and neurotypical sample. The following questions and hypotheses informed the method and analyses of this study.

Research Questions and Hypotheses

1. Are there significant differences in parenting style between parents of ASD and neurotypical children?

Hypothesis 1: There is significantly more Authoritarian and Permissive parenting style, and significantly less Authoritative parenting style, among parents of the ASD sample compared to the neurotypical sample.

2. Are there significant differences in attachment classifications between ASD and neurotypical children?

Hypothesis 2: There is significantly more Ambivalent and Avoidant attachment, and significantly less Secure attachment, in the ASD sample compared to the neurotypical sample.

3. Are there observable differences in the patterns of association between parenting style and attachment classifications, in parent-child pairs consisting of children with ASD compared to those with neurotypical children?

Hypothesis 3: The pattern of association between parenting styles and attachment classifications will look different in ASD compared to neurotypical children. There will not be direct positive correlations between positive parenting and secure attachment, or between less positive parenting and insecure attachment in the ASD sample.

4. Does parenting style predict ToM?

Hypothesis 4: Parenting style predicts ToM development over and above age, SES, and working memory and verbal intelligence, in both ASD and neurotypical children.

5. Does attachment classification predict ToM?

Hypothesis 5: Attachment classification predicts ToM development over and above age, SES, and working memory and verbal intelligence, in both ASD and neurotypical children.

Method

Research Design

This study formed part of a broader research protocol investigating the biological basis of social deficits in ASD. This study aimed to explore the relationship between parenting and attachment, and the association between these constructs and social development in children with ASD compared to neurotypical children. Some aspects of this study's design were quasi-experimental and some were correlational. This design was used to measure a range of variables and their relationship to one another across two groups. The study used purposive sampling to recruit two groups of parent-child pairs; one group consisted of children with ASD and their parents, and the other was a matched control group of neurotypical children and their parents. First, group differences were analysed. Second, relationships were explored between parenting style and attachment. Third, the association between parenting and attachment, and ToM development was analysed.

Participants

A priori power analysis was calculated using *G*Power* (Faul, Erdfelder, Lang, & Buchner, 2007). The calculation was based on the planned Multiple Regression Analysis in this study, using 6 predictor variables (see Data Analysis section below). The calculation was based on the multiple regressions as this analysis was the most sensitive to sample size compared to the other planned analyses (Knofczynski & Mundfrom, 2008; Maas & Hox, 2005). The analysis settings were set according to accepted standards and indicated that a

total sample size of 68 has 95% power for detecting a small sized effect (0.2) at $\alpha=.05$ (Cohen, 1988; Faul et al., 2007). This study formed a part of a broader research protocol. At the time of data analysis, 53 child-parent pairs consisting of children with ASD (ASD group) had been recruited and assessed. The ASD group participants were recruited from special needs schools and ASD-specific schools in the Western Cape and from the UCT Autism Research Group's database of families. In addition, in order to form a control group, 49 child-parent pairs consisting of children without ASD (neurotypical group) were recruited and assessed. The neurotypical group were recruited from mainstream schools in the Western Cape. Subsequent to aggregate matching the two groups (ASD and Neurotypical) used in the final analysis each consisted of 40 participants; 80 participants in total. Therefore, the sample size for adequate statistical power, as determined by the priori power analysis, was met.

Inclusion and exclusion criteria. *ASD group.* Children in the ASD group had an existing ASD diagnosis which was confirmed using the ADOS2. The ADOS2 is only valid for administration in English (not any other South African languages) and therefore only English language speaking children were included in the study. ASD is a disorder that commonly presents with comorbid conditions such as seizures, intellectual disability and depression (Abdallah et al., 2011; APA, 2013; Peacock, Amendah, Ouyang, & Grosse, 2012). Therefore, IQ was measured in order to control for the role of general intelligence. In addition, children with neurological comorbidities were excluded due to the confounding effect that these comorbidities may have on the relationships explored by this study. However, ASD is highly comorbid with Attention Deficit/Hyperactivity Disorder (ADHD) (Jang et al., 2013; Matson & Nebel-Schwalm, 2007). Therefore, those children with ADHD were not excluded from the study, in order to avoid significantly limiting the sample size.

Research indicates that ASD is approximately four times more likely to occur in males than in females (Kogan et al., 2009; Whiteley, Todd, Carr, & Shattock, 2010).

Furthermore, some studies show that ASD has a different presentation in females; indicating additional difficulties such as lowered intellectual ability, increased social communication impairment and more behavioural problems when compared to males (Dworzynski, Ronald, Bolton, & Happé, 2012; Frazier, Georgiades, Bishop, & Hardan, 2014). Therefore, only male children were recruited as participants in this study.

Neurotypical group. Children were excluded from the neurotypical group if they presented with any neurological or psychiatric conditions, and if they had, or were suspected to have, ASD. In order to maintain homogeneity across the groups these children were also English language speaking. These children were matched to the ASD sample on a case-by-cases basis using age, sex and socio-economic status (SES).

ASD and neurotypical group. Across both ASD and neurotypical groups; children were excluded from the study if they had had a head injury. Due to the verbal nature of test administration, only verbal children were included in the study. Children were excluded if they failed to succeed on a two-stage command comprehension of instruction task as comprehension difficulties may undermine performance on ToM tasks (Brooks, Sherman, & Strauss, 2009). The age of children recruited was between 6 and 16 years as this study aimed to focus on social development in childhood and early adolescence, particularly at a school-going age. This age range is suitable to the study because typically developing children are only able to understand the false beliefs of others after the age of 4 years (Wellman et al., 2001). While ToM is thought to be a process of continuous development (Chandler & Hala, 1994; Hutchins & Prelock, 2008), research has largely focused on, and gained some understanding of, its development in children (Wellman et al., 2001). ToM development in children is thought to be fostered by social interactions that are mediated by language (Hutchins, Bond, Silliman, & Bryant, 2009). Therefore, verbal children of a school-going age were included in this study. Parents were fluent in English, Afrikaans, or isiXhosa so that

they could complete the demographic forms and interviews. Other demographic variables were recorded and considered in analyses, but did not influence recruitment.

Measures

Demographic questionnaire. Demographic data was collected for each participant (see Appendix B). Age, sex, home language and SES, based on total monthly household income or total family income (TFI), was recorded. Additional measures of SES were collected, such as an index of assets and parents' highest level of education (Barnes, Wright, Noble, & Dawes, 2007; Bärnighausen, Hosegood, Timaeus, & Newell, 2007). However, TFI was found to be a more sensitive indicator of SES and was used in isolation as a measure of SES for this study. Additional questions were used to ascertain whether the child had had any head injuries or a history of neurological or psychiatric difficulties.

Screening for language comprehension deficits. *Comprehension of Instructions, Developmental Neuropsychological Assessment, Second Edition (NEPSY-II)* (Korkman, Kirk, & Kemp, 2007). The Comprehension of Instruction subtest was administered to all participants to screen for auditory comprehension difficulties that would undermine performance on ToM tasks (Brooks et al., 2009). The examiner gave verbal commands of increasing stage complexity and the child was required to select the correct picture within a series. This study required children to follow two-stage commands. They were therefore asked to follow one stage commands, and then progressed to two stage commands. The Comprehension of Instructions subtest has test-retest reliability ranging from .71 to .82 and the NEPSY-II as a whole has been shown to have acceptable validity (Brooks et al., 2009). The NEPSY-II has been widely used in South African contexts (Lindinger et al., 2016; Rochat et al., 2016), and has even been translated into Afrikaans (Dalen, Jellestad, & Kamaloodien, 2007). Neuropsychological testing of Zambian children showed that, in spite of its US norms, the NEPSY-II was relatively insensitive to the effects of language and

culture (Mulenga, Ahonen, & Aro, 2001). Thus, it would make for a good measure within a South African context.

ASD symptoms. *The Autism Diagnostic Observation Schedule, Second Edition (ADOS2)* (Lord et al., 2012) is a semi-structured, standardised observation measure used for diagnosis and research purposes in ASD. The ADOS2 consists of five modules and takes 40-60 minutes to administer. Children were assessed on the module appropriate for their age and verbal ability. This study used module 3, as it is appropriate for the sample of verbal children from 6 to 16 years of age. The module yielded comparable scores for the detection and severity of ASD-related symptoms, and a sub-score for social affect. The original ADOS2 was made for use in English and there are no valid translations in other South African languages. Therefore the ADOS2 was administered in English only for this study. Furthermore, the ADOS2 was administered by a qualified, trained and accredited professional. The ADOS2 has sensitivity ratings in the upper 90% range and specificity in the upper 80% to lower 90% range (Lord et al., 2012). Internal consistency ranges from .47-.96, but all lower scores were for non-social domains. Test-retest reliability is high for social domains, and acceptable for non-social domains (Lord et al., 2012). The ADOS2 has been effectively used to detect ASD in African populations and in those from other low and middle-income settings (de Vries, 2016). One study has examined the cultural appropriateness of an Afrikaans translation of the ADOS2 in the Western Cape, South Africa. The results supported appropriate use the Afrikaans ADOS2 in South African settings (Smith, Malcolm-Smith, & de Vries, 2017).

Attachment. *The Attachment Style Classification Questionnaire (ASCQ)* (Finzi, Har-Even, Weizman, Tyano, & Shnit, 1996) (see Appendix C) was administered as an interview with caregivers. This is a 15-item parent-report questionnaire that was used to classify children in one of three attachment categories; secure attachment, anxious-ambivalent

attachment, or anxious-avoidant attachment. The ASCQ is an adapted version of the Hebrew Adult Attachment Style Scale (Mikulincer, Florian, & Tolmacz, 1990) and was originally developed as a self-report measure for children aged 7 to 14 years. Due to the social deficits that characterise ASD, many children with ASD may have compromised insight into their own social behaviours and thus may not be able to accurately self-report on this measure. Therefore, for the purposes of this study, the measure was adapted to a parent interview that can be administered to parents. The original self-report version of the ASCQ has test re-test reliability ratings between .87 and .95, internal consistency ratings between .69 and .81, and validity has been consistently demonstrated in clinical and non-clinical, control, samples (Al-Yagon & Mikulincer, 2004; Al-Yagon & Mikulincer, 2004; Finzi et al., 1996). The test has demonstrated high reliability and adequate internal consistency in its use in western and Israeli populations (Al-Yagon & Mikulincer, 2004; Finzi et al., 2001). There is no published work that demonstrates its use in South African or African populations. However, the ASCQ is currently being used and evaluated in a large study of school age children at the University of Cape Town.

Parenting styles. *The Parenting Style and Dimension Questionnaire (Robinson, Mandleco, Olsen, & Hart, 1995) (PSDQ)* (see Appendix D) is designed in the form of a 5-point response scale and was used to ascertain scores associated with three parenting styles; authoritative, authoritarian and permissive. The PSDQ used in this study is a 31 item measure that has been adapted from the original 133 item measure (Robinson et al., 1995). The *authoritative* parenting style was assessed using 15 items that query four domains; warmth and involvement, reasoning or induction, democratic participation and good natured or easy going. This subscale has an overall reliability of .91. *Authoritarian* parenting style was assessed using 11 items and a further four domains are examined; verbal hostility, corporal punishment, non-reasoning and punitive punishments, and directiveness. This subscale has an

overall reliability of .86. Lastly, *permissive* parenting style was measured using 5 items tapping three domains; lack of follow through, ignoring misbehaviour, and self-confidence in their parenting. This subscale has an overall reliability of .75. A number of studies have shown that the PSDQ demonstrated adequate reliability and validity within South African contexts (Latouf & Dunn, 2010; Pretorius, 2000; Roman et al., 2015). Latouf and Dunn (2010) tested 853 learners at public schools in the Western Cape and Pretorius (2000) included a South African sample group within a low to average SES. Other studies have made use of Turkish and Lithuanian versions of the questionnaire (Kern & Jonyniene, 2012; Önder & Gülay, 2009). The wide use of PSDQ in non-western contexts suggested that it was applicable in the current study.

Theory of Mind. *The University of Cape Town Theory of Mind Battery (Hoogenhout & Malcolm-Smith, 2014).* The University of Cape Town Theory of Mind Battery (UCT ToM battery) was initially an adaptation of that which was developed by Steele, Joseph, and Tager-Flusberg (2003) for use in South African populations. The battery also includes the Diverse Desires task (Wellman et al., 2001); the Diverse Beliefs task (Wellman, 2012); the Strange Stories task (Happé, 1994a) and the Faux Pas task (Baron-Cohen, O'Riordan, Stone, Jones, & Plaisted, 1999). The UCT ToM battery is made up of fourteen tasks divided into four modules of increasing difficulty; early, basic, intermediate and advanced.

The *early module* measures the child's development of pretend play, understanding of the desires of others and precursors to false belief reasoning (Steele et al., 2003; Wellman, 2012). It consists of the Understanding of Intention task, the Pretend Play task, the Perception-Knowledge task, the Diverse Desires task, and the Diverse Beliefs task. The *basic module* assesses the child's understanding of emotions and deception, and false belief reasoning (Steele et al., 2003; Wellman, 2012). It is made of the Location-Change False Belief task, the Unexpected Contents False Belief task, the Sticker Hiding task, Belief-

Emotion Task, and the Real-Apparent Emotion task. The *intermediate module* measures second-order false beliefs and understanding of non-literal language (Happé, 1994a; Steele et al., 2003). It is made up of the Second Order False Belief task and the Strange Stories task. The *advanced module* aims to assess a child's comprehension of non-literal language (sarcasm specifically) and social norms (Baron-Cohen et al., 1999; Steele et al., 2003). It is made up of the Lie-Joke task and the Children's Version of the Faux Pas task.

Tasks included control and test questions; however, there are no control tasks for the Pretend Play and Sticker Hiding tasks. With the exception of the Faux Pas task, all tasks either used pictures or dolls in order to limit linguistic and memory demands. ToM subtests were scored as either pass or fail, but also included continuous scores that were added together to produce a total ToM score for each child. Children progressed through the battery until they either completed all of the tasks or failed a module. Each child attained a raw score out of 100, based on the four modules, even if not all of the modules were completed. Raw scores were standardized, by creating Z-scores, in order to account for age differences (See Data Analysis).

The UCT ToM Battery has been adapted for use in South African populations and has been applicable in this context in previous research (Hoogenhout & Malcolm-Smith, 2014).

General Intellectual functioning. The *Wechsler Abbreviated Scale of Intelligence (WASI)* (Wechsler, 1999). General intellectual functioning was assessed because verbal IQ has been shown to be a mediator for ToM ability (Fombonne, Siddons, Achard, Frith, & Happé, 1994; Happé, 1995). The WASI is made up of four subtests that make up a full scale IQ score. The Similarities and Vocabulary subtests assess Verbal IQ, which was used in this study. Verbal IQ is strongly associated with ToM and therefore needs to be considered in this study (Hamilton, Hoogenhout, & Malcolm-Smith, 2016; Happé, 1994b) The Block Design and Matrix Reasoning subtests assess Performance IQ. Children were assessed using the full

WASI but only Verbal IQ scores were used in analysis. The WASI is appropriate for administration to individuals from age 6 to 89 years. In children the reliability coefficients range from .81 to .97, and validity has been well established (Stano, 2004; Wechsler, 1999). The WASI is also well correlated with other Wechsler measures of intelligence and other short form intelligence tests (Hays, Reas, & Shaw, 2002; Wechsler, 1999; Zhu, Tulskey, & Leyva, 1999).

Wechsler tests are widely used within South African contexts with provisions made for certain factors to be considered regarding cultural appropriateness in test administration and score interpretation (Shuttleworth-Edwards, 2017). For use in this current study, all culturally inappropriate items were changed according to accepted adaptations for South African children. Additionally, all children were English speaking and attended well-resourced schools, indicating that no adaptations in scoring were necessary. Additionally, the WASI has been established as relevant for use in South African populations through previous studies, one that included Afrikaans-speaking learners (Ferrett, Carey, Thomas, Tapert, & Fein, 2010; Hoogenhout & Malcolm-Smith, 2014; Van Wyhe, 2012).

Working Memory. Working Memory was assessed using the backwards portion of the *Numbers* subtest form the *Children's Memory Scale (CMS)* (Cohen, 1997). This subtest required the participants to repeat numbers, read aloud by the researcher, in reverse order. Working Memory plays a role in ToM development and therefore needs to be considered in this study (Carlson, Moses, & Breton, 2002; Dennis, Agostino, Roncadin, & Levin, 2009; Hamilton et al., 2016). The CMS is relevant for use in children aged 5 to 16 years (Borden, Burns, & O'Leary, 2006; Cohen, 1997; Vaupel, 2001). The CMS has demonstrated test-retest reliability, and it has shown internal consistency coefficients of .71 to .91 across age bands (Vaupel, 2001). Furthermore, the CMS has been shown to have good construct validity and it correlates well with other tests of memory and learning. The CMS has been used in studies

examining clinical and non-clinical children, both locally and abroad (Borden et al., 2006; Riccio, Garland, & Cohen, 2007; Schoeman, 2011; Schrieff-Elson, Thomas, Rohlwink, & Figaji, 2015). Additionally, a study conducted on South African children showed that children from a low SES background performed in the average range on subtests of the CMS, including the Numbers subtest (Schoeman, 2011).

Procedure

This study formed part of a broader research protocol that had already obtained approval from the Psychology Department Ethics Board at UCT (see Appendix E) and the Western Cape Education Department (see Appendix F) to conduct research in schools in the Western Cape.

Screening and recruitment. The ASD group participants were recruited from special needs schools and ASD-specific schools in the Western Cape and from the UCT Autism Research Group's database of families. In order to form the control group, child-parent pairs consisting of children without ASD (neurotypical group) were recruited from mainstream schools in the Western Cape. These schools in the Western Cape were approached and presented with a detailed and informative request to conduct research. When approval had been given by the headmaster/headmistress and relevant staff, recruitment letters addressed to parents, containing information sheets (see Appendices G and H), consent forms (see Appendices I and J), and demographic questionnaires (see Appendix B), were sent home with children by their respective schools. Parents of ASD children and parents of neurotypical children were given different information forms indicating aspects of the research and data collection that pertained to their children. These forms were then returned to the researcher through the schools.

Data collection from parents. All parents who had agreed to participate in the study were then contacted to set up an interview appointment. These interviews were conducted

either telephonically or at UCT. The ASCQ and the PSDQ were administered in the interview, which lasted approximately 30 minutes.

Data collection from the children. All children were assessed individually by a team of three researchers who were involved in the broader research protocol. Each of the researchers was enrolled in a clinical programme at the time, and each was thoroughly trained in standardised assessment administration and scoring. The assessments took place either at their school or at the Department of Psychology at the University of Cape Town. The assessments were conducted in a quiet, distraction-free environment. Data was collected over several assessment sessions lasting between 30 and 60 minutes in order to ensure optimal concentration levels for the children. Each child's assent was obtained at the start of their first session (see Appendices K and L). All children in the ASD group were assessed with the ADOS2 in their first session, by a qualified member of the research team. Children from both groups were assessed using the WASI, and thereafter they completed the UCT ToM battery. The ToM battery has four levels of increasing difficulty, and children progressed through the levels until they either failed a level or completed the battery. Each level was administered in its own session. If a child became too fatigued they were given a break or they completed that particular level across two shorter sessions. All measures were administered and scored according to standard administration and scoring procedures as outlined in the relevant test manuals (Hoogenhout & Malcolm-Smith, 2014; Lord et al., 2012; Wechsler, 1999).

Ethical Considerations

This study formed part of a broader research protocol that had already obtained approval from the Psychology Department Ethics Board at UCT (see Appendix E) and the Western Cape Education Department (see Appendix F) to conduct research in schools in the Western Cape. The study was conducted in line with the ethical guidelines for research with human subjects as outlined by the Health Professions Council of South Africa (HPCSA) and

the University of Cape Town (UCT) Codes for Research. Permission was obtained from the school principals to approach parents and students for recruitment. Written informed consent was obtained from the participants' parents or legal guardians at initial recruitment (see Appendices I and J), and the assent of the children was obtained at the start of the testing sessions (see Appendices K and L). All data obtained in this study was only used for research purposes, and confidentiality has and will be maintained at all times. All data is securely stored at the UCT Department of Psychology. This study posed minimal risk of harm to the participants. All of the researchers maintained awareness that children, ASD children in particular, are a vulnerable group. Therefore, precautions were taken to ensure that the testing was a positive experience for the children, and that stress or anxiety around testing was minimized. In order to do this, researchers were kept consistent across sessions. Time was taken to build rapport with the children at the start of each session and the children were rewarded with sweets and encouragement for participation in the study. If a child became fatigued during testing they were given breaks, or the session was split into two shorter sessions. In the school settings, children of a younger age were fetched from their classrooms and accompanied by a researcher to be returned to their classrooms in order to ensure safety. Care was taken to ensure that children with ASD were prepared for the change in routine caused by their assessment sessions. They were informed well ahead of time of the scheduled date and time. They were also reminded regularly by their teachers. If an ASD child became upset by the change in daily routine caused by the testing, he was given the option to return to his classroom and testing was rescheduled. Children and parents were informed that they could withdraw from the study at any point without consequence. On completion of the study, the participants' parents received a short document summarising all findings. In addition, a report was compiled providing IQ feedback for children in both groups, and ADOS results for children in the ASD group. These reports were written by the researchers

and the ADOS reports were written by the researcher trained and accredited in ADOS administration. The IQ feedback did not include scores but reported performance ranges. These results were not intended for diagnostic purposes. The ADOS results, written up by a trained professional, may be used by therapist and teachers to contribute to the clinical understanding of the child.

During the parent interviews, some questions regarding the difficulties of parenting and attachment required sensitivity from the researchers. Researchers remained considerate and compassionate in their interactions with parents. The researchers also offered to give a presentation regarding the study at each school, and this has allowed parents and teachers to ask any questions that they had.

Data Management and Statistical Analysis

All statistical analyses were run using IBM SPSS Statistical Package for the Social Sciences, Version 25 (Field, 2005; Wagner, 2014). The threshold for statistical significance was set at $\alpha = .05$. The two participant groups were entered as categorical variables. All data was made continuous for the purpose of analysis. Socio-Economic Status (SES) was represented by the median value of the annual total family income category as indicated on the demographic questionnaire. Age was entered in months for the purpose of analysis. The sample characteristics were described by calculating the mean and standard deviation and range for both age and SES. I then performed aggregate matching and ran 2-tailed independent samples t-tests to check that there were no significant differences between the groups for both age and SES.

The variables of interest in this study are the outcome variable, Theory of Mind (ToM) and the predictor variables, parenting style and attachment. All of the variables yielded a continuous score, where a higher score indicates more of the variable concerned (e.g., secure attachment, ToM ability etc.). The ToM raw scores were initially an indication

of the participants' percentage performance over the entire battery regardless of the participants' ages and consequent points of discontinuation. In order to account for age-level expectations, the sample was divided into three age bands (5:0–7:11, 8:00–10:11 and 11:00–13:11). Subgroup means and standard deviations were calculated for each age band of the neurotypical group, and then Z scores were derived for each participant in both groups (neurotypical and ASD) based on the neurotypical subgroup means.

Verbal Intelligence Quotient (VIQ) and Working Memory (WM) scores are shown to be covariates in Theory of Mind prediction and therefore are controlled for in this study. Due to the strong correlation of both WM and VIQ, a composite score was created, comprising of equally weighted standardised WM and VIQ scores.

The statistical analysis involved three phases, following the five hypotheses set out in this study. The first phase aimed to test hypotheses 1 and 2 by establishing whether there were significant between-group differences in attachment classification and parenting styles. I conducted two mixed design ANOVAs. The assumptions of homogeneity of variance and equal groups were met. However, the data for both attachment and parenting style were not normally distributed. Therefore, the method of bootstrapping the data was adopted for all analyses. Bootstrap results were based on 1000 bootstrap samples. Bootstrapping is a viable technique to use with data derived from clinical samples, which are often prone to non-normal distribution. Bootstrapping makes fewer assumptions than other approaches to transforming data and is relatively simple in application (Wright, London, & Field, 2011)

The second phase of the analysis aimed to test hypothesis 3 by exploring the correlations between parenting style and attachment in the ASD and neurotypical groups separately. Two bivariate correlations were run on each group separately, and results were compared based on level of significance.

The third phase of the analysis aimed to test hypotheses 4 and 5 by determining whether or not attachment or parenting style were significant predictors of Theory of Mind. For this purpose, hierarchical multiple regression analyses (MRA) were employed. The MRA assumptions of linearity and normality of residuals were upheld. All predictor variables were expected to have a directional relationship with Theory of Mind. Therefore, I used one-tailed significant tests to assess the zero-order correlations. Attachment and parenting style were entered into separate regression models in order to not violate the assumption of multicollinearity (see Figure 1). Theory of Mind was entered as the outcome variable. Participant age and total family income (TFI) were entered into the MRAs as the first potential predictor (covariate) variables, in order to establish the effect of attachment and parenting style above these demographic influencers. The WM-VIQ composite score was entered into the regression second, in order to identify the effect of attachment and parenting style above working memory and verbal intelligence. The variables of attachment and parenting style were entered last into the separate regression models. The variable 'group' (indicating ASD or neurotypical group) was not entered into regression because it causes multicollinearity; as shown below, the ASD and neurotypical groups differ significantly on the variables of interest, attachment, and parenting, and on the WM-IQ covariate. This causes strong correlations between the variable 'group' and the other variables, and it is therefore better to be excluded from the regression. In order to examine the patterns of association between my variables of interest in each group, I will interpret the nature of the differences shown, based on what is already known about the data set from the analysis of group differences.

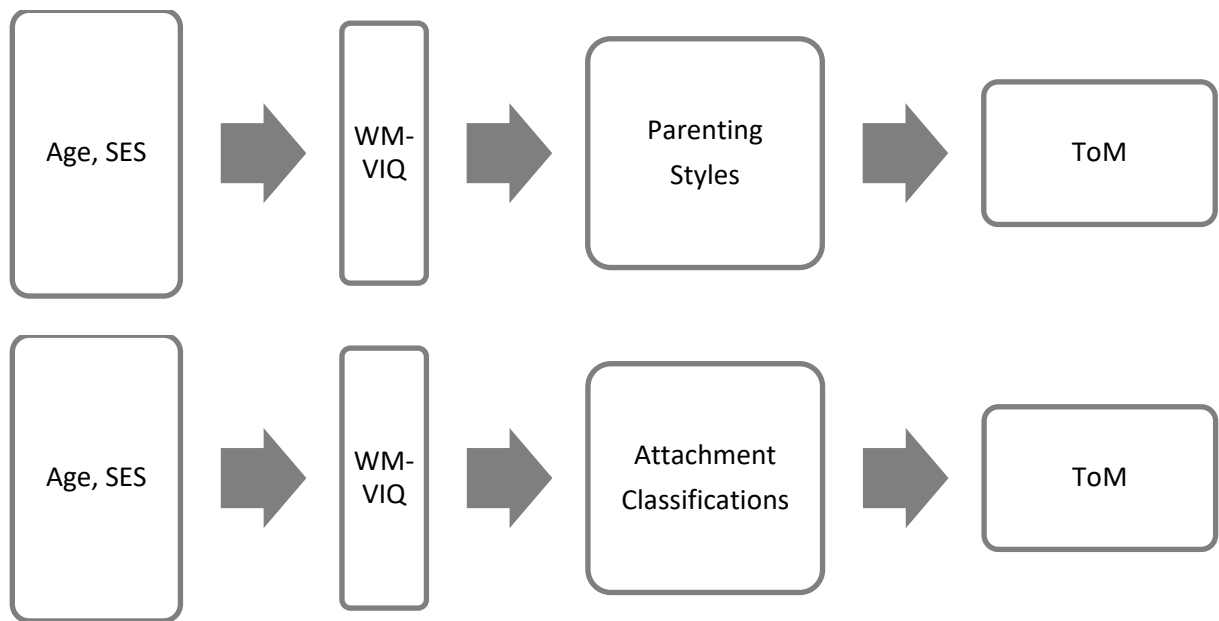


Figure 1. Diagram indicating entry of variables into separate regression models

Results

Sample Characteristics: Demographics

Sample characteristics are presented in Table 1. Two-tailed independent samples *t*-tests ($\alpha=.05$) were conducted. There were no significant differences in participant age and SES (TFI) across the groups and therefore the groups (neurotypical and ASD) were successfully aggregate matched.

Table 1

Demographic Sample Characteristics Across Groups

Characteristic	Group		Significance Across Groups		
	ASD (<i>n</i> = 40)	Neurotypical (<i>n</i> = 40)	* <i>t</i>	<i>p</i>	<i>Cohen's d</i>
Age Range (Years: Months)	6:1 – 16:11	6:7 – 13:6	-	-	
Age <i>M</i> (<i>SD</i>) (Years: Months)	10.12 (2.6)	10 (1.86)	-.235	.815	.05
TFI <i>M</i> (<i>SD</i>) (Rand per Year)	30336.68 (12224.26)	34945.04 (13505.7)	1.60	.114	.36

Note. ASD = Autism Spectrum Disorder. TFI = annual total family income.

Age in months was used for analysis but age in years was reported in the results for ease of understanding.

*Equal variances assumed (Levene's test for homogeneity of variances, $p > 0.05$)

Sample Characteristics: Outcome Variable (Theory of Mind)

The descriptive statistics for Theory of Mind are presented in Table 2. A one-tailed independent samples t-test was conducted. Results indicated that the neurotypical group ($M=0.00$, $SD=0.82$) scored significantly higher on z-transformed ToM (ToM_z) scores than the ASD group ($M= -2.49$, $SD=2.24$), $p<.001$. A large effect size was present (Cohen's $d= 1.47$). According to Levene's test, the assumption of homogeneity of variance was not met for ToM_z across groups. Therefore, the results for this t-test were interpreted based on equal variance not being assumed.

Table 2

Descriptive Characteristics of ToM_Z Across Groups

Measure	Descriptive Statistics	Group		Significance Across Groups		
		ASD (<i>n</i> = 40)	Neurotypical (<i>n</i> = 40)	* <i>t</i>	<i>p</i>	<i>Cohen's d</i>
	<i>M(SD)</i>	-2.49 (2.24)	0.00 (0.82)	6.591	.001**	1.47
ToM _Z	<i>Range</i>	-7.78–0.83	-2.13–2.55			

Note. Equal variances not assumed (Levene's test for equality of variances, $p < .001$)

Statistically significant $p < .001$

VIQ = Verbal Intelligence Quotient. ToM = Theory of Mind.

Group Differences: Parenting Styles

According to hypothesis 1, it was expected that there would be a significant difference in parenting styles between ASD and neurotypical children.

A mixed-design ANOVA was conducted to identify any differences in parenting styles between groups. The within-group factor was represented by the three types of parenting styles: Authoritative, Authoritarian, and Permissive. The two groups (ASD and Neurotypical) were entered into the mixed-design ANOVA analysis as the between-group factor. Descriptive characteristics of parenting styles across groups are presented (see Table 3).

According to Mauchly's Test of Sphericity, the assumption of sphericity has been violated, and therefore, an epsilon adjusted value, Greenhouse-Geisser is reported in this case. Results (See Table 4) indicated that there was a significant disordinal interaction between group and parenting styles, $F(1.657) = 5.435, p < .01$ (Table 4). The effect size indicated that the interaction between group and parenting styles explained 6.5% of the variance in parenting styles.

Table 3

Descriptive Characteristics of Parenting Style across Groups

Measure	Descriptive Statistics	Group	
		ASD (<i>n</i> = 40)	NT (<i>n</i> = 40)
PSDQ			
Authoritative	<i>M</i> (<i>SD</i>)	4.00 (0.47)	4.22 (0.63)
	<i>Range</i>	2.93–4.67	2.40–4.93
Authoritarian	<i>M</i> (<i>SD</i>)	1.97 (0.43)	1.72 (0.50)
	<i>Range</i>	1.17–3.00	1.08–3.94
Permissive	<i>M</i> (<i>SD</i>)	2.22 (0.77)	1.88 (0.62)
	<i>Range</i>	1.00–3.80	1.00–4.00

PSDQ = Parenting Style.

ASD = Autism Spectrum Disorder. NT = Neurotypical

Table 4

Mixed Design ANOVA Results for Parenting Style

Effect	<i>F</i> *	<i>p</i> *	Partial Eta Squared
Parenting Style	388.690	.001**	0.833
Group	2.580	.112	.032
Interaction (Parenting Style*Group)	5.435	.009**	0.065

*Greenhouse Geisser

**significant at $p < .05$ level.

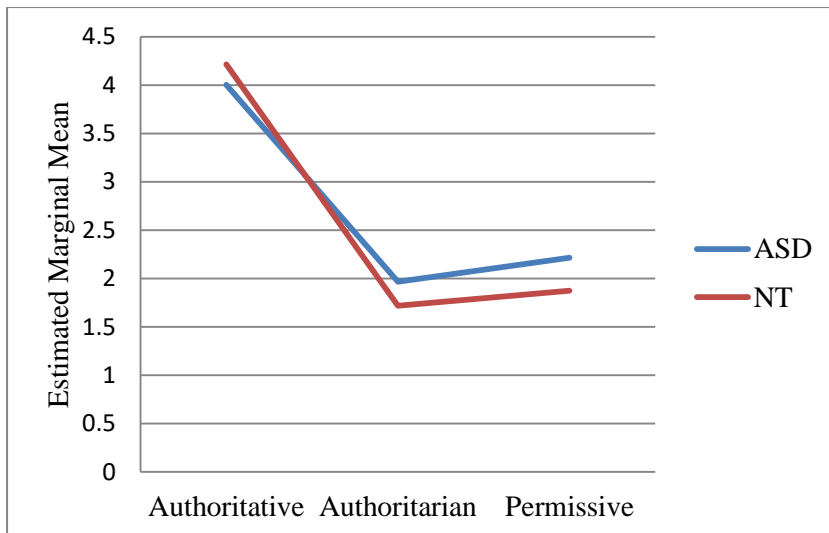


Figure 2. Estimated marginal means for ASD and neurotypical groups across Parenting Styles

In order to explore the interaction effect, syntax codes were used to show the pairwise comparisons by group and by parenting style, respectively.

Interaction by group. The first syntax (see Table 5 and Figure 2) was coded to show differences between groups on the types of parenting styles. Results indicated that the ASD group ($M = 1.967$, $SD = 0.074$) reported significantly more of the Authoritarian parenting style than the neurotypical group ($M = 1.719$, $SD = 0.074$), $p = .019$. The ASD group ($M = 2.215$, $SD = 0.110$) also reported significantly more of the Permissive parenting style than the neurotypical group ($M = 1.875$, $SD = 0.110$), $p = .032$.

Table 5

Parenting Styles: Interaction by Group

Parenting Style	Pairwise Comparisons		Mean Difference	Standard Error	<i>p</i>
Authoritative	NT	ASD	0.213	0.124	.090
Authoritarian	NT	ASD	- 0.248*	0.104	.019*
Permissive	NT	ASD	- 0.340*	0.156	.032*

ASD = Autism Spectrum Disorder. NT = Neurotypical

Based on estimated marginal means

*. The mean difference is significant at the .050 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Interaction by parenting styles. The second syntax (See Table 6 and Figure 2) was coded to reveal differences in parenting styles within each group. Results indicated that within both the ASD group and the neurotypical group, there was significantly more Authoritative parenting than the other two types (Authoritarian and Permissive). Furthermore, in the ASD group there was significantly more Permissive parenting than Authoritarian parenting. There were no significant differences between Authoritarian and Permissive parenting in the neurotypical group.

Table 6

Parenting Styles: Interaction by Parenting Styles

Group	Pairwise Comparisons			Mean Difference	Standard Error	p
	Authoritative	Authoritarian	Permissive			
	Mean (A1)	Mean (A2)	Mean (P)			
ASD	4.002	1.967		2.035*	0.118	.0001
	4.002		2.215	1.787*	0.153	.0001
		1.967	2.215	- 0.248*	0.106	.022
Neurotypical	4.215	1.719		2.496*	0.118	.0001
	4.215		1.875	2.340*	0.153	.0001
		1.719	1.875	- 0.156	0.106	.144

ASD = Autism Spectrum Disorder. NT = Neurotypical

Based on estimated marginal means

*. The mean difference is significant at the .050 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Group differences: Attachment

According to hypothesis 2, it was expected that there would be a significant difference in attachment between ASD and neurotypical children. A mixed-design ANOVA was conducted to identify any differences in attachment between groups. The within-group factor was represented by the three types of attachment: Secure, Ambivalent, and Avoidant. The two groups (ASD and Neurotypical) were entered into the mixed-design ANOVA analysis as the between-group factor. Descriptive characteristics of attachment classifications across groups are presented (see Table 7).

According to Mauchly’s Test of Sphericity, the assumption of sphericity has been violated, and therefore, an epsilon adjusted value, Greenhouse-Geisser, is reported in this case. Results (See Table 8) indicated that there was a significant disordinal interaction

between group and attachment, $F(1.688) = 22.352, p < .001$. The effect size indicated that the interaction between group and attachment explained 22.3% of the variance in type of attachment.

Table 7
Descriptive Characteristics of Attachment across Group

Measure	Descriptive Statistics	Group	
		ASD (n = 40)	NT (n = 40)
ASCQ			
Secure	<i>M(SD)</i>	6.83 (2.15)	8.45 (1.66)
	<i>Range</i>	2.00–10.00	4.00–10.00
Ambivalent	<i>M(SD)</i>	6.88 (2.49)	3.15 (2.65)
	<i>Range</i>	2.00–10.00	0.00–8.00
Avoidant	<i>M(SD)</i>	4.38 (3.48)	2.03 (2.41)
	<i>Range</i>	0.00–10.00	0.00–10.00

ASCQ = Attachment.

ASD = Autism Spectrum Disorder. NT = Neurotypical

Table 8

Mixed Design ANOVA Results for Attachment

Effect	<i>F</i> *	<i>p</i> *	Partial Eta Squared
Attachment	57.658	.001**	0.425
Group	24.283	.0001**	0.237
Interaction (Attachment*Group)	22.352	.0001**	0.223

*Greenhouse-Geisser

**Significant at the .05 level

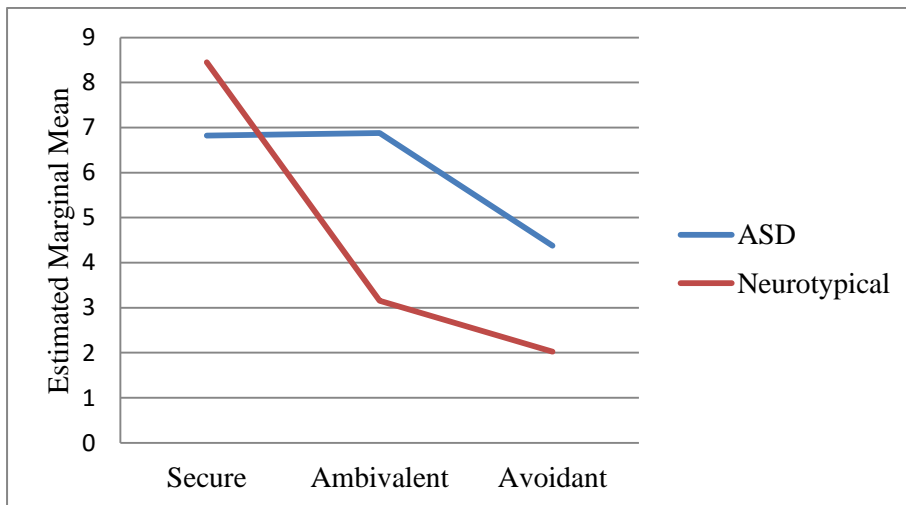


Figure 3. Estimated marginal means for ASD and neurotypical groups across Attachment Classifications

In order to explore the interaction effect, syntax codes were used to show the pairwise comparisons by group and by attachment, respectively.

Interaction by Group. The first syntax (see Table 9 and Figure 3) was coded to show differences between groups on the types of attachment. Results indicated that the neurotypical group ($M = 8.45$, $SD = 1.66$) reported significantly more Secure attachment than the ASD group ($M = 6.825$, $SD = 2.147$), $p < .001$. The ASD group ($M = 6.875$, $SD = 2.49$) reported significantly more Ambivalent attachment than the neurotypical group ($M = 3.15$, $SD = 2.65$), $p < .001$. The ASD group ($M = 4.376$, $SD = 3.48$) also reported significantly more Avoidant attachment than the neurotypical group ($M = 2.025$, $SD = 3.2$), $p < .001$.

Table 9

Attachment: Interaction by Group

Attachment	Pairwise Comparisons		Mean	Standard	<i>p</i>
			Difference	Error	
Secure	NT	ASD	1.625*	0.492	.0001
Ambivalent	NT	ASD	- 3.725*	0.575	.0001
Avoidant	NT	ASD	- 2.350*	0.669	.001

ASD = Autism Spectrum Disorder. NT = Neurotypical

Based on estimated marginal means

*. The mean difference is significant at the .050 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Interaction by Attachment. The second syntax (see Table 10 and Figure 3) was coded to reveal differences in attachment within each group. Results indicated that within the neurotypical group there was significantly more Secure attachment than Ambivalent and Avoidant and significantly more Ambivalent than Avoidant (Secure > Ambivalent > Avoidant). However, in the ASD group there was no significant difference between Secure and Ambivalent attachment, while both were significantly higher than Avoidant attachment.

Table 10

Attachment: Interaction by Attachment

Group	Pairwise Comparisons			Mean Difference	Standard Error	<i>p</i>
	Secure Mean	Ambivalent Mean	Avoidant Mean			
	(S)	(Am)	(Av)			
ASD	6.825	6.875		-0.05	0.557	.929
	6.825		4.375	2.45*	0.689	.0001
		6.875	4.375	2.5*	0.488	.0001
Neurotypical	8.45	3.15		5.3*	0.577	.0001
	8.45		2.025	6.425*	0.698	.0001
		3.15	2.025	1.125*	0.488	.024

ASD = Autism Spectrum Disorder. NT = Neurotypical

Based on estimated marginal means

*. The mean difference is significant at the .050 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Correlations between Parenting and Attachment in ASD and in Neurotypical children

Table 11

Bivariate Correlation Matrix for neurotypical group

	Attachment (Secure)	Attachment (Ambivalent)	Attachment (Avoidant)
Parenting (Authoritative)	.117	-.039	-.039
Parenting (Authoritarian)	-.120	.349*	.014
Parenting (Permissive)	-.202	.164	.033

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

Table 12

Bivariate Correlation Matrix for ASD group

	Attachment (Secure)	Attachment (Ambivalent)	Attachment (Avoidant)
Parenting (Authoritative)	-.102	.340*	.340*
Parenting (Authoritarian)	.136	.007	.001
Parenting (Permissive)	.304	.047	-.336*

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

Hypothesis 3 states that the pattern of association between parenting style and attachment will look different in parent-child pairs consisting of children with ASD compared to those with neurotypical children. In order to test hypothesis 3, two bivariate correlations were run on each group separately (see Table 11 and Table 12). Results showed that, in the neurotypical group, Ambivalent attachment has a strong positive correlation with Authoritarian parenting ($r(38) = +.349, p < .05$, two-tailed). In the ASD group there was not a significant correlation between Authoritarian parenting and Ambivalent attachment ($r(38) = +.007, p = ns$, two tailed). Furthermore, in the ASD group there were significant correlations between Authoritative parenting and both Ambivalent ($r(38) = +.340, p < .05$, two-tailed) and Avoidant attachment ($r(38) = +.340, p < .05$, two-tailed). There was also a significant inverse correlation found between Permissive parenting and Avoidant attachment in the ASD sample ($r(38) = -.336, p < .05$, two-tailed). The hypothesis that the pattern of association between parenting style and attachment will look different in ASD compared to neurotypical children was accepted. Furthermore, it was hypothesised that there would not be direct positive correlations between positive parenting and secure attachment, or between less positive parenting and insecure attachment in the ASD sample. This hypothesis was accepted.

Parenting Style as a Predictor of Theory of Mind

In order to test hypothesis 4, that parenting style will predict Theory of Mind, a hierarchical multiple linear regression was calculated (Table 14). The model was designed to predict Theory of Mind from Age, SES, WM-VIQ and three measures of parenting style. Tests for multicollinearity indicated that a very low level of multicollinearity was present (VIF = 1.055 for age, 1.17 for SES, 1.116 for WM-VIQ, 1.133 for Authoritative parenting, 1.315 for Authoritarian parenting and 1.290 for Permissive parenting). In addition, all Tolerance values were well above .2. A zero correlation matrix and table of coefficients are presented (see Table 13 and Table 15).

Table 13

Parenting Style: Zero Correlation Matrix

	Age (Months)	SES (TFI)	WM/VIQ (Composite)	ToM (Z)	PS (Authoritative)	PS (Authoritarian)	PS (Permissive)
Age (Months)	-						
SES (TFI)	-.180	-					
WM/VIQ (Composite)	-.075	.221*	-				
ToM (Z)	.138	.200*	.699***	-			
PS (Authoritative)	.026	-.065	.252*	.167	-		
PS (Authoritarian)	-.036	-.252*	-.223*	-.099	-.114	-	
PS (Permissive)	-.096	-.139	-.154	-.099	-.218*	.431***	-

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

***. Correlation is significant at the 0001 level (1-tailed).

According to theory, Age and SES were the first variables entered, followed by WM-VIQ and lastly, the three parenting styles in question. A significant regression equation was found ($F(6,73) = 14.231, p < .0001$) with an adjusted R^2 of .501. However, none of the three parenting styles in question were significant predictors of Theory of Mind (Authoritative, $\beta = .003, p = .990$; Authoritarian, $\beta = .400, p = .272$; Permissive, $\beta = .021, p = .936$). Note that β values mentioned in this section are unstandardized bootstrapped betas and should not be interpreted as a standardised beta value. The hypothesis that parenting style is a predictor of Theory of Mind was rejected. The better fitting model for predicting Theory of Mind was a linear combination of age, SES, and WM-VIQ (adjusted $R^2 = .513, F(3,76) = 28.694, p = .0001$). The addition of the three parenting style variables did not significantly improve prediction (R square change = .008, F change = .423, $p = .737$).

Table 14

Regression Model 1: Model Summary of the Predictors of ToM (Parenting Style)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	Sig. F Change
1	.267 ^a	0.071	0.047	2.04589	0.071	2.957	0.058
2	.729 ^b	0.531	0.513	1.46329	0.46	74.521	0
3	.734 ^c	0.539	0.501	1.48026	0.008	0.423	0.737

a. Predictors: (Constant), SES_TFI, Age

b. Predictors: (Constant), SES_TFI, Age, WM-VIQ

c. Predictors: (Constant), SES_TFI, Age, WM-VIQ, PSDQ_Permissive,
PSDQ_Authoritarian, PSDQ_Authoritative

d. Dependent Variable:

ToM_Z

Table 15

Bootstrap for Coefficients (Model 1 Predicting ToM from Parenting Style)

Model	Predictor Variables	B	Std. Error	<i>p</i>	Collinearity Statistics	
					Tolerance	VIF
1	(Constant)	-4.155	1.486	.01		
	Age (Months)	0.014	0.011	.192	0.968	1.034
	SES (TFI)	0.00003	0.00001	.027	0.968	1.034
2	(Constant)	-7.533	1.083	.001		
	Age (Months)	0.016	0.007	.021	0.966	1.035
	SES (TFI)	0.00001	0.00001	.246	0.924	1.082
	WM-VIQ	0.44	0.054	.001	0.950	1.053
3	(Constant)	-8.626	2.309	.001		
	Age (Months)	0.017	0.008	.032	0.948	1.055
	SES (TFI)	0.00001	0.00001	.183	0.856	1.168
	WM-VIQ	0.451	0.057	.001	0.858	1.166
	PSDQ Authoritative	0.003	0.264	.99	0.883	1.133
	PSDQ Authoritarian	0.4	0.383	.272	0.760	1.315
	PSDQ Permissive	0.021	0.288	.936	0.775	1.290

a. Dependent Variable: ToM_Z

Attachment as a Predictor of Theory of Mind

In order to test hypothesis 5, the hypothesis that attachment will predict Theory of Mind, a multiple linear regression was calculated (Table 17). The multiple linear regression was designed to predict Theory of Mind based on Age, SES, WM-VIQ, and three measures of attachment. Tests for multicollinearity indicated that a very low level of multicollinearity was present (VIF = 1.123 for age, 1.135 for SES, 1.207 for WM-VIQ, 1.912 for Secure attachment, 1.517 for Ambivalent attachment and 2.204 for Avoidant attachment). In addition, all Tolerance values were well above .2. A zero correlation matrix and table of coefficients are presented (see Table 16 and Table 18).

Table 16

Attachment: Zero Correlation Matrix

	Age (Months)	SES (TFI)	WM/VIQ (Composite)	ToM (Z)	Attachment (Secure)	Attachment (Ambivalent)	Attachment (Avoidant)
Age (Months)	-						
SES (TFI)	-.180	-					
WM/VIQ (Composite)	-.075	.221*	-				
ToM (Z)	.138	.200*	.699***	-			
Attachment (Secure)	-.037	.008	.299**	.283**	-		
Attachment (Ambivalent)	.162	-.117	-.314**	-.335**	-.392***	-	
Attachment (Avoidant)	-.088	-.139	-.232*	-.155	-.656***	.513***	-

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

***. Correlation is significant at the 0001 level (1-tailed).

According to theory, Age and SES were the first variables entered, followed by WM-VIQ and lastly, the three attachment classifications in question. A significant regression equation was found ($F(6,73) = 17.315, p < .0001$) with an adjusted R^2 of .553. The second model entered into the regression, a linear combination of age, SES, and WM-VIQ, produced a significantly improved prediction of Theory of Mind (adjusted $R^2 = .513, F(3,76) = 28.694, p = .000$). The addition of the third model, the three attachment classification variables, significantly improved the prediction of Theory of Mind (R square change = .056, F change = 3.315, $p = .025$). While the overall model explained 58.7% of the variance in Theory of Mind, attachment contributed a significant 5.6% to the model over and above the effects of age, SES, working memory, and verbal intelligence. The hypothesis that attachment is a predictor of Theory of Mind was accepted. More specifically, Secure attachment was not a significant predictor of Theory of Mind ($\beta = .195, p = .142$), but Ambivalent attachment ($\beta = -.150, p = .019$) and Avoidant attachment ($\beta = .179, p = .043$) were significant predictors. Note that β values mentioned in this section are unstandardized bootstrapped betas and should not be interpreted as a standardised beta value.

Table 17

Regression Model 2: Model Summary of the Predictors of ToM (Attachment)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	Sig. F Change
1	.267 ^a	0.071	0.047	2.04589	0.071	2.957	0.058
2	.729 ^b	0.531	0.513	1.46329	0.46	74.521	0
3	.766 ^c	0.587	0.553	1.4007	0.056	3.315	0.025

a. Predictors: (Constant), SES_TFI, Age

b. Predictors: (Constant), SES_TFI, Age, WM-VIQ

c. Predictors: (Constant), SES_TFI, Age, WM-VIQ, ASCQ_Avoidant,
ASCQ_Ambivalent, ASCQ_Secure

d. Dependent Variable:

ToM_Z

Table 18

Bootstrap for Coefficients (Model 2 Predicting ToM from Attachment)

Model	Predictor Variables	B	Std. Error	<i>p</i>	Collinearity Statistics	
					Tolerance	VIF
1	(Constant)	-4.155	1.488	.011		
	Age (Months)	0.014	0.011	.212	0.968	1.034
	SES (TFI)	0.00003	0.00001	.04	0.968	1.034
2	(Constant)	-7.533	1.036	.001		
	Age (Months)	0.016	0.007	.026	0.966	1.035
	SES (TFI)	0.00001	0.00001	.276	0.924	1.082
	WM-VIQ	0.44	0.057	.001	0.950	1.053
3	(Constant)	-9.219	1.711	.001		
	Age (Months)	0.021	0.007	.004	0.891	1.123
	SES (TFI)	0.00001	0.00001	.164	0.881	1.135
	WM-VIQ	0.399	0.049	.001	0.829	1.207
	ASCQ Secure	0.195	0.128	.142	0.523	1.912
	ASCQ Ambivalent	-0.15	0.06	.019	0.659	1.517
	ASCQ Avoidant	0.179	0.084	.043	0.454	2.204

a. Dependent Variable: ToM_Z

Discussion

The objective of this study was to see whether there were differences in types of parenting styles and differences in childhood attachment classifications - as perceived by parents - between child-parent pairs with children with ASD and neurotypical children. The study further explored the relationship between parenting styles and attachment classifications across these two groups. The final aim of this study was to explore the predictive value of attachment and parenting style in Theory of Mind development in ASD populations. With this aim in mind, the differences in parenting style and attachment between ASD and neurotypical groups will be discussed first. The relationship between attachment and parenting will be discussed second. Lastly, the predictive value of these variables in Theory of Mind development will be discussed. Additionally, limitations to this study will be considered and recommendations will be given with regard to future research.

Parenting Style in ASD and Neurotypical children

I investigated whether there were significant differences in parenting styles between ASD and neurotypical children.

Authoritative parenting. When examining the differences in parenting styles within each group, results indicated that within both the ASD group and the neurotypical group, there was significantly more Authoritative parenting reported than the other two types (Authoritarian and Permissive). These results are good news and indicate that most parents, of neurotypical children and of children with ASD, are still, predominantly, adopting positive parenting styles (maintaining a good balance between both responsive and demanding parenting).

Furthermore, there was no significant difference in the amount of Authoritative parenting style employed by the two groups. This indicates that parents of neurotypical

children and parents of children with ASD reported equal amounts of the more positive type of parenting, Authoritative parenting style.

Similarly, Van Ijzendoorn et al. (2007), in their research exploring parental sensitivity, found that parents of children with ASD showed equal sensitivity to parents of children without ASD. However, the children with ASD showed less involvement and interaction with their parents than children in the other groups. The current results indicate that parents of children with ASD are also deploying positive parenting styles in the face of children's behavioural challenges and alongside less positive parenting styles (see below).

Lin et al. (2018) point out that, in contrast to the emphasis on the negative aspects, there has been very little focus on the positive experiences of parenting a child with ASD. Their study aimed to focus on both stressful and enriching experiences of parenting a child with ASD. Their findings showed that experiences of enrichment were not affected by the child's ASD symptom severity, but rather that parenting self-efficacy and parents' perceived levels of stress were associated with parent experiences of enrichment. The research highlighted the paradox of parental challenges in ASD and the coexistence of experiences of enrichment (Lin et al., 2018). The phenomenon may be the reason for the resilience of positive parenting styles in the face of enormous challenges.

However, it needs to be considered that parental self-reports of parenting style have been used in this study and therefore, there is the possibility of a social desirability bias responsible for higher reports of more positive types of parenting.

Authoritarian and Permissive parenting. It has already been established that both neurotypical and ASD groups reported comparatively higher rates of positive parenting (Authoritative) and lower rates of less positive parenting styles (Authoritarian and Permissive). Therefore, Authoritarian and Permissive parenting will be discussed together and in relation to each other.

Results showed that the ASD group reported significantly more of the Authoritarian parenting style than the neurotypical group and, also, significantly more of the Permissive parenting style than the neurotypical group. These results indicate that while positive parenting styles are reported more often than less positive parenting styles across groups, when parenting a child with ASD, there is an increased tendency to adopt less ideal styles of parenting than with a neurotypical child.

Furthermore, within the ASD group there was significantly less Authoritarian parenting reported than Permissive parenting. However, in contrast, there were no significant differences between Authoritarian and Permissive parenting in the neurotypical group.

These results indicate that while parents of neurotypical children may occasionally employ less ideal parenting styles, their adopted style tends to vary, with equal preference, between either, increased demandingness and lowered responsiveness (Authoritarian) or, increased responsiveness without the balance of demandingness (Permissive). In contrast, when less positive parenting is at play within ASD populations there is a preferential adoption of Permissive parenting over Authoritarian.

The greater tendency to adopt less positive parenting styles when parenting a child with ASD is not a surprising finding. Parents of ASD children face specific behavioural issues and some have relinquished the ideals of managing their child's behaviours using conventional parenting methods (Reed & Osborne, 2014). Children with ASD have been shown to have more executive functioning difficulties (Hutchison et al., 2016). Their parents showed higher levels of stress and a more use of both authoritarian and permissive parenting styles, compared to neurotypical children (Hutchison et al., 2016; Reed & Osborne, 2014; Sinha et al., 2016). Furthermore, this high level of stress creates a tendency for parents of ASD children to focus on their children's negative behaviour traits and to, in turn, adopt less positive-parenting styles (Reed & Osborne, 2014).

Authoritative parenting requires warmth and responsiveness as well as reasoning, expectation, and democratic participation (Benoit, 2004). These aspects of parenting may be less achievable when a child has ASD, particularly at times when an ASD child engages in frequent melt-downs and resistant behaviour (Kanner, 1943). A parent may be forced to resort to less positive parenting styles in order to manage behaviour when co-operation from the child is low.

Similarly, it may be easier to respond with greater responsiveness and lowered demandingness (Permissive parenting) toward ASD children compared to neurotypical children. This result may be an indication of the increased overprotectiveness and lack of expectation placed on a child that is viewed to have a disability such as in ASD (Sanders, 2006). A decrease in a child's capacity for reciprocal negotiation and language skills, as is often seen in ASD (APA, 2013; Happé, 1994b; Zwaigenbaum et al., 2005), may result in less demand placed on the ASD child and less employment of Authoritarian type parenting compared to Permissive parenting.

In the same vein, Smetana (2017) explored the complexity of parenting while considering the influence of cultural and contextual differences. While much research has focused on the effect of parenting on the child, Smetana (2017) and Moilanen et al. (2015) noted the impact that the child, behaviourally and contextually, may have on the parent and the parenting styles that are adopted as a result. Specifically, significant effects caused by the child were associated with Permissive and, to a lesser extent, Authoritarian parenting, but not for Authoritative parenting. Smetana (2017) highlighted the inclusion of 'domain-specific' models of parenting that view parenting as situationally dependent. Parenting is viewed as flexible in its use of different practices, which are dependent on parenting goals, specific children's needs, and the types of behaviours that parenting is directed toward. It is therefore

likely that children with ASD may evoke or elicit a different style of parenting from their parents in contrast to neurotypical children.

Therefore, it is important to reiterate that parents of children with ASD tend to experience more parenting stress than parents of neurotypical children or those diagnosed with other developmental disabilities (Estes et al., 2013; Hayes & Watson, 2013).

Furthermore, 'problems with child behaviour' is a significant predictor of parenting-related stress in parents of children with ASD (Estes et al., 2013). It is therefore possible that the social deficits associated with ASD affect or play a large part in determining parental behaviour and overall parenting style.

Attachment in ASD and Neurotypical children

I investigated whether there were significant differences in attachment classifications, as perceived by parents, between ASD and neurotypical children.

Secure attachment. Results from this study indicated that the neurotypical group reported significantly more Secure attachment than the ASD group.

On closer analysis, results indicated that within the neurotypical group, there was significantly more Secure attachment reported than Ambivalent and Avoidant and significantly more Ambivalent than Avoidant attachment (Secure > Ambivalent > Avoidant). This result was anticipated and is in keeping with previous research investigating attachment in neurotypical children, showing that Secure attachment holds a greater weighting in the normal population than other types of attachment (Benoit, 2004; Van Ijzendoorn et al., 2007).

Differently, in the ASD group there was no significant difference between Secure and Ambivalent attachment, while both were significantly higher than Avoidant attachment. These results indicate that, while Secure attachment is possible within an ASD context, it exists alongside similarly high rates of Ambivalent attachment.

In order to foster a Secure attachment a caregiver must consistently respond to distress with sensitivity, comfort, and reassurance (Ainsworth, 1979; Benoit, 2004). A child can then learn to seek proximity to the reliable caregiver as a secure base from which to explore the world. The securely attached child knows when and how to approach and maintain contact with a caregiver (Benoit, 2004). Unfortunately, this reciprocal organisation and development is highly dependent on affective contact between caregiver and child (Ainsworth, 1979), and therefore is not as simple within an ASD context.

The ASD child's difficulty with making affective contact is evident early in childhood development and frequently presents as concerns regarding caregiver attachment, and later in development, as deficits in peer relations (Lord, 1984). Children with ASD often present with a deficit in interconnectedness, in that they lack the understanding of how to relate to others and form a relational bond (Travis & Sigman, 1998; Volkmar et al., 1987). Kanner (1943) suggested that their disinterest in others may result in their failure to respond to the expressions of others. This behaviour results in a lack of the affective and reciprocal interaction necessary for relationship formation.

The social and communication deficits outlined in ASD appear to be present early in life and may therefore serve to disrupt the formation of parent-child attachments at this stage (Fodstad et al., 2009). These deficits can include: visual disengagement; deficits in imitating behaviours, social smiling, responsiveness and social interest; significant passivity; reduced activity levels; and delayed expressive and receptive language (Zwaigenbaum et al., 2005). Poor parent-child attachment has been recognised in children with ASD from infancy and is frequently observed as reduced to absent comfort seeking behaviours (Rutgers et al., 2004; Rutgers et al., 2007a).

However, research regarding attachment in ASD is varied and results have been inconsistent. It is likely that while ASD remains on a spectrum of severity and while ASD

presentation is vastly diverse, research results concerning ASD may be varied due to inconsistencies in consideration of severity and differences in inclusion criteria as well as significant individual differences in every child diagnosed with ASD.

The results from this study stand to confirm that while secure attachment is present in ASD, it is significantly less present than in their neurotypical counterparts. These findings are supported by a systemic review conducted by Kahane and El-Tahir (2015) noting that while secure attachment can be present in children with ASD, it is not as common as in neurotypical children.

Ambivalent attachment. In order to focus on Ambivalent attachment, it is helpful to reiterate the differences in attachment classification, as they occurred in relation to each other. Results from this study indicated that within the neurotypical group there was significantly more Secure attachment reported than Ambivalent and Avoidant, and significantly more Ambivalent than Avoidant (Secure > Ambivalent > Avoidant). In contrast, in the ASD group there was no significant difference between Secure and Ambivalent attachment, while both were significantly higher than Avoidant attachment.

Furthermore, the ASD group reported significantly more insecure attachment (Ambivalent and Avoidant) than the neurotypical group. These results indicate that children with ASD show more insecure attachment than neurotypical children. This outcome is in keeping with previous research regarding attachment in ASD compared to neurotypical children (Rutgers et al., 2007b).

Ambivalent attachment behaviour is often unpredictable. Children with high ambivalent attachment style frequently offer an ambivalent response after separation, where they alternate between behaving with resistance and rejection toward the caregiver or with dependence and fixation. Often separations from the primary caregiver cause a great deal of distress for these children, and they are not easily soothed when reunited (Benoit, 2004).

Similarly, children with ASD frequently exhibit atypical restrictive behaviours, particularly a need for sameness and resistance to change, such as the change caused by caregiver separation (APA, 2013; Kanner, 1943). It is possible that the social deficits characteristic of ASD serve to disrupt attachment formation in ASD.

The current results serve to confirm the hampering effect of early-life, ASD related social deficits on parent-child attachment formation (Fodstad et al., 2009). The lack of interconnectedness common in ASD is frequently accompanied by and speculated as being instrumental in the development of deficits in care-giver attachment security (Rutgers et al., 2004).

However, in contrast, Keenan et al. (2016) explored the relationship between child attachment and caregiver wellbeing in families of children with ASD. The study showed that the sample of children with ASD were not less securely attached than neurotypical children, but that their parents experienced more stress and reported greater attachment-related anxiety than parents of neurotypical children. This finding highlights the great propensity for uncertainty when parents are required to give an accurate report of their child's attachment related behaviours when their own attachment-related anxiety may be high. Therefore, the use of parental-reports of attachment, without direct observation of attachment related behaviours, may be a limitation in this study. This study was limited in time and resources and therefore direct observation of attachment was not feasible. However, future studies should adopt a measure of attachment that is more rigidly based on the fundamental definition of attachment, which is proximity seeking (Benoit, 2004). For example, incorporation of the strange-situation procedure to measure attachment, in infants and toddlers, is likely to yield more accurate rates of attachment classifications.

Avoidant attachment. It has already been established that within the neurotypical group there was significantly more Secure attachment reported than Ambivalent and

Avoidant, and significantly more Ambivalent than Avoidant (Secure > Ambivalent > Avoidant). In the ASD group, both Secure and Ambivalent attachment were also significantly higher than Avoidant attachment. Avoidant attachment was the lowest measure of attachment across both groups.

Furthermore, the ASD group reported significantly more insecure attachment (Ambivalent and Avoidant) than the neurotypical group. This indicated that even though Avoidant attachment measured as the lowest attachment classification in both groups, there was still significantly more Avoidant attachment evident in the sample of ASD parent-child dyads than in the neurotypical sample.

Avoidant attachment behaviours take on the form of caregiver avoidance, particularly during times of distress and need. Any displays of negative emotion are minimized in order to ‘avoid’ the caregiver (Benoit, 2004). While this type of behaviour is not predominantly characteristic of ASD, it is more likely to form a part of the varied picture of ASD related social disconnectedness than to be characteristic of neurotypical behaviour (Kanner, 1943). It is also possible that a parent may perceive their ASD child as ‘avoidant’ when social affective behaviours are low and parental attempts at affection are unrealised and unacknowledged. Again, it is important to consider the effect of ASD social disconnectedness on attachment formation. The very behaviours that characterise an ASD diagnosis serve to hamper the formation of caregiver attachments, leading to attachment insecurity (Fodstad et al., 2009; Rutgers et al., 2004).

Relationship between Parenting and Attachment in ASD and in Neurotypical Children

Many studies have implicated parental sensitivity as a possible factor in determining attachment security, and the impact of parenting on attachment has been comprehensively studied (Capps et al., 1994; Kahane & El-Tahir, 2015). However, the relationship between parenting and attachment in ASD is not well established. In the current study, hypothesis 3

was accepted because associations between parenting style and attachment showed different patterns in the ASD sample compared to the neurotypical sample

Results from this study showed that, in neurotypical populations, Ambivalent attachment has a strong positive correlation with Authoritarian parenting. However, in the ASD sample, it was shown that there was no significant correlation between Authoritarian parenting and Ambivalent attachment. Furthermore, in the ASD sample, there were significant associations between positive parenting (Authoritative) and insecure attachment classifications (Ambivalent and Avoidant). There was also a significant inverse correlation found between Permissive parenting and Avoidant attachment in the ASD sample.

It is likely that associations between parenting and attachment in neurotypical children can be understood in terms of the types of parenting that may serve to foster an Ambivalent attachment within normal contexts. Authoritarian parenting is defined as being high in parenting practices related to demandingness and low in factors related to responsiveness. Under Authoritarian parenting, a child's needs are not ignored but rather dealt with a high level of parental control and expectation of child compliance (Barber, 1996; Baumrind, 1971b; Maccoby & Martin, 1983). These parents tend to make decisions for their child with little participation from the child (Hess & McDevitt, 1984). The child is often not heard and not trusted. This may also present as lacking warmth, which may create an unpredictable and possibly inconsistent environment for the child, who in turn, may develop an ambivalent approach in response to the caregiver (Benoit, 2004). Consequently, when Authoritarian parenting is low, typically developing children are able to respond with less Ambivalent attachment behaviours (Benoit, 2004). However, this pattern does not seem to hold in ASD.

In light of this, it is important to consider that the context built around an ASD child is different from that of a neurotypical child. A recent study was designed to establish the

association between parenting and the quality of children's attachment in families of children with ASD. It was determined that there was greater parental stress and anxiety and increased attachment insecurity in families of children with ASD than in families of children with other developmental disabilities (Teague et al., 2018). These contextual differences could disrupt the recognised associations between parenting and attachment that are seen in typically developing children.

In the same vein, the results from this study indicated that the established relationship between positive parenting and attachment security in neurotypical children does not appear to hold in ASD. It was previously shown that the ASD group reported less secure attachment than the neurotypical group, despite equal rates of Authoritative parenting in both groups. Furthermore, the ASD group appears to have a strong positive association between positive parenting (Authoritative) and insecure attachment classifications (Ambivalent and Avoidant).

These findings suggest a disconnection between parenting and attachment in ASD, whereby good and positive parenting does not foster attachment security and even sees the development of insecure attachment. This may be viewed as confirmation that parents of ASD children tend to employ a positive parenting style, in spite of their child's negative behaviour patterns and difficulties with connection. These results speak to a high level of parental resilience in those with children with ASD. Furthermore, this association also indicates that when Authoritative parenting is lowered, insecure attachment behaviours are also lowered, in ASD. This result serves to confirm a disconnection between parenting and attachment behaviour in ASD (Van Ijzendoorn et al., 2007).

Additionally, the association found between permissive parenting and avoidant attachment in the ASD group does not follow a typical progression. Permissive parenting involves an expression of warmth and acceptance of the child, but there is a lack of parental control or parental involvement in terms of monitoring and disciplining the child (Baumrind,

1989, 1991; Maccoby & Martin, 1983). These results indicate that an increase in Permissive parenting may foster a reduction in Avoidant attachment. The child may feel that their parent is more warm and approachable and this may lead to less resistant and avoidant behaviours.

The results also indicate that less permissive parenting is associated with higher rates of avoidant attachment in ASD. It is possible that when an ASD child engages in ‘avoidant type’ behaviours, limiting connection, affection, and contact, their parents engage less in permissive parenting practices. This association differs from the neurotypical population, where one might expect difficult child behaviours to elicit more of the less positive parenting styles in parents (Fox, Platz, & Bentley, 1995). It is possible that, within the context of an ASD diagnosis, parents feel an overriding duty to respond with greater levels of involvement, in spite of their child’s relational avoidance. This may be because the ASD child is understood within the frame of developmental disability and therefore, vulnerability. There may be a parental response to apply more parental involvement in order to assist the ASD child with all aspects of his life.

Additionally, the association between permissive parenting and avoidant attachment that we see in ASD may be resulting from bidirectional influences. While child behaviour may elicit certain parenting styles, parenting practices may also influence child behaviours. Children of permissive parenting are often left to act autonomously without monitoring (Baumrind, 1989, 1991). In ASD, higher rates of permissive parenting are associated with lowered avoidant attachment behaviours. The ASD child may engage in avoidance in order to seek out social isolation. When parental control is minimized, as in permissive parenting, it is possible that an ASD child feels less overwhelmed by social forces and is less inclined to engage in avoidant behaviours.

These results are in keeping with a study by Van Ijzendoorn et al. (2007) that did not find the expected link between parenting and attachment to hold in ASD samples. Van

Ijzendoorn et al. (2007) suggested that the social deficits in ASD, such as emotion recognition difficulties, might produce inadequate perception and interpretation of parental sensitivities and responsiveness, thus hindering the expected association between parental sensitivity and attachment security. Therefore, social impairments, characteristic of ASD, appear to disrupt the usual relationship between parenting and attachment development. Thus, insecure attachment is more present in ASD even when parents of children with ASD showed equal sensitivity to parents of children without ASD (Rutgers et al., 2004; Van Ijzendoorn et al., 2007).

Interestingly, no other significant correlations were found between parenting and attachment in the neurotypical sample. However, it was noted that the relationships followed the anticipated direction and the lack of significant findings may have been due to the small sample size.

Differences in Theory of Mind

It has been well established that ToM development is disrupted in ASD populations (Baron-Cohen, 2000; Baron-Cohen et al., 1985; Hoogenhout & Malcolm-Smith, 2014; Yirmiya et al., 1998). Therefore, it was anticipated that the ASD group and the neurotypical group would differ significantly on measurement of ToM. Data from this study indicated that the neurotypical group scored significantly higher on ToM tasks than the ASD group. While not the focus of this study, this expected result was a necessary first step in the establishment of further analyses.

Parenting Style as a Predictor of Theory of Mind

In order to test the hypothesis that parenting style will predict Theory of Mind (hypothesis 4), a hierarchical multiple linear regression was conducted. The model was designed to predict Theory of Mind from Age, SES, working memory and verbal intelligence,

and three measures of parenting style (Theory of Mind scores were standardised for use in this model). Given the between group differences shown, the ToM scores are regarded as lying on a continuum, with the ASD group's scores on the lower end and neurotypical group's scores on the upper end. The results indicated that none of the three parenting styles in question were significant predictors of Theory of Mind. The better fitting model for predicting Theory of Mind was a linear combination of age, SES, and working memory and verbal intelligence. Parenting practices have been associated with Theory of Mind development in neurotypical children. However, in this sample, comprising both neurotypical children with relatively higher ToM and ASD children with relatively lower ToM, parenting style did not have a significant predictive effect.

Research in neurotypical populations has shown that parenting plays a significant role in enabling children to learn about differing mental states, i.e., ToM skills necessary for social development (Guajardo et al., 2009; Hughes et al., 1999). Previous studies have highlighted a transactional relationship between ToM and social development (Laranjo et al., 2010). The bi-directionality of this relationship suggests that ToM skills are both influential in, and influenced by, social contexts such as those familial relations constructed from parenting and, importantly, language.

Therefore, ToM ability appears to be learned during a child's development, and in particular family background (class of parental occupation and maternal education) has a significant effect on the development of ToM (Cutting & Dunn, 1999; Hughes & Leekam, 2004). More specifically, Meins et al. (2002) and Ontai and Thompson (2008) showed that a mother's use of language that appropriately reflected her infant's mental states is the earliest social predictor of ToM development. It is therefore possible that language remains one of the most significant predictors of ToM ability and not parenting in particular.

Similarly, a study investigated the impact of ToM development on the social skills necessary for interacting with peers. The study was comprised of neurotypical children, children with ASD, and children with deafness. In the neurotypical group and the group of children with deafness, ToM development predicted social skills over and above the effect of age, language ability, or gender. Interestingly, a different relationship was found in ASD. In the ASD group, the relationship between ToM and peer social skills was not direct but was strongly mediated by language ability (Peterson et al., 2016).

The social deficits characteristic of ASD may bear some responsibility for the lack of association and predictive value between parenting style and ToM, in the ASD sample. For the ASD child, parenting behaviours and parental use of language may not be understood and interpreted as they would be within a neurotypical parent-child dyad. The decreased ability of children with ASD to understand relationships and their tendency to display a genuine disinterest in other people may hamper an effective association between parenting and ToM. (APA, 2013; Fein et al., 1986).

Therefore, it is possible that the parental use of language that serves to foster ToM development in neurotypical children does not have the same effect in ASD children. In the current study, both neurotypical and ASD samples were included in the same regression analysis. The expected association between parenting style and ToM in the neurotypical sample may have been concealed by the lack of this effect in the ASD sample. This is particularly possible because of the relatively small sample size that has been used.

Due to the relational nature of this analysis, it is also useful to explore the reverse association: the value of ToM in predicting parenting style. It is possible that variation in child ToM ability may alter the type of parenting that is employed (Pears & Moses, 2003). In the current study, it was noted that all parents adopted more of the positive parenting style, whether or not their child had an ASD diagnosis. The results showed that the same is likely to

be true regardless of ToM ability, which was shown to be lower in ASD. Therefore, in this sample comprised of both neurotypical children and children with ASD, ToM is not significantly associated with parenting style. Parents of ASD children appear to have chosen more positive parenting styles over and above the effect that their child's ToM ability might have on their parenting. Furthermore, lowered ToM ability in the ASD sample may present as these children having difficulty understanding and predicting their parents' responses to behaviour. Therefore, the typical social negotiations of parenting, such as disciplining, become difficult. The context differs in ASD compared to neurotypical family environments. This may be a reason that the expected link between ToM and parenting was not seen in ASD as it is in neurotypical populations. Again, it is possible that the effect of ToM on parenting style in the neurotypical group is undetected due to the lack of this effect in the ASD group in the relatively small sample.

Additionally, it may be true that parenting style is resilient in the face of behavioural and developmental challenges, but the potential effect of social desirability through self-reporting must be considered. According to parents' self-report, parents of both groups continue to engage with their children, predominantly, in a manner characteristic of both warmth and reciprocal negotiation (Authoritative parenting). It is possible that the form of data collection used in this study, parent-report measures, caused an inflation in the reports of positive parenting practices in order for the parents to protect the appearance of being a good parent. This potential misreporting of true variables would then disrupt the detection of any predictive association between ToM and parenting style. This is an important consideration for future research.

Another possible explanation for this result might be in the lack of specificity of the variables used in this study. Pears and Moses (2003) found that maternal education and maternal income were associated with ToM development, specifically perception

understanding. Pears and Moses (2003) sought to examine maternal influence on isolated aspects of ToM. For example, they found that aspects of ToM, such as perception and desire understanding, were positively impacted by maternal use of instruction in response to a child's poor behaviour. However, they also found that if a mother asserted power over a child by use of consequences in response to poor behaviour, it was negatively associated with elements of ToM. In fact, power assertion showed positive effects on a child's ability to understand emotions but negative effects on a child's understanding of beliefs (Pears & Moses, 2003). In light of the findings by Pears and Moses (2003), it is clear that very specific aspects of parenting may have competing effects on ToM development. It is therefore possible that the findings from this study were limited in the broadness of the parenting categories examined. Analysis of more specific parenting behaviours, within the three parenting styles, may show different results.

Attachment as a Predictor of Theory of Mind

In order to test the hypothesis that attachment will predict Theory of Mind, a multiple linear regression was conducted (hypothesis 5). The multiple linear regression was designed to predict Theory of Mind based on Age, SES, working memory and verbal intelligence, and three measures of attachment (Theory of Mind scores were standardised for use in this model). Given the between group differences shown, the ToM scores are regarded as lying on a continuum, with the ASD group's scores on the lower end and neurotypical group's scores on the upper end. The results indicated that the addition of three attachment classification variables significantly improved the prediction of Theory of Mind over and above the effect of Age, SES, working memory, and verbal intelligence.

These results indicate that in a sample of both ASD and neurotypical children, attachment classification, as perceived by parents, is a predictor of Theory of Mind. More specifically, Ambivalent attachment and Avoidant attachment were significant predictors.

Secure attachment was not a significant predictor of Theory of Mind. These results can be interpreted in light of the results indicating the differences in types of attachment classification present between the groups. As presented previously, the ASD group was shown to have significantly more Ambivalent and Avoidant attachment than the neurotypical group. It has also been shown that the ASD group is associated with relatively lower ToM scores than the neurotypical group. It is therefore indicated that insecure attachment seen in ASD is predictive of lower ToM. These results are in keeping with established knowledge that the relationship between the child and primary caregiver plays an important role in the social and emotional development of the child (Bowlby, 2008). This established link appears to hold in ASD.

These findings may be a result of the child's innate capacity for attachment, which is in keeping with an innate capacity for ToM. The skills required for forming attachment, such as reciprocal social interaction and joint attention, are also the foundational skills necessary for ToM development. These skills appear to be influential in both attachment and ToM and are possibly responsible for the association found between attachment and ToM. When there is a deficit in these these skills, there is also predicted a barrier to secure attachment formation and lowered ToM, resulting from the deficit. These findings are in keeping with research conducted by Kahane and El-Tahir (2015) who noted that increasing severity of ASD was related to reduced attachment security. Deficits in social behaviours such as joint attention and symbolic play were risk factors for insecure and disorganised attachment. Sigman and Ungerer (1984) showed that in ASD, the children who had increased secure attachment behaviours also demonstrated greater levels of symbolic play skills. It therefore appears that the innate social deficits in ASD play an important role in the formation or disturbance of both attachment and ToM development.

Alternatively, Bowlby (1944, 1969a) postulated that the relationship between the child and primary caregiver plays an important role in the social and emotional development of the child. A mother's consistent, appropriate, and ready responses to her infant's behavioural signals for food and comfort lead to secure attachment. In this secure attachment, the caregiver becomes a 'secure base' from which the infant can safely explore the surrounding environment, including the surrounding social context (Ainsworth et al., 1978; Ainsworth & Bell, 1970; Ainsworth, 1979). The securely attached infant is not overwhelmed by separation but can engage with the environment, trusting that there is a reliable connection with the caregiver to return to (Ainsworth et al., 1971; Ainsworth, 1979; Benoit, 2004; Main & Cassidy, 1988). This context serves to foster understanding of mental states and supports the development of ToM (Meins et al., 2002).

Furthermore, in secure attachment, maternal connection is characteristic of high maternal sensitivity (Meins et al., 2001) and this maternal engagement also serves to foster ToM development. It has been shown that a mother's use of language to accurately reflect the mental states of her child is a significant predictor of ToM development (Meins et al., 2002; Ontai & Thompson, 2008). Similarly, McQuaid et al. (2008) showed that a mother's use of language toward their child had the ability to improve the security of their attachment and to develop ToM traits in the child. This is consistent with research indicating that early attachment security either predicted or was significantly associated with ToM acquisition and performance (Arranz et al., 2002; Meins et al., 1998; Symons & Clark, 2000).

This relationship appears to be similar in insecure attachment. In the current study it was found that insecure attachment classifications were predictive of ToM. When a child does not experience the security of a consistent caregiver and when a context defined by maternal sensitivity is not in place, there is a limitation in exploration and a disconnection between child and caregiver (Ainsworth et al., 1971; Ainsworth & Bell, 1970; Ainsworth,

1979; Benoit, 2004; Bowlby, 1960a). This environment is not supportive of social learning and the development of an understanding of mental states. Attachment security appears to play a significant role in enabling children to learn about differing mental states, and therefore, ToM development may be hindered within the context of insecure attachment (Arranz et al., 2002; Guajardo et al., 2009; Hughes et al., 1999).

In contrast, in this current study secure attachment was not predictive of ToM. Furthermore, results showed that, in the sample of both ASD and neurotypical groups, high rates of secure attachment were reported, relative to some of the other attachment classifications. It needs to be considered that there may have been an over representation of secure attachment in the sample due to the effect of social desirability in self-report measures. An over representation of secure attachment, particularly in the ASD group where ToM scores are lower, may have concealed the predictive effect of secure attachment for ToM development in this sample.

From another perspective, there exists a transactional relationship between ToM and social development. It has been established that ToM skills both have an impact on, and are impacted by, social contexts, familial relations, and language (Hughes & Leekam, 2004; Laranjo et al., 2010; Peterson et al., 2016). When considering the reverse association between attachment and ToM, the effect of ToM ability on attachment formation presents as another explanation for this association. The resultant behaviours that are present when a child has either lowered or elevated ToM ability may serve to hinder or foster the development of attachment (Bowlby, 1958, 1969b). For example, a child that is able to read and respond appropriately to parental cues for connection will then be in a position to create and deepen the parent-child connection. When ToM development is low, such as in ASD, a child is less able to understand the social context created in a parent-child relationship (Baron-Cohen et al., 1985; Wing & Gould, 1979). There exists potential for misunderstanding; poorly

expressed needs, and consequently, poorly met needs. Thus, it is possible that lowered ToM ability may feed into the development of an insecure attachment by further facilitating a disconnection and breakdown in trust between child and caregiver. Similarly, Van Ijzendoorn et al. (2007) found that attachment security could be predicted by the severity of ASD-associated social impairments.

Limitations and Directions for Future Research

Self-report Measures

During the analysis phase of this study, certain limitations to the study became apparent. Much of the research exploring parenting and attachment, including this study, has made use of parental reports of behaviour in order to gain a measurement of either parenting style or attachment (Cutting & Dunn, 1999). While this is likely to be the most practical method, the results should be viewed in light of the fact that parents of ASD children are experiencing more stress and have reported greater attachment-related anxiety than parents of neurotypical children (Estes et al., 2013; Hayes & Watson, 2013; Keenan et al., 2016). This highlights the room left for uncertainty when parents are required to give an accurate report of their child's attachment related behaviours, while their own attachment-related anxiety is high. In addition, a parent self-report measure leaves room for the influence of social desirability bias to play a role in potentially inflating the positive aspects and undermining the less positive aspects, of parenting and attachment. Although it is a task requiring more time than this current study could afford, future research may benefit from detailed observations of parent and child behaviours.

Specificity of the Variables Used

It was noted during analysis that a more detailed examination of specific parental behaviours in relation ToM may have been useful. This study found that, broadly speaking,

parenting style was not predictive of ToM. However, specific parental behaviours may have shown opposing effects that have, therefore, been unobservable in this study. Within the broader parenting dimensions considered in this study, namely, Authoritative, Authoritarian and Permissive parenting, there are subdimensions of parenting behaviour. For example, democratic participation, use of explanation in response to negative behaviour, power assertion, warmth and support etc. (Pears & Moses, 2003). These subdimension may exert different, and possibly competing, effects on the variables of interest in this study. The findings from this study may be limited in the broadness of the parenting categories examined. Future research would benefit from considering the potentially predictive value of specific subdomains of parental behaviours, within each style, for ToM development.

Cultural Relevance of ToM Battery

The ToM battery used in this study was limiting in its use of some culturally inappropriate questions. In particular, it was noted that South African children often did not respond with understanding on the Lies and Jokes task. The Lies and Jokes task required the child to indicate whether a child in a story was telling a lie to or joking with his/her parent, using sarcasm. The scenarios in the story included activities that a child might lie or joke about having completed, such as tidying a room, completing homework, or eating the cookies. It was noted throughout data collection that the children, from both sample groups, very rarely selected 'joking' as an answer. It is possible that, for a child, joking with an adult about matters such as chores or homework, is not a commonplace manner of relating to adults or figures of authority in South Africa. It is likely that South African children would regard it as rude to be sarcastic toward figures of authority. Future studies would benefit from adapting the ToM battery to exclude these elements that have been found ineffective in South African child populations.

ASD Severity

As indicated above, it still remains that research regarding attachment in ASD is varied, and results have been inconsistent. It is likely that, while ASD remains on a spectrum of severity, and while individual ASD presentation is vastly diverse, results concerning ASD will vary. A limitation to this study was the lack of consideration for ASD severity. Without the consideration of ASD severity, this study misses an accurate portrayal of the full spectrum of ASD. Unfortunately this study was limited in its size, and a greater sampler size would have been required to allow an additional variable of ASD severity. Furthermore, due to the verbal nature of test administration, this study was only conducted on verbal participants, and again, misses the portion of the spectrum that may include non-verbal children with ASD. Importantly, the ToM test battery required verbal responses, and therefore, non-verbal children could not be included in this sample. However, a deficit in verbal communication is likely to have significant implications for both attachment formation and ToM development. Due to the difficulty with standardised testing, limited research has been conducted concerning non-verbal children with ASD. Also, differences in attachment behaviours have been observed between verbal and non-verbal ASD samples (Dissanayake & Crossley, 1997). Future research may benefit from investigating ToM development, parenting styles, and attachment in the context of ASD severity, inclusive of verbal and non-verbal ASD children.

Age of Participants

This study deals with children within a designated age bracket and at varying developmental stages (Piaget, 1964). The variables of interest in this study are not static but are in a process of changing and developing. While the age range selected is justified in measuring these variables in ‘school-aged’ children, the sample is still comprised of differing stages of cognitive development (Piaget, 1964). Hoogenhout and Malcolm-Smith (2014)

make the point that high functioning children with ASD appear to follow the same sequence of ToM development as neurotypical children but their developmental trajectory is delayed. Furthermore, this study failed to consider differing attachment-related behaviours, consistent with development, when measuring attachment. For example, Shulman, Elicker, and Sroufe (1994) made important observations about preadolescent friendship formation when considering attachment.

However, for these reasons, the ToM scores in this study were standardised prior to data analysis in order to adjust for age-related variation in scores. The factor of age when measuring attachment is a key consideration and therefore participants were matched for age across sample groups. This research included participants ranging from age 6 to 16 years. Given the time constraints imposed on this study and the difficulties faced when collecting data from a clinical sample, a wide age range was necessary in order to increase the chances of attaining an adequate sample size from a limited clinical population. Future research should aim to measure these variables in narrower age brackets, hopefully isolating important differences between younger and older 'school-aged' children.

Co-morbid ADHD

In order to avoid the significantly limiting the sample size, children with ADHD were not excluded from the study. However, ASD is highly comorbid with ADHD (Jang et al., 2013; Matson & Nebel-Schwalm, 2007). This may be a limitation to this study because the presence of ADHD in the ASD sample may have influenced measurements associated with children's social skills and their social environments, such as attachment, parenting and ToM (Finzi-Dottan, Manor, & Tyano, 2006). Antshel et al. (2011) found that children with ASD benefitted from social skills treatment. However, children with ASD and co-morbid ADHD did not benefit from social skills treatment, indicating that ADHD may introduce an

interfering factor in the development of social skills. Future research may benefit from gathering a sample of children with ASD without co-morbid ADHD.

Multiple researchers

A limitation to this study may be the possible effect of multiple researchers. Due to the fact that this study formed part of a broader research protocol, data collection was shared among a team of three researchers. All of the researchers were enrolled in clinical programmes at the time and all had been thoroughly trained in standardised assessment administration and scoring. However, it is important to acknowledge the possibility of individual differences in test administration and scoring bias that could have played a role. Future studies may wish to have assessments scored by more than one researcher and to conduct regular monitoring of assessment standards.

Sample Size and Matching

In addition, this study was limited in its size, and therefore, the ASD group and the neurotypical group were included together in the same regression analysis. The sample size is comparable with other studies comparing attachment in ASD and neurotypical samples (Filippello et al., 2015; Sivaratnam et al., 2018). However, this study sought to include ToM and control for a number of important, additional variables such as socio-economic status, causing the sample size to be relatively small. In addition, this study was limited in terms of time restraints and a limited clinical population within the Western Cape. Collecting a larger clinical sample, specific to the inclusion and group matching criteria, was not feasible and would have required recruitment across multiple provinces. In addition, due to the limitations set out above, aggregate matching was used for this study. It may be beneficial to repeat this study on a larger sample so that separate regression analyses can be interpreted for each group, and case matching can be employed for greater control of group comparison. In addition, a small sample size may serve to threaten the reliability of the results, due to risk for

sampling error, and this should be considered when interpreting the results. Therefore, these results should form the basis for further investigation, and should not be considered conclusive.

Conclusion

This study was exploratory in nature and aimed to form a foundational view of the relationships between parenting style, attachment, and Theory of Mind development in a sample of ASD children compared to a sample of neurotypical children. Research concerning these variables is limited and this exact exploration has not been published in the current literature.

The most pertinent results from this study showed that both the ASD group and the neurotypical group reported significantly more Authoritative parenting than the other two styles (Authoritarian and Permissive). There was also significantly more of the less positive parenting styles reported in the ASD group compared to the neurotypical group.

Regarding attachment, the results indicated that the ASD group reported significantly less secure attachment and also significantly more insecure attachment (Ambivalent and Avoidant) than the neurotypical group.

Overall, the ASD group was characterised by less positive parenting and less attachment security, compared to the neurotypical group. It was also apparent that associations between parenting style and attachment showed different patterns in the ASD sample compared to the neurotypical sample.

Lastly, none of the three parenting styles in question were significant predictors of Theory of Mind. It is possible that the parental use of language, that serves to foster ToM development in neurotypical children (Meins et al., 2002), does not have the same effect in ASD due to the social disinterest and social deficits characteristic of ASD (Fein et al., 1986).

However, attachment classification was shown to be a significant predictor of Theory of Mind. Ambivalent attachment and Avoidant attachment, in particular, were significant predictors. Secure attachment was not a significant predictor of Theory of Mind. ToM development may be hindered within the context of insecure attachment. The disconnection between child and caregiver can result in reduced maternal engagement and limited security for exploration of the world and social relationships (Ainsworth & Bell, 1970; Benoit, 2004). In turn, there is limited opportunity for social learning and development of an understanding of mental-states necessary for ToM acquisition (Hughes & Leekam, 2004; Meins et al., 1998). The current study showed that in ASD there was more insecure attachment and lower ToM development compared to neurotypical children and that these variables were associated.

This study gained a foundational understanding of the differing patterns of association between parenting, attachment, and ToM across ASD and neurotypical groups. These results contribute to what is known about ASD social development and may inform future plans for intervention and support programs. The limitations discussed above indicate that this work has begun the exploration and discussion around these differences, but in no means serves to provide a comprehensive understanding of this topic. Future research should aim to explore these variables in a larger sample size that will accommodate separate analysis of ASD and neurotypical groups and will allow for the inclusion of ASD severity as a variable in the analysis.

References

- Abdallah, M. W., Greaves-Lord, K., Grove, J., Nørgaard-Pedersen, B., Hougaard, D. M., & Mortensen, E. L. (2011). Psychiatric comorbidities in autism spectrum disorders: findings from a Danish Historic Birth Cohort. *European Child & Adolescent Psychiatry, 20*, 599-601. <https://doi.org/10.1007/s00787-011-0220-2>
- Ainsworth, M., Blehar, M., Waters, E., & Wall, S. (1978). *Patterns of attachment*. Hillsdale, NJ: Erlbaum.
- Ainsworth, M. D. S. (1967). *Infancy in Uganda: Infant care and the growth of love*. Oxford, England: Johns Hopkins Press.
- Ainsworth, M. D. S., Bell, S. M., & Stayton, D. J. (1971) Individual differences in strange-situation behavior of one-year-olds. In H. R. Schaffer (Ed.) *The origins of human social relations*. London and New York: Academic Press. Pp. 17-58.
- Ainsworth, M. D. S., & Bell, S. M. (1970). Attachment, exploration, and separation: Illustrated by the behavior of one-year-olds in a strange situation. *Child Development, 40*, 49-67. <http://dx.doi.org/10.2307/1127388>
- Ainsworth, M. S. (1979). Infant-mother attachment. *American Psychologist, 34*, 932-937. <http://dx.doi.org/10.1037/0003-066X.34.10.932>
- Ainsworth, M. S., & Bowlby, J. (1991). An ethological approach to personality development. *American Psychologist, 46*, 333-341. <http://dx.doi.org/10.1037/0003-066X.46.4.333>
- Al-Yagon, M., & Mikulincer, M. (2004). Socioemotional and academic adjustment among children with learning disorders: The mediational role of attachment-based factors. *The Journal of Special Education, 38*, 111-123. <http://dx.doi.org/10.1177/00224669040380020501>
- Al-Yagon, M., & Mikulincer, M. (2004). Patterns of close relationships and socioemotional and academic adjustment among school-age children with learning disabilities. *Learning Disabilities Research & Practice, 19*, 12-19. <https://doi.org/10.1111/j.1540-5826.2004.00085.x>
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Antshel, K. M., Polacek, C., McMahon, M., Dygert, K., Spenceley, L., Dygert, L., . . . Faisal, F. (2011). Comorbid ADHD and anxiety affect social skills group intervention

- treatment efficacy in children with autism spectrum disorders. *Journal of Developmental & Behavioral Pediatrics*, 32, 439-446.
<https://doi.org/10.1097/DBP.0b013e318222355d>
- Arranz, E., Artamendi, J., Olabarrieta, F., & Martín, J. (2002). Family context and theory of mind development. *Early Child Development and Care*, 172, 9-22.
<http://dx.doi.org/10.1080/03004430210880>
- Astington, J. W., & Jenkins, J. M. (1999). A longitudinal study of the relation between language and theory-of-mind development. *Developmental Psychology*, 35, 1311-1320. <http://dx.doi.org/10.1037/0012-1649.35.5.1311>
- Aunola, K., Stattin, H., & Nurmi, J.-E. (2000). Parenting styles and adolescents' achievement strategies. *Journal of Adolescence*, 23, 205-222.
<https://doi.org/10.1006/jado.2000.0308>
- Baranek, G. T. (1999). Autism during infancy: A retrospective video analysis of sensory-motor and social behaviors at 9–12 months of age. *Journal of Autism and Developmental Disorders*, 29, 213-224. <https://doi.org/10.1023/A:1023080005650>
- Barber, B. K. (1996). Parental psychological control: Revisiting a neglected construct. *Child Development*, 67, 3296-3319. <http://dx.doi.org/10.2307/1131780>
- Barnes, H., Wright, G., Noble, M., & Dawes, A. (2007). *The South African index of multiple deprivation for children: Census 2001*. Cape Town, South Africa: HSRC Press.
- Bärnighausen, T., Hosegood, V., Timaeus, I. M., & Newell, M.-L. (2007). The socioeconomic determinants of HIV incidence: Evidence from a longitudinal, population-based study in rural South Africa. *AIDS*, 21), S29-S38.
<http://dx.doi.org/10.1097/01.aids.0000300533.59483.95>
- Baron-Cohen, S. (2000). Theory of mind and autism: A fifteen year review. In S. Baron-Cohen, H. Tager-Flusberg, & D. J. Cohen (Eds.), *Understanding other minds: Perspectives from developmental cognitive neuroscience* (pp. 3-20). New York, NY: Oxford University Press.
- Baron-Cohen, S., Leslie, A. M., & Frith, U. (1985). Does the autistic child have a “theory of mind”? *Cognition*, 21(1), 37-46. doi: [http://dx.doi.org/10.1016/0010-0277\(85\)90022-8](http://dx.doi.org/10.1016/0010-0277(85)90022-8)
- Baron-Cohen, S., O'Riordan, M., Stone, V., Jones, R., & Plaisted, K. (1999). Recognition of faux pas by normally developing children and children with Asperger syndrome or high-functioning autism. *Journal of Autism and Developmental Disorders*, 29, 407-418. <https://doi.org/10.1023/A:1023035012436>

- Baumrind, D. (1966). Effects of authoritative parental control on child behavior. *Child Development*, 37, 887-907. <http://dx.doi.org/10.2307/1126611>
- Baumrind, D. (1971a). Current patterns of parental authority [Monograph]. *Developmental Psychology*, 4(1, Pt. 2), 1-103. <http://dx.doi.org/10.1037/h0030372>
- Baumrind, D. (1971b). Types of adolescent life-styles. *Developmental Psychology Monographs*, 4(1 Pt 2).
- Baumrind, D. (1989). Rearing competent children. In W. Damon (Ed.), *The Jossey-Bass social and behavioral science series. Child development today and tomorrow* (pp. 349-378). San Francisco, CA: Jossey-Bass.
- Baumrind, D. (1991). The influence of parenting style on adolescent competence and substance use. *The Journal of Early Adolescence*, 11, 56-95. <https://doi.org/10.1177/02724316911111004>
- Benoit, D. (2004). Infant-parent attachment: Definition, types, antecedents, measurement and outcome. *Paediatrics & Child Health*, 9, 541-545. <https://doi.org/10.1093/pch/9.8.541>
- Bergen, D. (2002). The role of pretend play in children's cognitive development. *Early Childhood Research & Practice*, 4(1), n1. Retrieved from <http://ecrp.uiuc.edu/v4n1/bergen.html>
- Borden, K. A., Burns, T. G., & O'Leary, S. D. (2006). A comparison of children with epilepsy to an age- and IQ-matched control group on the Children's Memory Scale. *Child Neuropsychology*, 12, 165-172. <https://doi.org/10.1080/09297040500276836>
- Bosacki, S., & Wilde Astington, J. (1999). Theory of mind in preadolescence: Relations between social understanding and social competence. *Social Development*, 8, 237-255. <https://doi.org/10.1111/1467-9507.00093>
- Bowlby, J. (1944). Forty-four juvenile thieves: Their characters and home-life. *The International Journal of Psychoanalysis*, 25, 19-53. Retrieved from <https://pdfs.semanticscholar.org/ecc5/eeaf75614e4129f0088bb472c5de2a7800c.pdf>
- Bowlby, J. (1958). The nature of the child's tie to his mother. *The International Journal of Psychoanalysis* 39, 350-373. Retrieved from https://s3.amazonaws.com/academia.edu.documents/33604973/nature_of_the_childs_tie_bowlby.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=1549635769&Signature=%2Bj3KKHrIBwFaryiLueJ61aFUDqE%3D&response-content-disposition=inline%3B%20filename%3D%20THE_NATURE_OF_THE_CHILDS_TIE_TO_HIS_MOTH.pdf

- Bowlby, J. (1960a). Grief and mourning in infancy and early childhood. *The Psychoanalytic Study of the Child*, 15, 9-52. <https://doi.org/10.1080/00797308.1960.11822566>
- Bowlby, J. (1960b). Separation anxiety. *The International Journal of Psychoanalysis*, 41, 89-113. Retrieved from <https://search.proquest.com/openview/62444b029746eb15a20cdae0f58e2d0b/1?pq-origsite=gscholar&cbl=1818729>
- Bowlby, J. (1969a). *Attachment and loss: Vol. 1. Attachment*. New York, NY: Basic Books.
- Bowlby, J. (1969b). *Attachment and loss: Attachment*. New York, NY: Basic Books.
- Bowlby, J. (2008). *A secure base: Parent-child attachment and healthy human development*. New York, NY: Basic Books.
- Brooks, B. L., Sherman, E. M. S., & Strauss, E. (2009). NEPSY-II: A developmental neuropsychological assessment, second edition. *Child Neuropsychology*, 16, 80-101. <https://doi.org/10.1080/09297040903146966>
- Cantwell, D. P., & Baker, L. (1984). Research concerning families of children with autism, In E. Schopler & G. B. Mesibov (Series Eds.), *Current issues in autism: The effects of autism on the family* (pp. 41-63). Boston, MA: Springer.
- Capps, L., Sigman, M., & Mundy, P. (1994). Attachment security in children with autism. *Development and Psychopathology*, 6, 249-261. <https://doi.org/10.1017/S0954579400004569>
- Carlson, S. M., Moses, L. J., & Breton, C. (2002). How specific is the relation between executive function and theory of mind? Contributions of inhibitory control and working memory. *Infant and Child Development*, 11, 73-92. <https://doi.org/10.1002/icd.298>
- Chandler, M., & Hala, S. (1994). The role of personal involvement in the assessment of early false belief skills. In C. Lewis & P. Mitchell (Eds.), *Children's early understanding of mind: Origins and development* (pp. 403-425). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Cohen, J. (1988). *Statistical power analysis for the behavioural sciences*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Cohen, M. (1997). *Children's memory scale*. San Antonio, TX: Psychological Corporation
- Cummings, E. M., & Cummings, J. S. (2002). Parenting and attachment. In M. H. Bornstein (Ed.), *Handbook of parenting: Practical issues in parenting* (pp. 35-58). Mahwah, NJ, US: Lawrence Erlbaum Associates.
- Cutting, A. L., & Dunn, J. (1999). Theory of mind, emotion understanding, language, and family background: Individual

- differences and interrelations. *Child Development*, 70, 853-865.
<https://doi.org/10.1111/1467-8624.00061>
- Dalen, K., Jellestad, F., & Kamaloodien, K. (2007). The translation of the NEPSY-II to Afrikaans, some ethical reflections. *Cognition, Brain, Behavior*, 11, 609-620.
 Retrieved from
https://www.researchgate.net/profile/Kamal_Kamaloodien/publication/301789537_THE_TRANSLATION_OF_THE_NEPSY-II_TO_AFRIKAANS_SOME_ETHICAL_REFLECTIONS/links/5728793708ae586b21e5784f/THE-TRANSLATION-OF-THE-NEPSY-II-TO-AFRIKAANS-SOME-ETHICAL-REFLECTIONS.pdf
- de Vries, P. J. (2016). Thinking globally to meet local needs: Autism spectrum disorders in Africa and other low-resource environments. *Current Opinion in Neurology*, 29, 130-136. <https://doi.org/10.1097/WCO.0000000000000297>
- Dennis, M., Agostino, A., Roncadin, C., & Levin, H. (2009). Theory of mind depends on domain-general executive functions of working memory and cognitive inhibition in children with traumatic brain injury. *Journal of Clinical and Experimental Neuropsychology*, 31, 835-847. <http://dx.doi.org/10.1080/13803390802572419>
- Dissanayake, C., & Crossley, S. A. (1997). Autistic children's responses to separation and reunion with their mothers. *Journal of Autism and Developmental Disorders*, 27, 295-312. <https://doi.org/10.1023/A:1025802515241>
- Downs, A., & Smith, T. (2004). Emotional understanding, cooperation, and social behavior in high-functioning children with autism. *Journal of Autism and Developmental Disorders*, 34, 625-635. <https://doi.org/10.1007/s10803-004-5284-0>
- Dworzynski, K., Ronald, A., Bolton, P., & Happé, F. (2012). How different are girls and boys above and below the diagnostic threshold for autism spectrum disorders? *Journal of the American Academy of Child & Adolescent Psychiatry*, 51, 788-797.
<https://doi.org/10.1016/j.jaac.2012.05.018>
- Estes, A., Olson, E., Sullivan, K., Greenson, J., Winter, J., Dawson, G., & Munson, J. (2013). Parenting-related stress and psychological distress in mothers of toddlers with autism spectrum disorders. *Brain and Development*, 35, 133-138.
<https://doi.org/10.1016/j.braindev.2012.10.004>
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior research methods*, 39, 175-191. <https://doi.org/10.3758/BF03193146>

- Fein, D., Pennington, B., Markowitz, P., Braverman, M., & Waterhouse, L. (1986). Toward a neuropsychological model of infantile autism: Are the social deficits primary? *Journal of the American Academy of Child Psychiatry*, *25*, 198-212.
[https://doi.org/10.1016/S0002-7138\(09\)60227-2](https://doi.org/10.1016/S0002-7138(09)60227-2)
- Ferrett, H. L., Carey, P. D., Thomas, K. G., Tapert, S. F., & Fein, G. (2010). Neuropsychological performance of South African treatment-naïve adolescents with alcohol dependence. *Drug and Alcohol Dependence*, *110*, 8-14.
<https://doi.org/10.1016/j.drugalcdep.2010.01.019>
- Field, A. (2005). *Discovering statistics using SPSS*. Beverly Hills, CA: Sage.
- Filippello, P., Marino, F., Chilà, P., & Sorrenti, L. (2015). Attachment and social behavior in children's autistic disorders. *Life Span and Disability*, *18*, 101-118. Retrieved from
<https://pdfs.semanticscholar.org/9ccf/f793a609db6c1d391883ea3f4b879746515f.pdf>
- Finzi-Dottan, R., Manor, I., & Tyano, S. (2006). ADHD, temperament, and parental style as predictors of the child's attachment patterns. *Child Psychiatry and Human Development*, *37*, 103-114. <https://doi.org/10.1007/s10578-006-0024-7>
- Finzi, R., Har-Even, D., Weizman, A., Tyano, S., & Shnit, D. (1996). The adaptation of the attachment styles questionnaire for latency-aged children. *Israel Journal of Psychology*, *5*(2), 167-177. Retrieved from
https://www.researchgate.net/profile/Ricky_Finzi-Dottan-BIU/post/Can_anyone_suggest_an_instrument_for_assessing_the_attachment_style_in_8_to_12_year_old_children/attachment/59d63d73c49f478072ea87d4/AS:273760207212544@1442280927224/download/ASCQ-ENG-MY.doc
- Finzi, R., Ram, A., Shnit, D., Har-Even, D., Tyano, S., & Weizman, A. (2001). Depressive symptoms and suicidality in physically abused children. *American Journal of Orthopsychiatry*, *71*, 98-107. <http://dx.doi.org/10.1037/0002-9432.71.1.98>
- Fodstad, J. C., Matson, J. L., Hess, J., & Neal, D. (2009). Social and communication behaviours in infants and toddlers with autism and pervasive developmental disorder-not otherwise specified. *Developmental Neurorehabilitation*, *12*, 152-157.
<https://doi.org/10.1080/17518420902936748>
- Fombonne, E., Siddons, F., Achard, S., Frith, U., & Happé, F. (1994). Adaptive behaviour and theory of mind in autism. *European Child & Adolescent Psychiatry*, *3*, 176-186.
<https://doi.org/10.1007/BF02720324>
- Fox, R. A., Platz, D. L., & Bentley, K. S. (1995). Maternal factors related to parenting practices, developmental expectations, and perceptions of child behavior problems.

- The Journal of Genetic Psychology*, 156, 431-441.
<https://doi.org/10.1080/00221325.1995.9914835>
- Frazier, T. W., Georgiades, S., Bishop, S. L., & Hardan, A. Y. (2014). Behavioral and cognitive characteristics of females and males with autism in the Simons Simplex Collection. *Journal of the American Academy of Child & Adolescent Psychiatry*, 53, 329-340. <https://doi.org/10.1016/j.jaac.2013.12.004>
- Frith, U., Hill, L., Klin, A., Jones, W., Schultz, R., & Volkmar, F. (2003). The enactive mind, or from actions to cognition: Lessons from autism. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences*, 358, 345-360.
<http://dx.doi.org/10.1098/rstb.2002.1202>
- George, C., Kaplan, N., & Main, M. (1985). *Adult attachment interview (AAI)*. Unpublished manuscript. Retrieved from <http://library.allanschore.com/docs/AAIProtocol.pdf>
http://www.psychology.sunysb.edu/attachment/measures/content/aai_interview.pdf
- Goldman, A. I., Margolis, E., Samuels, R., & Stich, S. (2012). Theory of mind. In E. Margolis, R. Samuels, & S. P. Stich (Eds.), *The Oxford handbook of philosophy of cognitive science* (pp. 402-424). London: Oxford University Press.
- Guajardo, N. R., Snyder, G., & Petersen, R. (2009). Relationships among parenting practices, parental stress, child behaviour, and children's social-cognitive development. *Infant and Child Development*, 18, 37-60. <http://dx.doi.org/10.1002/icd.578>
- Hamilton, K., Hoogenhout, M., & Malcolm-Smith, S. (2016). Neurocognitive considerations when assessing theory of mind in autism spectrum disorder. *Journal of Child & Adolescent Mental Health*, 28, 233-241.
<https://doi.org/10.2989/17280583.2016.1268141>
- Happé, F. G. (1994a). An advanced test of theory of mind: Understanding of story characters' thoughts and feelings by able autistic, mentally handicapped, and normal children and adults. *Journal of Autism and Developmental Disorders*, 24, 129-154.
<https://doi.org/10.1007/BF02172093>
- Happé, F. G. (1994b). Wechsler IQ profile and theory of mind in autism: A research note. *Journal of Child Psychology and Psychiatry*, 35, 1461-1471.
<http://dx.doi.org/10.1111/j.1469-7610.1994.tb01287.x>
- Happé, F. G. (1995). The role of age and verbal ability in the theory of mind task performance of subjects with autism. *Child Development*, 66, 843-855.
<http://dx.doi.org/10.2307/1131954>

- Harris, P. L., Johnson, C. N., Hutton, D., Andrews, G., & Cooke, T. (1989). Young children's theory of mind and emotion. *Cognition & Emotion*, 3, 379-400.
<http://dx.doi.org/10.1080/02699938908412713>
- Hayes, S. A., & Watson, S. L. (2013). The impact of parenting stress: A meta-analysis of studies comparing the experience of parenting stress in parents of children with and without autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 43, 629-642. <http://dx.doi.org/10.1007/s10803-012-1604-y>
- Hays, J. R., Reas, D. L., & Shaw, J. B. (2002). Concurrent validity of the Wechsler abbreviated scale of intelligence and the Kaufman brief intelligence test among psychiatric inpatients. *Psychological Reports*, 90, 355-359.
<http://dx.doi.org/10.2466/PR0.90.2.355-359>
- Hazan, C., & Shaver, P. R. (1994). Deeper into attachment theory. *Psychological Inquiry*, 5, 68-79. http://dx.doi.org/10.1207/s15327965pli0501_15
- Hess, R. D., & McDevitt, T. M. (1984). Some cognitive consequences of maternal intervention techniques: A longitudinal study. *Child Development*, 55, 2017-2030.
<http://dx.doi.org/10.2307/1129776>
- Hesse, E. (1999). The adult attachment interview: Historical and current perspectives. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 395-433). New York, NY: Guilford Press.
- Hoogenhout, M., & Malcolm-Smith, S. (2014). Theory of mind in autism spectrum disorder: Does DSM classification predict development? *Research in Autism Spectrum Disorders*, 8(6), 597-607. <https://doi.org/10.1016/j.rasd.2014.02.005>
- Hughes, C., Deater-Deckard, K., & Cutting, A. L. (1999). 'Speak roughly to your little boy'? Sex differences in the relations between parenting and preschoolers' understanding of mind. *Social Development*, 8, 143-160. <http://dx.doi.org/10.1111/1467-9507.00088>
- Hughes, C., & Leekam, S. (2004). What are the links between theory of mind and social relations? Review, reflections and new directions for studies of typical and atypical development. *Social Development*, 13, 590-619. <https://doi.org/10.1111/j.1467-9507.2004.00285.x>
- Hutchins, T. L., Bond, L. A., Silliman, E. R., & Bryant, J. B. (2009). Maternal epistemological perspectives and variations in mental state talk. *Journal of Speech, Language, and Hearing Research*, 52, 61-80. [https://doi.org/10.1044/1092-4388\(2008/07-0161\)](https://doi.org/10.1044/1092-4388(2008/07-0161))

- Hutchins, T. L., & Prelock, P. A. (2008). Supporting theory of mind development: Considerations and recommendations for professionals providing services to individuals with autism spectrum disorder. *Topics in Language Disorders, 28*, 340-364. <https://doi.org/10.1097/01.TLD.0000341128.01158.f2>
- Hutchison, L., Feder, M., Abar, B., & Winsler, A. (2016). Relations between parenting stress, parenting style, and child executive functioning for children with ADHD or autism. *Journal of Child and Family Studies, 25*, 3644-3656. <http://dx.doi.org/10.1007/s10826-016-0518-2>
- Jang, J., Matson, J. L., Williams, L. W., Tureck, K., Goldin, R. L., & Cervantes, P. E. (2013). Rates of comorbid symptoms in children with ASD, ADHD, and comorbid ASD and ADHD. *Research in Developmental Disabilities, 34*, 2369-2378. <https://dx.doi.org/10.1016/j.ridd.2013.04.021>
- Jenkins, J. M., & Astington, J. W. (2000). Theory of mind and social behavior: Causal models tested in a longitudinal study. *Merrill-Palmer Quarterly (46)*, 203-220. Retrieved from <https://www.jstor.org/stable/23093714>
- Kahane, L., & El-Tahir, M. (2015). Attachment behavior in children with autistic spectrum disorders. *Advances in Mental Health and Intellectual Disabilities, 9*, 79-89. <http://dx.doi.org/10.1108/AMHID-06-2014-0026>
- Kanner, L. (1943). Autistic disturbances of affective contact. *Nervous child, 2*(3), 217-250. Retrieved from http://mail.neurodiversity.com/library_kanner_1943.pdf
- Keenan, B. M., Newman, L. K., Gray, K. M., & Rinehart, N. J. (2016). Parents of children with ASD experience more psychological distress, parenting stress, and attachment-related anxiety. *Journal of Autism and Developmental Disorders, 46*, 2979-2991. <http://dx.doi.org/10.1007/s10803-016-2836-z>
- Kern, R. M., & Jonyniene, J. (2012). Psychometric properties of the Lithuanian version of the Parenting Styles and Dimensions Questionnaire (PSDQ): Pilot study. *The Family Journal, 20*, 205-214. <http://dx.doi.org/10.1177/1066480712439845>
- Klin, A., Jones, W., Schultz, R., Volkmar, F., & Cohen, D. (2002). Visual fixation patterns during viewing of naturalistic social situations as predictors of social competence in individuals with autism. *Archives of General Psychiatry, 59*, 809-816. <http://dx.doi.org/10.1001/archpsyc.59.9.809>
- Knofczynski, G. T., & Mundfrom, D. (2008). Sample sizes when using multiple linear regression for prediction. *Educational and Psychological Measurement, 68*, 431-442. <http://dx.doi.org/10.1177/0013164407310131>

- Kogan, M. D., Blumberg, S. J., Schieve, L. A., Boyle, C. A., Perrin, J. M., Ghandour, R. M., . . . van Dyck, P. C. (2009). Prevalence of parent-reported diagnosis of autism spectrum disorder among children in the US, 2007. *Pediatrics*, *124*, 1395-1403.
<https://doi.org/10.1542/peds.2009-1522>
- Korkman, M., Kirk, U., & Kemp, S. (2007). *NEPSY-II: Clinical and interpretive manual*. San Antonio, TX: Psychological Corporation.
- Lam, Y. G., & Yeung, S.-s. S. (2012). Cognitive deficits and symbolic play in preschoolers with autism. *Research in Autism Spectrum Disorders*, *6*, 560-564.
<https://doi.org/10.1016/j.rasd.2011.07.017>
- Laranjo, J., Bernier, A., Meins, E., & Carlson, S. M. (2010). Early manifestations of children's theory of mind: The roles of maternal mind-mindedness and infant security of attachment. *Infancy*, *15*, 300-323. <https://doi.org/10.1111/j.1532-7078.2009.00014.x>
- Latouf, N., & Dunn, M. (2010). Parenting styles affecting the social behaviour of five-year olds. *Journal of Psychology in Africa*, *20*, 109-112.
<https://doi.org/10.1080/14330237.2010.10820350>
- Lerner, M. D., Hutchins, T. L., & Prelock, P. A. (2011). Brief report: Preliminary evaluation of the theory of mind inventory and its relationship to measures of social skills. *Journal of Autism and Developmental Disorders*, *41*, 512-517.
<http://dx.doi.org/10.1007/s10803-010-1066-z>
- Leslie, A. M. (1987). Pretense and representation: The origins of "theory of mind." *Psychological Review*, *94*, 412-426. <http://dx.doi.org/10.1037/0033-295X.94.4.412>
- Lillard, A. S. (1993). Pretend play skills and the child's theory of mind. *Child Development*, *64*, 348-371. <http://dx.doi.org/10.2307/1131255>
- Lin, H.-C., Bourque, J., Zeanah, P., & McFatter, R. (2018). Perceptions of stress and enrichment in caregivers of children with autism spectrum disorder: Implications for community support. *Societies*, *8*, 88-100. <https://doi.org/10.3390/soc8030088>
- Lindinger, N. M., Malcolm-Smith, S., Dodge, N. C., Molteno, C. D., Thomas, K. G., Meintjes, E. M., . . . Jacobson, S. W. (2016). Theory of mind in children with fetal alcohol spectrum disorders. *Alcoholism: Clinical and Experimental Research*, *40*, 367-376. <https://doi.org/10.1111/acer.12961>
- Lord, C. (1984). The development of peer relations in children with autism. In F. J. Morrison, C. Lord, & D. P. Keating (Eds.), *Applied developmental psychology: Vol. 1* (pp. 165-230). Orlando, FL: Academic Press.

- Lord, C., Rutter, M., DiLavore, P. C., Risi, S., Gotham, K., & Bishop, S. (2012). *Autism diagnostic observation schedule: ADOS-2*. Los Angeles, CA: Western Psychological Services.
- Maas, C. J., & Hox, J. J. (2005). Sufficient sample sizes for multilevel modeling. *Methodology, 1*, 86-92. <https://doi.org/10.1027/1614-2241.1.3.86>
- Maccoby, E. E., & Martin, J. A. (1983). Socialization in the context of the family: Parent-child interaction. In P. H. Mussen (Series Ed.), *Handbook of child psychology: Formerly Carmichael's Manual of child psychology: Vol. 4 Socialization, personality, and social development* (pp. 1-101). Chichester, NY: John Wiley & Sons.
- Main, M., & Cassidy, J. (1988). Categories of response to reunion with the parent at age 6: Predictable from infant attachment classifications and stable over a 1-month period. *Developmental Psychology, 24*, 415-426. <http://dx.doi.org/10.1037/0012-1649.24.3.415>
- Main, M., & Solomon, J. (1986). Discovery of an insecure-disorganized/disoriented attachment pattern. In T. B. Brazelton & M. W. Yogman (Eds.), *Affective development in infancy* (pp. 95-124). Westport, CT: Ablex.
- Matson, J. L., & Nebel-Schwalm, M. S. (2007). Comorbid psychopathology with autism spectrum disorder in children: An overview. *Research in Developmental Disabilities, 28*, 341-352. <http://dx.doi.org/10.1016/j.ridd.2005.12.004>
- Mcquaid, N., Bigelow, A. E., McLaughlin, J., & MacLean, K. (2008). Maternal mental state language and preschool children's attachment security: Relation to children's mental state language and expressions of emotional understanding. *Social Development, 17*, 61-83. <https://doi.org/10.1111/j.1467-9507.2007.00415.x>
- Meins, E., Fernyhough, C., Fradley, E., & Tuckey, M. (2001). Rethinking maternal sensitivity: Mothers' comments on infants' mental processes predict security of attachment at 12 months. *The Journal of Child Psychology and Psychiatry and Allied Disciplines, 42*, 637-648. <https://doi.org/10.1111/1469-7610.00759>
- Meins, E., Fernyhough, C., Russell, J., & Clark-Carter, D. (1998). Security of attachment as a predictor of symbolic and mentalising abilities: A longitudinal study. *Social Development, 7*, 1-24. <https://doi.org/10.1111/1467-9507.00047>
- Meins, E., Fernyhough, C., Wainwright, R., Das Gupta, M., Fradley, E., & Tuckey, M. (2002). Maternal mind-mindedness and attachment security as predictors of theory of mind understanding. *Child Development, 73*, 1715-1726. <https://doi.org/10.1111/1467-8624.00501>

- Mikulincer, M., Florian, V., & Tolmacz, R. (1990). Attachment styles and fear of personal death: A case study of affect regulation. *Journal of Personality and Social Psychology*, 58, 273-280. <http://dx.doi.org/10.1037/0022-3514.58.2.273>
- Moilanen, K. L., Rasmussen, K. E., & Padilla-Walker, L. M. (2015). Bidirectional associations between self-regulation and parenting styles in early adolescence. *Journal of Research on Adolescence*, 25, 246-262. <http://dx.doi.org/10.1111/jora.12125>
- Mulenga, K., Ahonen, T., & Aro, M. (2001). Performance of Zambian children on the NEPSY: A pilot study. *Developmental Neuropsychology*, 20, 375-383. https://doi.org/10.1207/S15326942DN2001_4
- Mundy, P., & Sigman, M. (1989). The theoretical implications of joint-attention deficits in autism. *Development and psychopathology*, 1, 173-183. <https://doi.org/10.1017/S0954579400000365>
- Mundy, P., Sigman, M., Ungerer, J., & Sherman, T. (1986). Defining the social deficits of autism: The contribution of non-verbal communication measures. *Journal of Child Psychology and Psychiatry*, 27, 657-669. <https://doi.org/10.1111/j.1469-7610.1986.tb00190.x>
- Önder, A., & Gülay, H. (2009). Reliability and validity of parenting styles & dimensions questionnaire. *Procedia-Social and Behavioral Sciences*, 1, 508-514. <http://dx.doi.org/10.1016/j.sbspro.2009.01.092>
- Ontai, L. L., & Thompson, R. A. (2008). Attachment, parent-child discourse and theory-of-mind development. *Social Development*, 17, 47-60. <http://dx.doi.org/10.1111/j.1467-9507.2007.00414.x>
- Osterling, J. A., Dawson, G., & Munson, J. A. (2002). Early recognition of 1-year-old infants with autism spectrum disorder versus mental retardation. *Development and Psychopathology*, 14, 239-251. <https://doi.org/10.1017/S0954579402002031>
- Peacock, G., Amendah, D., Ouyang, L., & Grosse, S. D. (2012). Autism spectrum disorders and health care expenditures: the effects of co-occurring conditions. *Journal of Developmental & Behavioral Pediatrics*, 33, 2-8. <https://doi.org/10.1097/DBP.0b013e31823969de>
- Pears, K. C., & Moses, L. J. (2003). Demographics, parenting, and theory of mind in preschool children. *Social Development*, 12, 1-20. <https://doi.org/10.1111/1467-9507.00219>

- Peterson, C., Slaughter, V., Moore, C., & Wellman, H. M. (2016). Peer social skills and theory of mind in children with autism, deafness, or typical development. *Developmental Psychology, 52*, 46-57. <https://doi.org/10.1037/a0039833>
- Piaget, J. (1964). Part I: Cognitive development in children: Piaget development and learning. *Journal of Research in Science Teaching, 2*, 176-186. <https://doi.org/10.1002/tea.3660020306>
- Premack, D., & Woodruff, G. (1978). Does the chimpanzee have a theory of mind? *Behavioral and Brain Sciences, 1*, 515-526. <https://doi.org/10.1017/S0140525X00076512>
- Pretorius, N. (2000). *Aspects of parenting styles and the expressed fears of a selected group of pre-school children*. (Unpublished master's thesis). University of Stellenbosch, South Africa.
- Pulkkinen, L. (1982). Self-control and continuity from childhood to late adolescence. In P. B. Baltes & O. G. Brim, Jr. (Eds.), *Life-span development and behavior* (pp. 63-105). New York, NY: Academic Press.
- Reed, P., & Osborne, L. A. (2014). Parenting and autism spectrum disorders. In V. B. Patel, V. R. Preedy, & C. R. Martin (Eds.), *Comprehensive guide to autism* (pp. 185-206). New York, NY: Springer.
- Riccio, C. A., Garland, B. H., & Cohen, M. J. (2007). Relations between the Test of Variables of Attention (TOVA) and the Children's Memory Scale (CMS). *Journal of Attention Disorders, 11*, 167-171. <https://doi.org/10.1177/1087054706295653>
- Richer, J. M., & Coss, R. (1976). Gaze aversion in autistic and normal children. *Acta Psychiatrica Scandinavica, 53*, 193-210. <https://doi.org/10.1111/j.1600-0447.1976.tb00074.x>
- Robinson, C. C., Mandleco, B., Olsen, S. F., & Hart, C. H. (1995). Authoritative, authoritarian, and permissive parenting practices: Development of a new measure. *Psychological Reports, 77*, 819-830. <http://dx.doi.org/10.2466/pr0.1995.77.3.819>
- Rochat, T. J., Houle, B., Stein, A., Coovadia, H., Coutsoydis, A., Desmond, C., . . . Bland, R. M. (2016). Exclusive breastfeeding and cognition, executive function, and behavioural disorders in primary school-aged children in rural South Africa: A cohort analysis. *PLoS Medicine, 13*(6), e1002044. <https://doi.org/10.1371/journal.pmed.1002044><https://doi.org/10.1371/journal.pmed.1002044>

- Roman, N. V., Davids, E. L., Moyo, A., Schilder, L., Lacante, M., & Lens, W. (2015). Parenting styles and psychological needs influences on adolescent life goals and aspirations in a South African setting. *Journal of Psychology in Africa*, *25*, 305-312. <https://doi.org/10.1080/14330237.2015.1078087>
- Rutgers, A. H., Bakermans-Kranenburg, M. J., Ijzendoorn, M. H., & Berckelaer-Onnes, I. A. (2004). Autism and attachment: a meta-analytic review. *Journal of Child Psychology and Psychiatry*, *45*, 1123-1134. <https://doi.org/10.1111/j.1469-7610.2004.t01-1-00305.x>
- Rutgers, A. H., Van IJzendoorn, M. H., Bakermans-Kranenburg, M. J., & Swinkels, S. H. (2007a). Autism and attachment: The Attachment Q-Sort. *Autism*, *11*, 187-200. <https://doi.org/10.1177/1362361307075713>
- Rutgers, A. H., Van Ijzendoorn, M. H., Bakermans-Kranenburg, M. J., Swinkels, S. H., Van Daalen, E., Dietz, C., . . . van Engeland, H. (2007b). Autism, attachment and parenting: A comparison of children with autism spectrum disorder, mental retardation, language disorder, and non-clinical children. *Journal of Abnormal Child Psychology*, *35*, 859-870. <https://doi.org/10.1007/s10802-007-9139-y>
- Sanders, K. Y. (2006). Overprotection and lowered expectations of persons with disabilities: The unforeseen consequences. *Work*, *27*, 181-188. Retrieved from <https://content.iospress.com/articles/work/wor00561>
- Schoeman, F. (2011). *Neuropsychological performance of low socio-economic status South African children*. (Unpublished master's thesis). University of Cape Town, South Africa.
- Schrieff-Elson, L., Thomas, K., Rohlwink, U., & Figaji, A. (2015). Low brain oxygenation and differences in neuropsychological outcomes following severe pediatric TBI. *Child's Nervous System*, *31*, 2257-2268. <https://doi.org/10.1007/s00381-015-2892-2>
- Seskin, L., Feliciano, E., Tippy, G., Yedloutschnig, R., Sossin, K. M., & Yasik, A. (2010). Attachment and autism: Parental attachment representations and relational behaviors in the parent-child dyad. *Journal of Abnormal Child Psychology*, *38*, 949-960. <https://doi.org/10.1007/s10802-010-9417-y>
- Shulman, S., Elicker, J., & Sroufe, L. A. (1994). Stages of friendship growth in preadolescence as related to attachment history. *Journal of Social and Personal Relationships*, *11*, 341-361. <http://dx.doi.org/10.1177/0265407594113002>

- Shultz, S., Klin, A., & Jones, W. (2018). Neonatal transitions in social behavior and their implications for autism. *Trends in Cognitive Sciences*, 22, 452-469.
<https://doi.org/10.1016/j.tics.2018.02.012>
- Shuttleworth-Edwards, A. B. (2017). Countrywide norms declared obsolete: Best practice alert for IQ testing in a multicultural context. *South African Journal of Psychology*, 47, 3-6. <https://doi.org/10.1177/0081246316684465>
- Sigman, M., & Ungerer, J. A. (1984). Attachment behaviors in autistic children. *Journal of Autism and Developmental Disorders*, 14, 231-244.
<https://doi.org/10.1007/BF02409576>
- Sinha, D., Verma, N., & Hershe, D. (2016). A comparative study of parenting styles, parental stress and resilience among parents of children having autism spectrum disorder, parents of children having specific learning disorder and parents of children not diagnosed with any psychiatric disorder. *Annals of International Medicine and Dental Research*, 2(4), 106-111. <https://doi.org/10.21276/aimdr.2016.2.4.30>
- Sivaratnam, C., Newman, L., & Rinehart, N. (2018). Emotion-recognition and theory of mind in high-functioning children with ASD: Relationships with attachment security and executive functioning. *Research in Autism Spectrum Disorders*, 53, 31-40.
<https://doi.org/10.1016/j.rasd.2018.05.005>
- Smetana, J. G. (2017). Current research on parenting styles, dimensions, and beliefs. *Current Opinion in Psychology*, 15, 19-25. <https://doi.org/10.1016/j.copsy.2017.02.012>
- Smith, L., Malcolm-Smith, S., & de Vries, P. J. (2017). Translation and cultural appropriateness of the Autism Diagnostic Observation Schedule-2 in Afrikaans. *Autism*, 21, 552-563. <https://doi.org/10.1177/1362361316648469>
- Stano, J. F. (2004). Test review. *Rehabilitation Counseling Bulletin*, 48, 56-57.
<https://doi.org/10.1177/00343552040480010801>
- Steele, S., Joseph, R. M., & Tager-Flusberg, H. (2003). Brief report: Developmental change in theory of mind abilities in children with autism. *Journal of Autism and Developmental Disorders*, 33, 461-467. <https://doi.org/10.1023/A:1025075115100>
- Steinberg, L., Lamborn, S. D., Darling, N., Mounts, N. S., & Dornbusch, S. M. (1994). Over-time changes in adjustment and competence among adolescents from authoritative, authoritarian, indulgent, and neglectful families. *Child Development*, 65, 754-770.
<http://dx.doi.org/10.2307/1131416>
- Steinberg, L., Lamborn, S. D., Dornbusch, S. M., & Darling, N. (1992). Impact of parenting practices on adolescent achievement: Authoritative parenting, school involvement,

- and encouragement to succeed. *Child Development*, 63, 1266-1281.
<http://dx.doi.org/10.2307/1131532>
- Symons, D. K., & Clark, S. E. (2000). A longitudinal study of mother-child relationships and theory of mind in the preschool period. *Social Development*, 9, 3-23.
<http://dx.doi.org/10.1111/1467-9507.00108>
- Teague, S. J., Newman, L. K., Tonge, B. J., Gray, K. M., & MHYPeDD Team. (2018). Caregiver mental health, parenting practices, and perceptions of child attachment in children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 48, 2642-2652. <https://doi.org/10.1007/s10803-018-3517-x>
- Travis, L. L., & Sigman, M. (1998). Social deficits and interpersonal relationships in autism. *Mental Retardation and Developmental Disabilities Research Reviews*, 4, 65-72.
[https://doi.org/10.1002/\(SICI\)1098-2779\(1998\)4:2<65::AID-MRDD2>3.0.CO;2-W](https://doi.org/10.1002/(SICI)1098-2779(1998)4:2<65::AID-MRDD2>3.0.CO;2-W)
- Van Ijzendoorn, M. H., Rutgers, A. H., Bakermans-Kranenburg, M. J., Swinkels, S. H., Van Daalen, E., Dietz, C., . . . Van Engeland, H. (2007). Parental sensitivity and attachment in children with autism spectrum disorder: Comparison with children with mental retardation, with language delays, and with typical development. *Child Development*, 78, 597-608. <https://doi.org/10.1111/j.1467-8624.2007.01016.x>
- Van Ijzendoorn, M. H., Schuengel, C., & Bakermans-Kranenburg, M. J. (1999). Disorganized attachment in early childhood: Meta-analysis of precursors, concomitants, and sequelae. *Development and Psychopathology*, 11, 225-250.
 Retrieved from
https://openaccess.leidenuniv.nl/bitstream/handle/1887/1530/168_212.pdf?sequ
- Van Wyhe, K. (2012). *Wechsler Abbreviated Scale of Intelligence: Preliminary normative data for 12-15-year-old English-and Afrikaans-speaking Coloured learners in the Western Cape* (Unpublished master's thesis). University of Cape Town, South Africa.
- Vaupel, C. A. (2001). Test reviews: Cohen, MJ (1997). Children's Memory Scale. San Antonio, TX: The Psychological Corporation. *Journal of Psychoeducational Assessment*, 19, 392-400. <https://doi.org/10.1177/073428290101900408>
- Verfaillie, K., & Daems, A. (2002). Representing and anticipating human actions in vision. *Visual Cognition*, 9, 217-232. <http://dx.doi.org/10.1080/13506280143000403>
- Volkmar, F. R., Sparrow, S. S., Goudreau, D., Cicchetti, D. V., Paul, R., & Cohen, D. J. (1987). Social deficits in autism: An operational approach using the Vineland Adaptive Behavior Scales. *Journal of the American Academy of Child & Adolescent Psychiatry*, 26, 156-161. <http://dx.doi.org/10.1097/00004583-198703000-00005>

- Wagner, W. E., III. (2014). *Using IBM® SPSS® statistics for research methods and social science statistics*: Thousand Oaks, CA: SAGE.
- Wechsler, D. (1999). *Wechsler Abbreviated Scale of Intelligence*. San Antonio, TX: Psychological Corporation.
- Wellman, H. M. (2012). Theory of mind: Better methods, clearer findings, more development. *European Journal of Developmental Psychology*, 9, 313-330. <https://doi.org/10.1080/17405629.2012.680297>
- Wellman, H. M., Cross, D., & Watson, J. (2001). Meta-analysis of theory-of-mind development: The truth about false belief. *Child Development*, 72, 655-684. <https://doi.org/10.1111/1467-8624.00304>
- Whitaker, P. (2004). Fostering communication and shared play between mainstream peers and children with autism: approaches, outcomes and experiences. *British Journal of Special Education*, 31, 215-222. <https://doi.org/10.1111/j.0952-3383.2004.00357.x>
- Whiteley, P., Todd, L., Carr, K., & Shattock, P. (2010). Gender ratios in autism, Asperger syndrome and autism spectrum disorder. *Autism Insights*, 2, 17-24. <http://dx.doi.org/10.4137/AUI.S3938>
- Wing, L., & Gould, J. (1979). Severe impairments of social interaction and associated abnormalities in children: Epidemiology and classification. *Journal of Autism and Developmental Disorders*, 9, 11-29. <https://doi.org/10.1007/BF01531288>
- Wolff, M. S., & Ijzendoorn, M. H. (1997). Sensitivity and attachment: A meta-analysis on parental antecedents of infant attachment. *Child development*, 68, 571-591. <https://doi.org/10.1111/j.1467-8624.1997.tb04218.x>
- Wright, D. B., London, K., & Field, A. P. (2011). Using Bootstrap Estimation and the Plug-in Principle for Clinical Psychology Data. *Journal of Experimental Psychopathology*, 2(2), 252-270. <https://doi.org/10.5127/jep.013611>
- Yirmiya, N., Erel, O., Shaked, M., & Solomonica-Levi, D. (1998). Meta-analyses comparing theory of mind abilities of individuals with autism, individuals with mental retardation, and normally developing individuals. *Psychological Bulletin*, 124, 283-307. <http://dx.doi.org/10.1037/0033-2909.124.3.283>
- Zhu, J., Tulskey, D., & Leyva, L. (1999). Using WASI in conjunction with the WAIS-III. *Archives of Clinical Neuropsychology*, 8, 724-725. <https://doi.org/10.1093/arclin/14.8.724a>
- Zwaigenbaum, L., Bryson, S., Rogers, T., Roberts, W., Brian, J., & Szatmari, P. (2005). Behavioral manifestations of autism in the first year of life. *International Journal of*

Developmental Neuroscience, 23, 143-152.

<https://doi.org/10.1016/j.ijdevneu.2004.05.001>

Appendix A: Diagnostic Criteria for Autism Spectrum Disorder

Diagnostic Criteria for 299.00 Autism Spectrum Disorder

- A. Persistent deficits in social communication and social interaction across multiple contexts, as manifested by the following, currently or by history (examples are illustrative, not exhaustive; see text):
1. Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to social interactions.
 2. Deficits in nonverbal communicative behaviors used for social interaction, ranging, for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication.
 3. Deficits in developing, maintaining, and understand relationships, ranging, for example, from difficulties adjusting behavior to suit various social contexts; to difficulties in sharing imaginative play or in making friends; to absence of interest in peers.

Specify current severity:

Severity is based on social communication impairments and restricted, repetitive patterns of behavior.

- B. Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following, currently or by history (examples are illustrative, not exhaustive; see text):
1. Stereotyped or repetitive motor movements, use of objects, or speech (e.g., simple motor stereotypes, lining up toys or flipping objects, echolalia, idiosyncratic phrases).
 2. Insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior (e.g., extreme distress at small changes, difficulties with transitions, rigid thinking patterns, greeting rituals, need to take same route or eat same food every day).
 3. Highly restricted, fixated interests that are abnormal in intensity or focus (e.g., strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interests).
 4. Hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment (e.g. apparent indifference to pain/temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement).

Specify current severity:

Severity is based on social communication impairments and restricted, repetitive patterns of behavior.

- C. Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities, or may be masked by learned strategies in later life).
- D. Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning.
- E. These disturbances are not better explained by intellectual disability (intellectual developmental disorder) or global developmental delay. Intellectual disability and autism spectrum disorder frequently co-occur; to make comorbid diagnoses of autism spectrum disorder and intellectual disability, social communication should be below that expected for general developmental level.

Note: Individuals with a well-established DSM-IV diagnosis of autistic disorder, Asperger's disorder, or pervasive developmental disorder not otherwise specified should be given the diagnosis of autism spectrum disorder. Individuals who have marked deficits in social communication, but whose symptoms do not otherwise meet criteria for autism spectrum disorder, should be evaluated for social (pragmatic) communication disorder.

Specify if:

With or without accompanying intellectual impairment

With or without accompanying language impairment

Associated with a known medical or genetic condition or environmental factor

(Coding note: Use additional code to identify the associated medical or genetic condition.)

Associated with another neurodevelopmental, mental, or behavioral disorder

(Coding note: Use additional code[s] to identify the associated neurodevelopmental, mental, or behavioral disorder[s].)

With catatonia (refer to the criteria for catatonia associated with another mental disorder)

(Coding note: Use additional code 293.89 catatonia associated with autism spectrum disorder to indicate the presence of the comorbid catatonia.)

Appendix B: Demographic questionnaire

#

DEMOGRAPHIC QUESTIONNAIRE

Your name: _____ Date: _____

Child's Name: _____ School: _____

Age: _____ Date of Birth: _____

Number(s) to contact you on for parent interview:

1. Child's Sex: *Male* *Female*
2. Ethnicity: *White* *Black* *Indian* *Coloured*
 Asian *Other* *If other please specify:*

3. Home Language: _____

4. Handedness (circle one): *Left* *Right* *Ambidextrous*

5. Number of siblings: _____

6. Number of **older** siblings: _____

7. Who is the child's primary caregiver?

8. What is your relationship to the child (e.g. mother, father, etc)?

9. Has your child ever been diagnosed with Autism Spectrum Disorder (ASD)?

YES NO

Please indicate any other diagnoses or information related to your child's ASD:

10. Has your child ever been diagnosed with a disruptive, impulse-control, or conduct disorder, such as conduct disorder or oppositional defiant disorder (ODD)?

YES NO

If yes, please specify:

11. Has your child ever had a communication disorder? (For example: Having problems with understanding or producing speech, slow vocabulary development, difficulties recalling words or problems with producing sentences appropriate for his/her age.)

YES NO

If yes, please specify:

12. Has your child ever experienced learning difficulties such as dyslexia or attention-deficit / hyperactivity disorder (ADD/ ADHD)?

YES NO

If yes, please specify:

13. Has your child ever experienced a head injury? (e.g., being hit on the head and losing consciousness as a result)

YES NO

If yes, please give details:

14. Has your child ever experienced any of the following medical conditions:

a. Neurological problems (e.g., epilepsy, meningitis, cerebral palsy, encephalitis, Tourette's syndrome, brain tumour, other)

YES NO

If yes, please specify:

b. Depression

YES NO

If yes, please specify:

c. Memory problems

YES

NO

If yes, please specify:

d. Problems with their vision:

YES

NO

If yes, please specify:

e. Problems with their hearing (e.g. difficulty hearing, hearing aids, grommets):

YES

NO

If yes, please specify (please include details on how this affected their language development):

f. Is he/she currently taking any prescription medication?

YES

NO

If yes, what medication(s)?

Parent / Guardian Information

#

Please indicate here if child is adopted): _____

Please note that information on the primary caregiver is required. If the primary caregiver is not the biological or adoptive mother or father, please place their information under "Guardian".

What is the total monthly income of your household? (Tick the appropriate block):

[NOTE: This should be total household income, not personal income.]

0 – R2999	R3000 – R6299	R6300 – R 10 499	R10 500 – R 14599
R14 600 – R18 799	R18 800 – R22 999	R23 000 – R26 999	R27 000 – R31 299
R31 300 – R35 499	R35 500 - R39 499	R39 500 – R43 750	more than R43 750:
What is the estimated value of your total monthly household income: R			

Highest level of education completed for ... (please circle number):

	Mother	Father	Guardian
1) 0 years (Never went to school)	1	1	1
2) Grade 1	2	2	2
3) Grade 2	3	3	3
4) Grade 3 / Standard 1	4	4	4
5) Grade 4 / Standard 2	5	5	5
6) Grade 5 / Standard 3	6	6	6
7) Grade 6 / Standard 4	7	7	7
8) Grade 7 / Standard 5 [Completed primary school]	8	8	8
9) Grade 8 / Standard 6	9	9	9
10) Grade 9 / Standard 7	10	10	10
11) Grade 10 / Standard 8	11	11	11
12) Grade 11 / Standard 9	12	12	12
13) Grade 12 / Standard 10 [Matric; Completed high school]	13	13	13
14) Tertiary education: Higher education certificate	14	14	14
15) Tertiary education: Diploma received	15	15	15
16) Tertiary education: Bachelor's degree received	16	16	16
17) Tertiary education: Post graduate degree received	17	17	17
18) Don't know	18	18	18

Parental employment: (Please circle appropriate number)	Mother	Father	Guardian
1. Higher executives, owners of large businesses, major professionals (e.g. doctors, lawyers)	1	1	1
2. Business managers of medium sized businesses, professions like nurses, opticians, pharmacists, social workers, teachers, accountants	2	2	2
3. Administrative personnel, managers, owners / sole proprietors of small businesses (decorator, actor, reporter, travel agent)	3	3	3
4. Clerical and sales, technicians, (e.g. bank teller, bookkeeper, clerk, draftsman, timekeeper, secretary)	4	4	4
5. Skilled manual – usually having had training (e.g. baker, barber, chef, electrician, fireman, machinist, mechanic, welder, police, plumber, electrician)	5	5	5
6. Semi-skilled (e.g. hospital aide, painter, bartender, bus driver, cook, garage guard, checker, waiter, machine operator)	6	6	6
7. Unskilled (e.g. attendant, janitor, construction helper, unspecified labour, porter)	7	7	7
8. Homemaker	8	8	8
9. Student, disabled, no occupation	9	9	9

Which of the following items, in working order, does your household have?	Yes	No
1. A refrigerator or freezer	Yes	No
2. A vacuum cleaner or polisher	Yes	No
3. A television	Yes	No
4. A hi-fi or music center (radio excluded)	Yes	No
5. A microwave oven	Yes	No
6. A washing machine	Yes	No
7. A video cassette recorder or dvd player	Yes	No

Which of the following do you have in your home?	Yes	No
1. Running water	Yes	No
2. A domestic servant	Yes	No
3. At least one car	Yes	No
4. A flush toilet	Yes	No
5. A built-in kitchen sink	Yes	No
6. An electric stove or hotplate	Yes	No
7. A working telephone / cellular phone	Yes	No

Do you personally do any of the following?	Yes	No
1. Shop at supermarkets	Yes	No
2. Use financial services such as a bank account, ATM card or credit card	Yes	No
3. Have an account or credit card at a retail store	Yes	No

Thank you for your participation!

PARENT INTERVIEW

Date:

Child's Name:

Parent's Name:

Relationship to Child:

Use son's name to make it more personal. Phrase as questions, as conversationally and naturally as possible.

Thank you for agreeing to participate in our research. Today I would like to ask you several questions to help me better understand your son. As his mother/father, you can provide unique insight into how he behaves in different environments. I would like to ask you about how he behaves around friends or other children, how well he is able to relate to others, and finally about his behaviour at home. If a question is unclear or you aren't sure which answer best suits your son, we can discuss the question in more depth and go over some examples of your son's behaviour that you may have in mind.

ASCQ: Son and friendships

For the following questions, I would like you to think about how your son is around friends, or around other children. For each question, I would like to know whether the statement is true or not for your son. If you are not sure, that is also fine.

*If the parent answers with **yes** or **no**, clarify. Many will do this, because these are more natural responses to the statements. For eg: following a yes answer, "**So it's true that your son makes friends with other children easily?**" or following a no answer, "**So your son is not comfortable trying to make friends?**" or "**So your son does not find it easy to depend on good friends?**" Negatively phrased questions are always particularly tricky – make sure you understand what their answer means.*

Give the statement and ask whether true or not true (i.e. do not offer unsure as a prompt. If they cannot decide, mark as Unsure.

	Not true	Unsure	True
1. My son makes friends with other children easily. True or not true?	0	1	2
2. My son doesn't feel comfortable trying to make friends.	0	1	2
3. It is easy for my son to depend on others, if they're good friends of his.	0	1	2
4. Sometimes others get too friendly and too close to my son.	0	1	2
	Not true	Unsure	True
5. Sometimes my son is afraid that other kids won't want to be with him.	0	1	2
6. My son would like to be really close to some children and always be with them.	0	1	2
7. It's all right with my son if good friends trust and depend on him.	0	1	2
8. It's hard for my son to trust others completely.	0	1	2
9. My son sometimes feels that others don't want to be good friends with him as much as he does with them.	0	1	2
10. My son usually believes that others who are close to him will not leave him.	0	1	2
11. My son is sometimes afraid that no one really loves him.	0	1	2
12. My son finds it uncomfortable and gets annoyed when someone tries to get too close to him.	0	1	2
13. It's hard for my child to really trust others, even if they're good friends of his/hers.	0	1	2
14. Children sometimes avoid my child when he wants to get too close and be a good friend of theirs.	0	1	2
15. Usually when anyone tries to get too close to my child, it does not bother him.	0	1	2

Appendix D: PSDQ

PSDQ: Your son and your family

Now I would like to ask questions about your son and your family, and specifically about how your son responds to you. Some of the questions focus on discipline and dealing with disruptive behaviours. These questions were designed for typically developing children, so they may not all be appropriate for your son, but please try answer as accurately as you can.

Read statement and then prompt parents with “never, sometimes, often, or always”. If parent stuck, ask if their child ever does it: if “no”, check whether “never or sometimes”; if “yes”, check frequency.

		Never	Some times	About Half of the Time	Often	Always
1.	I am responsive to my child’s feelings and needs. <small>[SEP]</small>	1	2	3	4	5
2.	I use physical consequences as a way of disciplining <small>[SEP]</small> my child. <small>[SEP]</small>	1	2	3	4	5
3.	I take my child’s desires into account before asking him to do something. <small>[SEP]</small>	1	2	3	4	5
4.	When my child asks why he has to conform, I state: because I said so, or I am your parent and I want you to. <small>[SEP]</small>	1	2	3	4	5
5.	I explain to my child how I feel about his good and bad behaviour. <small>[SEP]</small>	1	2	3	4	5
6.	I spank when my child is disobedient. <small>[SEP]</small>	1	2	3	4	5
7.	I encourage my child to talk about his <small>[SEP]</small> troubles. <small>[SEP]</small>	1	2	3	4	5
8.	I find it difficult to discipline my child. <small>[SEP]</small>	1	2	3	4	5
9.	I encourage my child to freely express <small>[SEP]</small> himself even when disagreeing with his parents. <small>[SEP]</small>	1	2	3	4	5
10.	I discipline by taking privileges away from my <small>[SEP]</small> child with little if any explanations. <small>[SEP]</small>	1	2	3	4	5
11.	I emphasize the reasons for rules. <small>[SEP]</small>	1	2	3	4	5
12.	I give comfort and understanding when	1	2	3	4	5

	my child is upset. [L1] [SEP]					
13.	I yell or shout when my child misbehaves. [L1] [SEP]	1	2	3	4	5
14.	I give praise when my child is good. [L1] [SEP]	1	2	3	4	5
15.	I give into my child when he causes a commotion about something. [L1] [SEP]	1	2	3	4	5
		Never	Some times	About Half of the Time	Often	Always
16.	I explode in anger towards my child. [L1] [SEP]	1	2	3	4	5
17.	I threaten my child with consequences more often than actually giving it. [L1] [SEP]	1	2	3	4	5
18.	I take into account my child's preferences in making plans for the family. [L1] [SEP]	1	2	3	4	5
19.	I grab my child when being disobedient. [L1] [SEP]	1	2	3	4	5
20.	I state consequences to my child and do not [L1] [SEP] actually do them. [L1] [SEP]	1	2	3	4	5
21.	I show respect for my child's opinions by [L1] [SEP] encouraging him to express them. [L1] [SEP]	1	2	3	4	5
22.	I allow my child to give input into family rules. [L1] [SEP]	1	2	3	4	5
23.	I scold and criticize to make my [L1] [SEP] child improve. [L1] [SEP]	1	2	3	4	5
24.	I spoil my child. [L1] [SEP]	1	2	3	4	5
25.	I give my child reasons why rules should be obeyed. [L1] [SEP]	1	2	3	4	5
26.	I use threats as a consequence with little or no [L1] [SEP] justification. [L1] [SEP]	1	2	3	4	5
27.	I have warm and intimate times together with my [L1] [SEP] child. [L1] [SEP]	1	2	3	4	5
28.	I help my child to understand the impact of [L1] [SEP] behaviour by encouraging my child to talk about the [L1] [SEP] consequences of his own actions. [L1] [SEP]	1	2	3	4	5
29.	I scold or criticize when my child's behaviour doesn't meet my expectations. [L1] [SEP]	1	2	3	4	5
30.	I explain the consequences of his [L1] [SEP] behaviour. [L1] [SEP]	1	2	3	4	5

31.	I slap my child when he misbehaves. <small>[1] [SEP]</small>	1	2	3	4	5
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Thank you for your participation. We really appreciate your contribution. Once we have seen your son for all the necessary sessions we will provide you with feedback. We will send you and the school a report, and will be available to answer any questions.

Appendix E: Ethical Approval for the broader protocol from the Psychology

Department Ethics Board at UCT

UNIVERSITY OF CAPE TOWN



Department of Psychology

University of Cape Town, Rondebosch 7701, South Africa
Telephone: (021) 650 3414
Fax No. (021) 650 4104

13 April 2015

Mr K. Hamilton
Department of Psychology
University of Cape Town
Rondebosch

Dear Ms Hamilton,

This is to confirm that ethical clearance has been given by an Ethics Review Committee of the Faculty of Humanities for your study, *The Biological Bases of Social Deficits*. The reference number is PSY2014-024.

I wish you all the best for your study.

Yours sincerely,

signature removed to avoid exposure online

Johann Louw PhD
Professor
Chair: Ethics Review Committee

Appendix F: Ethical Approval for the broader protocol from the Western Cape



Directorate: Research

Audrey.wyngaard@westerncape.gov.za

tel: +27 021 467 9272

Fax: 0865902282

Private Bag x9114, Cape Town, 8000

wced.wcape.gov.za

REFERENCE: 20150422-46598

ENQUIRIES: Dr A T Wyngaard

Ms Kate Hamilton
PO Box 1694
Millerton
7435

Dear Ms Kate Hamilton

RESEARCH PROPOSAL: THE BIOLOGICAL BASES OF SOCIAL DEFICITS: THE POSSIBLE ROLES OF THE MU-OPIOID RECEPTOR (OPRM1) AND THE SEROTONIN TRANSPORTER PROMOTER LENGTH POLYMORPHISM (5-HTTLPR) IN SOCIAL MOTIVATION AND THEORY OF MIND IN AN AUTISM SPECTRUM DISORDER (ASD) SAMPLE

Your application to conduct the above-mentioned research in schools in the Western Cape has been approved subject to the following conditions:

1. Principals, educators and learners are under no obligation to assist you in your investigation.
2. Principals, educators, learners and schools should not be identifiable in any way from the results of the investigation.
3. You make all the arrangements concerning your investigation.
4. Educators' programmes are not to be interrupted.
5. The Study is to be conducted from **24 April 2015 till 30 September 2017**
6. No research can be conducted during the fourth term as schools are preparing and finalizing syllabi for examinations (October to December).
7. Should you wish to extend the period of your survey, please contact Dr A.T Wyngaard at the contact numbers above quoting the reference number?
8. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
9. Your research will be limited to the list of schools as forwarded to the Western Cape Education Department.
10. A brief summary of the content, findings and recommendations is provided to the Director: Research Services.
11. The Department receives a copy of the completed report/dissertation/thesis addressed to:
**The Director: Research Services
Western Cape Education Department
Private Bag X9114
CAPE TOWN
8000**

We wish you success in your research.

Kind regards,
Signed: Dr Audrey T Wyngaard
Directorate: Research
DATE: 22 April 2015

Lower Parliament Street, Cape Town, 8001
tel: +27 21 467 9272 fax: 0865902282
Safe Schools: 0800 45 46 47

Private Bag X9114, Cape Town, 8000
Employment and salary enquiries: 0861 92 33 22
www.westerncape.gov.za

Education Department

UCT Autism Research



Brief Overview of Psychology Doctoral Study

The Biological Bases of Social Deficits: The possible roles of two candidate genes in social motivation and social ability in Autism Spectrum Disorder

Dear Parents

You and your child are invited to participate in my study! I am a PhD Psychology student with a history in Neuropsychology (MA Clinical Neuropsychology, cum laude, 2014), and am a member of the University of Cape Town Autism Research Group (uctautism.com). I am investigating the social difficulties in Autism Spectrum Disorders (ASD). I am interested in general social ability, and specifically in social motivation and Theory of Mind. Theory of Mind refers to the ability to understand other people's thoughts, beliefs, and emotions, and to understand that these are different from one's own. For example, the ability to understand jokes and the ability to understand that when you know something, everyone else doesn't automatically know it too, are forms of Theory of Mind. I am interested in two candidate genes as one may be involved in whether children look for social interaction (the mu-opioid receptor, OPRM1), and the other may be involved in how well children understand social interaction and other people's behaviours (the serotonin transporter promoter length polymorphism, 5-HTTLPR).

Who can participate?

In order to participate, your son must be between 4-16 years old and must understand English. Children with limited language ability can participate, and even non-verbal children can participate, as long as their home language or the language their teachers use with them is English. Children can participate either if they have or are suspected to have Autism Spectrum Disorder. You as the parent must also be fluent in either English or Afrikaans as I will need to interview you about your son.

Must my child and I participate?

No, not at all – this study is completely optional. There are no negative consequences if you choose not to participate. Also, if you decide to participate and then change your mind, you can just let me know that you are withdrawing and you don't even need to provide a reason. If this happens, you and your son will not be penalised in any way.

What will happen if we take part?

If you decide to participate in the study, I will ask you to sign a consent form and complete a demographics form. The demographic forms asks about your son's medical history and your family

income and education. I understand that this is personal information, so as soon as I receive it I will remove your name and record the information under a confidential participation number. This information will not be shared with anyone else. We need this personal information for two reasons: first, we need the medical information to establish whether anything else could explain the relationships we are exploring, in which case we may not be able to include your son in the study (for example, if your child experienced a severe head injury, we cannot conclude that his social difficulties are due to ASD and the genes we are exploring); and second, we need the financial information to make sure that this research recruits children from all backgrounds and is therefore representative of the South African population.

Myself or someone in my team will then call you to arrange a time to interview you. The interview will consist of two parts, each 30-60 minutes, and can be done telephonically or we can meet and conduct the interview in person.

I will then meet with your son at his school. At the start of every session I will ask your son if he is willing to play the games with me that day, and if he isn't then we won't have a session. I will meet each child for 1-4 sessions, where we will complete several tasks all designed to measure different aspects of social and cognitive ability. All the tasks are designed to appear as games for the children, so they are all toy or story based.

Included in these sessions is the ADOS2 assessment. The ADOS2 (Autism Diagnostic Observation Schedule, Second Edition) is the international gold-standard ASD diagnostic tool. The information from an ADOS2 assessment is very valuable to your school and any doctors or psychologists involved in your child's treatment. Unfortunately there are usually long waiting lists to get an ADOS2 assessment and having it done privately can be quite expensive. However, if your child completes this assessment as part of this study I can share this information with the appropriate professionals.

Later in my PhD I will contact you again to arrange to use a non-invasive cheek swab to collect a DNA sample from your child. This is done to see which expression of the candidate genes I'm researching your son has. I will do this by gently rubbing a cotton swab on the inside of his cheek. This swab is similar to an earbud and will not hurt your son or pose any risk to him. To make sure your son is comfortable, I will first let him play with a cotton bud and get used to putting it in his mouth. He can then imitate me showing him how to rub the inside of the cheek. I will only collect the sample once your son is comfortable.

What will happen to the information I give you and the information from seeing my son?

All information is recorded under a confidential participant number, and your privacy will be maintained at all times. I will not share this information with others, and if any data is shared it will be the kind of information that does not reveal who you are (for example, when I send the lab samples I may give them the age and sex of your son, but not his name, school, or anything else). Therefore, your name, income information, son's medical information, and all other information will not be shared with anyone. All information will be securely stored so that no one else can access it, and the data is coded so that your name and your son's name are removed. Any DNA that is unused will be destroyed.

What will happen with the results of this study?

At the end of this study I will provide you with a personalised report explaining what I learnt about your son. You can keep this report, and you can choose to share it with schools or any clinical professional involved in your son's care (for example, psychologists, GPs, speech therapists, etc). I am also always available to discuss anything about the research and to answer any questions.

If I publish my findings from this study, you and your son will never be identified personally. I will be delighted to share the results with you as soon as they are available.

Who has approved this study?

This study has received ethical approval from the Western Cape Education Department, the UCT Psychology Department Ethics Board, and the UCT Faculty of Science Ethics Board.

Who is responsible for this study?

I am the Doctoral Candidate who is conducting the study, and can be contacted at any time with any questions. My supervisor, Dr Susan Malcolm-Smith, is a senior lecturer and Neuropsychologist at UCT can also be contacted if you have any queries or complaints that you would rather address to her. Or, alternatively you can address these issues to Rosaline Adams, the administrative assistant for the Psychology Department Ethics board. All contact details are included at the end of this letter.

How to participate?

Thank you for considering participating in my study! In order to join the study, please sign the attached consent form, complete the demographic form and return these forms to your school. Please feel free to call me with any questions or for help submitting these forms.

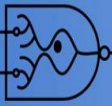
I look forward to hearing from you!

Katie Hamilton
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Dr Susan Malcolm-Smith
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Rosalind Adams
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Appendix H: Control group recruitment letter/Information Sheet



ACSENT Laboratory

Department of Psychology, University of Cape Town

Brief Overview of Psychology Doctoral Study

The Biological Bases of Social Deficits: Exploring social functioning in Autism Spectrum Disorder and Neurotypical Children

Dear Parents

You and your child are invited to participate in my study! I am a PhD Psychology student with a history in Neuropsychology (MA Clinical Neuropsychology, 2014), and am a member of the University of Cape Town Autism Research Group (uctautism.com). I am investigating the social difficulties in Autism Spectrum Disorders (ASD) and I am inviting children with ASD and without ASD to participate. I am interested in general social ability, and specifically in social motivation and Theory of Mind. Theory of Mind refers to the ability to understand other people's thoughts, beliefs, and emotions, and to understand that these are different from one's own. For example, the ability to understand jokes and the ability to understand that when you know something, everyone else doesn't automatically know it too, are forms of Theory of Mind. I am interested in the functioning of two candidate genes in the ASD group. In order to conduct my study, I have recruited children with ASD and I am now inviting children who do not have ASD to participate. This will enable me to make comparisons and improve our understanding of how children with ASD may differ from other children.

Who can participate?

In order to participate, your son must be between 4-16 years old and must understand English. Children can participate as long as they do not have a diagnosed Autism Spectrum Disorder and their home language or the language their teachers use with them is English. You as the parent must also be fluent in either English or Afrikaans as I will need to interview you about your son.

Must my child and I participate?

No, not at all – this study is completely optional. There are no negative consequences if you choose not to participate. Also, if you decide to participate and then change your mind, you can just let me know that you are withdrawing and you don't even need to provide a reason. If this happens, you and your son will not be penalised in any way.

What will happen if we take part?

If you decide to participate in the study, I will ask you to sign a consent form and complete a demographics form. The demographic forms asks about your son's medical history and your family income and education. I understand that this is personal information, so as soon as I receive it I will

remove your name and record the information under a confidential participation number. This information will not be shared with anyone else. We need this personal information for two reasons: first, we need the medical information to establish whether anything else could explain the relationships we are exploring, in which case we may not be able to include your son in the study, and second, we need the financial information to make sure that this research recruits children from all backgrounds and is therefore representative of the South African population.

Myself or someone in my team will then call you to arrange a time to interview you. The interview will consist of two parts, each 30-60 minutes, and can be done telephonically or we can meet and conduct the interview in person.

I will then meet with your son at his school. At the start of every session I will ask your son if he is willing to play the games with me that day, and if he isn't then we won't have a session. I will meet each child for 2 sessions of approximately 40 minutes, where we will complete several tasks all designed to measure different aspects of social and cognitive ability. All the tasks are designed to appear as games for the children, so they are all toy or story based.

What will happen to the information I give you and the information from seeing my son?

All information is recorded under a confidential participant number, and your privacy will be maintained at all times. I will not share this information with others, and if any data is shared it will be the kind of information that does not reveal who you are. Therefore, your name, income information, son's medical information, and all other information will not be shared with anyone. All information will be securely stored so that no one else can access it, and the data is coded so that your name and your son's name are removed.

What will happen with the results of this study?

At the end of this study I will provide you with a personalised report explaining what I learnt about your son. You can keep this report, and you can choose to share it with schools or any clinical professional involved in your son's care (for example, psychologists, GPs, speech therapists, etc). I am also always available to discuss anything about the research and to answer any questions.

If I publish my findings from this study, you and your son will never be identified personally. I will be delighted to share the results with you as soon as they are available.

Who has approved this study?

This study has received ethical approval from the Western Cape Education Department, the UCT Psychology Department Ethics Board, and the UCT Faculty of Science Ethics Board.

Who is responsible for this study?

I am the Doctoral Candidate who is conducting the study, and can be contacted at any time with any questions. My supervisor, Dr Susan Malcolm-Smith, is a senior lecturer and Neuropsychologist at UCT can also be contacted if you have any queries or complaints that you would rather address to her. Or, alternatively you can address these issues to Rosalind Adams, the administrative assistant for the Psychology Department Ethics board. All contact details are included at the end of this letter.

How to participate?

Thank you for considering participating in my study! In order to join the study, please sign the attached consent form, complete the demographic form and return these forms to your school. Please feel free to call me with any questions or for help submitting these forms.

I look forward to hearing from you!

Katie Hamilton
PhD Psychology Candidate
Department of Psychology,
UCT
082 463 8335
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Department of Psychology,
UCT
021-650-4605
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Rosalind Adams
Admin. Assistant: Ethics Committee
Department of Psychology, UCT
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Appendix I: ASD group consent form

UCT Autism Research



#

Consent Form

The study has been explained to me, and my questions have been answered. I understand that participation in this study is voluntary, and that I may withdraw my child at any point. I understand that my child will not be identified except by an initial, and that this anonymity will be maintained throughout the study and when the research is published.

I consent to participate and to allow my child to **participate** in this study.

Child's name:

Signature of parent /guardian:

Date:

I hereby give consent for **DNA** samples to be collected from my child using cheek swabs. I understand that this DNA will only be used for research purposes. I give consent for this DNA to be stored at the Department of Molecular and Cell Biology or the Department of Psychology, UCT, and to be used in later research.

Signature of parent /guardian:

Date:

I hereby give consent for **ADOS2** administration to be video recorded. I understand that this video will only be used for research purposes. I give consent for this video to be stored at the Department Psychology, UCT, and to be used in later research.

Signature of parent /guardian:

Date:

Please indicate below if you would like to be notified of future research conducted by our research group:

Yes, I _____ (initial) would like to be added to your research participation pool and be notified of research projects in which I or my child might participate in the future.

Phone number:

Cell phone number:

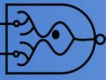
E-mail address:

(Parent/guardian) _____ has been informed of the purpose, procedures, and any possible risks of this study. He / she has been given time to ask any questions, and these questions have been answered to the best of my ability. He / she understands that participation is voluntary.

Researcher:

Signature & Date:

Appendix J: Control group consent form



ACSENT Laboratory

Department of Psychology, University of Cape Town

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Consent Form

The study has been explained to me, and my questions have been answered. I understand that participation in this study is voluntary, and that I may withdraw my child at any point. I understand that my child will not be identified except by an initial, and that this anonymity will be maintained throughout the study and when the research is published.

I consent to participate and to allow my child to **participate** in this study.

Child's name: _____

Signature of parent /guardian: _____

Date: _____

Please indicate below if you would like to be notified of future research conducted by our research group:

Yes, I _____ (initial) would like to be added to your research participation pool and be notified of research projects in which I or my child might participate in the future.

Phone number: _____

Cell phone number: _____

E-mail address: _____

(Parent/guardian) _____ has been informed of the purpose, procedures, and any possible risks or this study. He / she has been given time to ask any questions, and these questions have been answered to the best of my ability. He / she understands that participation is voluntary.

Researcher: _____

Signature & Date: _____

Appendix K: ASD group assent form for broader protocol

Assent Form: Collection of DNA and Psychological Data

Hello! I want to tell you about a research study I am doing. A research study is a way to learn more about something, and we want to learn more about autism!

If you join this study, I will ask you to put a cotton bud inside your mouth and rub your cheek with it. This will not hurt you at all. You can bring your parent or guardian with if you want to.

I will also ask you to complete tasks and play a few games with me. Some of the games will have toys, and some will involve listening to stories and looking at some pictures with me. I may ask to see you again after today so that we can play more games. Every time we meet I will have new games. If you get tired, then we can take a break.

You do not have to join this study. It is up to you. No one will get upset if you don't want to be in the study. You won't get into trouble if you don't join this study. It is also fine if you join the study, but then change your mind and want to stop. You can decide at any time to stop being in this study.

Do you have any questions?

(Participant's name) _____ has been informed of the purpose, procedures, and any possible risks of this study. He has been given time to ask any questions, and these questions have been answered to the best of my ability. He understands that participation is voluntary.

Researcher _____

Signature _____

Date _____

Appendix L: Control group assent form for broader protocol

Assent Form: Collection of Psychological Data

Hello! I want to tell you about a research study I am doing. A research study is a way to learn more about something, and we want to learn more about autism!

If you join this study, I will also ask you to complete tasks and play a few games with me. Some of the games will have toys, and some will involve listening to stories and looking at some pictures with me. I may ask to see you again after today so that we can play more games. Every time we meet I will have new games. If you get tired, then we can take a break.

You do not have to join this study. It is up to you. No one will get upset if you don't want to be in the study. You won't get into trouble if you don't join this study. It is also fine if you join the study, but then change your mind and want to stop. You can decide at any time to stop being in this study.

Do you have any questions?

(Participant's name) _____ has been informed of the purpose, procedures, and any possible risks of this study. He has been given time to ask any questions, and these questions have been answered to the best of my ability. He understands that participation is voluntary.

Researcher _____

Signature _____

Date _____