Attachment in children with autism spectrum disorder: A systematic review

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A B S T R A C T

This paper aims to synthesise the literature on attachment in children with Autism Spectrum Disorder (ASD), highlighting gaps in current research and applications for clinical practice. The research databases PsycINFO, Ovid Medline, and the Cochrane Library were searched for the terms “autism” and “attachment”. Forty papers investigating attachment in children with ASD were identified and narratively reviewed. Seven samples were identified that reported attachment classifications using the Strange Situation Paradigm, with an average of 47% of children with ASD classified as secure (n = 186). With research to date concluding that children with ASD can form secure attachments, studies are now looking at risk and protective factors in the development of attachment, correlates of attachment, attachment disorders in children with ASD, and attachment-based interventions for children with ASD. Many of these studies are preliminary investigations with contradictory findings reported, highlighting important directions for future research.

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1. Introduction

Attachment is the innate neurobiological system underlying the development of relationships between children and caregivers to ensure the child’s safety (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969). The attachment system enables children to establish a sense of security under stressful circumstances by seeking proximity to caregivers. Attachment behaviours adapt as the child develops; infant behaviours include crying and clinging to caregivers, wariness of strangers, and preference for a caregiver, while toddlers and preschoolers may also use the caregiver as a safe-base to return to when exploring new environments (Bowlby, 1969). In older children, attachment behaviours become less dependent on the child’s physical proximity to caregivers and instead surround caregivers’ unconditional availability and responsiveness, e.g. as a confidante (Kobak, Rosenthal, & Serwik, 2005).

The quality of a child’s attachment is affected by the quality of the caregiving the child experiences (Bowlby, 1969). Children with a secure attachment exhibit proximity-seeking behaviours when distressed and exploratory behaviours when feeling secure. Insecurely attached children exhibit an imbalance in proximity-seeking or exploratory behaviours (Ainsworth et al., 1978). Disorganised attachment describes a breakdown in a cohesive pattern in attachment behaviour, usually due to the child perceiving the attachment figure as both a safe-haven and source of fear (Main & Hesse, 1990). Finally, disturbed attachment behaviours that are described in the clinical literature include inhibited, disinhibited and controlling attachment behaviours (Newman & Mares, 2007; Zeanah & Smyke, 2008). Over time, the child develops an internal working model of their expectations and attitude towards themselves and their attachment figure, which shapes their interpretation of events in the environment across the lifespan (Bowlby, 1969, 1973).

Historically, children with Autism Spectrum Disorder (ASD) were assumed to be unable to form discriminated attachment relationships with caregivers (American Psychiatric Association, 1980). Theories of the aetiology of the disorder often focussed on the impact of cold and distant parenting on the child’s capacity to relate (e.g. Bettelheim, 1959; Bowlby, 1969, 1973; Kanner, 1949). More recent discussion surrounds the relationship between the attachment system and the intersubjective difficulties of children with ASD, such as the difficulties in eye-contact, turn-taking, conversation, joint attention, and other aspects of interpersonal relatedness. Non-human primates and other animals are able to form attachment bonds without the sophisticated social communication and understanding evident in humans (Bowlby, 1977; Cortina and Liotti, 2010; Insel & Young, 2001). However, the human attachment system provides context for the emergence of the child’s reflective capacity – a central emotional development task of infancy. Reflective functioning, or the capacity to understand mental states in oneself and in others, emerges as a function of attuned early interactions where caregivers demonstrate the capacity to mentalise or understand and regulate the inner world of the infant (Fonagy, Steele, Steele, Moran, & Higgitt, 1991). Stern (2004) argues that intersubjectivity and attachment are related but distinct motivational systems, where intersubjectivity is the drive for group belonging and attachment is the drive for safety and physical closeness. Thus the difficulties in social communication and understanding demonstrated by children with ASD are expected to shape the attachment quality of children with ASD and vice versa, but not to inhibit the formation of attachment bonds altogether (Hobson, 1989; Stern, 2004).

Investigating attachment in children with ASD could lead to improvements in wellbeing for children with ASD and an improved understanding of the aetiology and development of the disorder. Longitudinal and cross-sectional studies demonstrate the role of attachment across the lifespan in typically developing children, with secure attachment associated with normal development and insecure attachments associated with psychopathology and other adverse outcomes (Sroufe, 2005; Werner, 1989). Designing interventions that target attachment constructs may enhance the child–parent relationship and improve outcomes for children with ASD.

Our understanding of the aetiology and development of autism may be improved by attachment research. Theoretical models of autism differ in their predictions of the presence and quality of attachment in children with ASD (Rogers, Ozonoff, & Maslin-Cole, 1993). Insight regarding the quality of attachment in children with ASD may offer support for specific models of autism. Investigations into the behavioural, social, and cognitive correlates of attachment in children with ASD may provide clarity on the impairments associated with autism and enhance our knowledge of the disorder’s developmental trajectory. Finally, investigations into the neurobiology of attachment in children with ASD provide insight into the neurological underpinnings of autism and attachment alike.

A systematic review of attachment research in children with ASD is pertinent and timely given ongoing concerns about the nature of the social capacities of these children and approaches to intervention. To date, only one systematic review of attachment research in children with ASD has been performed, which focused solely on the attachment security of children with ASD through studies using the Strange Situation Paradigm (Rutgers, Bakermans-Kranenburg, van Ijzendoorn, & van Berckelaer-Onnes, 2004). Reviewing 16 studies, Rutgers et al. (2004) concluded that although children with ASD were significantly less likely to form a secure attachment to caregivers than children without ASD, most (53%) children with ASD
did form secure attachments to their caregiver. A substantial body of research has been conducted on other aspects of attachment in children with ASD that have not been considered for a systematic review, including risk and protective factors in the development of secure attachments, correlates of attachments in children with ASD, and the clinical applications of attachment research.

This systematic review aimed to provide a concise, critical snapshot of the research to date investigating attachment in children with ASD. In this review, we sought to investigate the literature by mapping the evidence and identifying current gaps in the knowledge base. Reviews to date have been narrowly focused on comparisons of the rates of attachment security in the autism population (e.g. Rutgers et al., 2004). Therefore a synthesis of the wider literature on attachment in children with autism is required, which this review addresses. We begin by investigating child and caregiving environmental factors that may impact the quality of attachments in children with ASD. Next, we investigate attachment classifications identified in children with ASD. Finally, we consider the clinical implications of attachment research in children with ASD. This includes correlates of attachment in children with ASD and attachment-based interventions used in ASD samples. Advances in the field are highlighted and directions for future research are identified and discussed.

![PRISMA procedural flow chart](image_url)

**Fig. 1.** PRISMA procedural flow chart.
Table 1
Summary of articles included for review.

<table>
<thead>
<tr>
<th>Authors</th>
<th>Comparison Groups</th>
<th>N</th>
<th>CA (months)</th>
<th>Attachment Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Aldemir et al., 2009)</td>
<td>ASD; non-ASD DD</td>
<td>37</td>
<td>38</td>
<td>Child: SSP</td>
</tr>
<tr>
<td>(Bauminiger et al., 2010a)</td>
<td>ASD (without ID); TD</td>
<td>77</td>
<td>121</td>
<td>Parent: Relationships Scale Questionnaire</td>
</tr>
<tr>
<td>(Bauminiger et al., 2010b)</td>
<td>ASD (without ID); TD; and a nominated friend for each group</td>
<td>164</td>
<td>124</td>
<td>Child: Kerns Security Scale</td>
</tr>
<tr>
<td>(Bauminiger-Zvieli &amp; Kugelmaiss, 2013)</td>
<td>Total sample of ASD</td>
<td>25</td>
<td>88.8</td>
<td>Child: Attachment Q-Set</td>
</tr>
<tr>
<td>(Beurkens et al., 2013)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Capps et al., 1994)</td>
<td></td>
<td>15</td>
<td>48.6</td>
<td>Child: Kerns Security Scale</td>
</tr>
<tr>
<td>(Chandler &amp; Dissanyake, 2013)</td>
<td></td>
<td>38</td>
<td>110</td>
<td>Child: Kerns Security Scale</td>
</tr>
<tr>
<td>(Davidson et al., 2015)</td>
<td>ASD; RAD</td>
<td>125</td>
<td>90</td>
<td>Child: Kerns Security Scale</td>
</tr>
<tr>
<td>(Dissanayake &amp; Crossley, 1996)</td>
<td>ASD; Down Syndrome; TD</td>
<td>48</td>
<td>52</td>
<td>Child: SSP</td>
</tr>
<tr>
<td>(Dissanayake &amp; Crossley, 1997)</td>
<td>ASD; Down Syndrome; TD</td>
<td>48</td>
<td>52</td>
<td>Child: SSP</td>
</tr>
<tr>
<td>(Deole et al., 2014)</td>
<td>Total sample of ASD</td>
<td>39</td>
<td>49</td>
<td>Child: SSP</td>
</tr>
<tr>
<td>(Falk et al., 2014)</td>
<td>Total sample of Parents of children with ASD</td>
<td>479</td>
<td>N/A</td>
<td>Parent: Parent-Child Relationship Inventory</td>
</tr>
<tr>
<td>(Feldman et al., 2014)</td>
<td>ASD (without ID); TD</td>
<td>40</td>
<td>58</td>
<td>Salivary oxytocin during parent-child interactions</td>
</tr>
<tr>
<td>(Gilraj, Sterkenburg, &amp; Schuengel, 2015)</td>
<td>Total sample of DD</td>
<td>102</td>
<td>106</td>
<td>Child: DAI</td>
</tr>
<tr>
<td>(Goodman &amp; Glenwick, 2012)</td>
<td>Total sample of ASD</td>
<td>86</td>
<td>66</td>
<td>Child: Maternal Perceptions of Child Attachment</td>
</tr>
<tr>
<td>(Grzadzinski et al., 2014)</td>
<td>ASD; Clinical Comparison Group (LD, DD, ADHD, ODD); TD</td>
<td>267</td>
<td>42</td>
<td>Parent: Post-natal Attachment Questionnaire</td>
</tr>
<tr>
<td>(Koren-Karie et al., 2009)</td>
<td>Total sample of ASD</td>
<td>45</td>
<td>49</td>
<td>Child: SSP</td>
</tr>
<tr>
<td>(Kyriakopoulos et al., 2015)</td>
<td>ASD with/without psychotic features</td>
<td>84</td>
<td>133</td>
<td>Clinical assessment of presence/absence of MCDD symptoms</td>
</tr>
<tr>
<td>(Marcus et al., 2009)</td>
<td>Total sample of ASD</td>
<td>45</td>
<td>49</td>
<td>Child: SSP</td>
</tr>
<tr>
<td>(Naber et al., 2008)</td>
<td>ASD; DD; Atypical Controls; TD</td>
<td>41</td>
<td>26</td>
<td>Child: SSP</td>
</tr>
<tr>
<td>(Naber et al., 2007)</td>
<td>ASD; DD</td>
<td>80</td>
<td>42</td>
<td>Child: SSP</td>
</tr>
<tr>
<td>(Naber et al., 2007)</td>
<td>ASD; DD; Atypical Controls; TD</td>
<td>78</td>
<td>26</td>
<td>Child: SSP</td>
</tr>
<tr>
<td>(Oppenheim et al., 2006)</td>
<td>Total sample of ASD</td>
<td>45</td>
<td>49</td>
<td>Child: SSP</td>
</tr>
<tr>
<td>(Oppenheim et al., 2012)</td>
<td>Total sample of ASD</td>
<td>45</td>
<td>49</td>
<td>Child: SSP</td>
</tr>
<tr>
<td>(Poslawsky et al., 2015)</td>
<td>Total sample of ASD with comparisons between intervention and control groups.</td>
<td>78</td>
<td>43</td>
<td>Parent: Parental Emotional Availability Scales (EAS)</td>
</tr>
<tr>
<td>(Rogers &amp; DiLalla, 1990)</td>
<td>Total sample of ASD with comparisons between AD &amp; PDD-NOS groups.</td>
<td>39</td>
<td>45</td>
<td>Child: SSP</td>
</tr>
<tr>
<td>(Rogers et al., 1991)</td>
<td>ASD; Non-ASD Clinical Group</td>
<td>60</td>
<td>48</td>
<td>Child: SSP</td>
</tr>
<tr>
<td>(Rogers et al., 1993)</td>
<td>Total sample of ASD</td>
<td>32</td>
<td>46</td>
<td>Child: SSP</td>
</tr>
<tr>
<td>(Rutgers et al., 2007)</td>
<td>ASD; DD</td>
<td>89</td>
<td>26</td>
<td>Child: Brief Attachment Screening Questionnaire</td>
</tr>
<tr>
<td>(Sadiq et al., 2012)</td>
<td>ASD (without ID); RAD and DSED; TD</td>
<td>126</td>
<td>78</td>
<td>Child: RAD Diagnosis</td>
</tr>
<tr>
<td>(Seskin et al., 2010)</td>
<td>Total sample of ASD</td>
<td>40</td>
<td>89</td>
<td>Parent: AAI, Functional Emotional Assessment Scale</td>
</tr>
<tr>
<td>(Shapiro et al., 1981)</td>
<td>ASD; DD</td>
<td>36</td>
<td>46</td>
<td>Child: SSP</td>
</tr>
<tr>
<td>(Mundy and Sigman, 1989)</td>
<td>ASD; DD</td>
<td>28</td>
<td>52</td>
<td>Child: SSP</td>
</tr>
<tr>
<td>(Sigman &amp; Ungerer, 1984)</td>
<td>ASD; DD</td>
<td>28</td>
<td>52</td>
<td>Child: SSP</td>
</tr>
<tr>
<td>(Siler et al., 2014)</td>
<td>Total sample of ASD with comparisons between intervention and control groups.</td>
<td>70</td>
<td>57</td>
<td>Child: Either Maternal Perceptions of Child Attachment or SPP</td>
</tr>
<tr>
<td>(Sotgiu et al., 2011)</td>
<td>ASD; TD; Cuban; Italian.</td>
<td>52</td>
<td>101</td>
<td>Child: Parent-Child Reunion Inventory</td>
</tr>
<tr>
<td>(van IJzendoorn et al., 2007)</td>
<td>ASD; DD</td>
<td>55</td>
<td>28</td>
<td>Child: SSP, Richters Security Scale</td>
</tr>
</tbody>
</table>
Table 1 (Continued)

<table>
<thead>
<tr>
<th>Authors</th>
<th>Comparison Groups</th>
<th>N</th>
<th>CA (months)</th>
<th>Attachment Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Willemse-Swinkels et al., 2000)</td>
<td>ASD; LD; TD</td>
<td>82</td>
<td>63</td>
<td>Child: SSP</td>
</tr>
</tbody>
</table>

2. Method

2.1. Search strategy

A systematic review was performed as per the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009). Two search strategies were implemented to identify relevant studies. First, a search of the literature was conducted through the research databases PsycInfo, OVID Medline, and the Cochrane Library, with the key terms “attachment” and “autism” in the title or abstract. Second, the reference lists of all articles selected for review were manually searched.

2.2. Inclusion and exclusion criteria

The inclusion and exclusion criteria were determined prior to implementing the search strategy. Articles were included in the review if: (i) the article was published in a peer-reviewed journal; (ii) at least 70% of the sample were children aged 12 or less; (iii) children were diagnosed with Autism Spectrum Disorder, Pervasive Developmental Disorder – Not Otherwise Specified (PDD-NOS), Autistic Disorder, or Asperger Syndrome; and (iv) the article reported statistical findings on attachment-related concepts in children with ASD. Articles were excluded if: (i) the article was not available in English, and; (ii) the article was identified as grey literature.

2.3. Study selection and data extraction

284 articles were identified through the search strategies. In total, 40 articles were identified, screened, and determined to be eligible for inclusion in the review (see Fig. 1). Articles reporting results on the same sample of children were included and are noted in the review. Data were extracted and summarised from the 40 articles relating to sample size, mean chronological age of participants, comparison groups used, attachment measure used, and study results (see Table 1).

2.4. Plan for analysis

A best evidence narrative review synthesis was chosen to ensure that the breadth of research investigating attachment in children with ASD would be captured. A meta-analysis was not appropriate given the range of research designs, samples, measures and research topics. Each article identified for inclusion was reviewed and the key findings and areas of focus were extracted. Through a process of synthesis and summary, seven research themes were identified: child characteristics, caregiving environment risk and protective factors, attachment security, disorders of attachment, correlates of attachment, the neurobiology of attachment, and attachment-based interventions. Results from articles were allocated to relevant research themes rather than allocating the entire article into a single theme.

3. Synthesis of results

3.1. Participants and measures

The 40 articles identified for review differed in the characteristics of the autism samples used, the characteristics of comparison groups used, and the measures used to assess both child and parental attachment. A summary is provided in Table 1. Sample sizes ranged from \( n = 15 \) to \( n = 479 \) (\( M = 83.05 \)). The mean age of children used across articles ranged from 26 months to 11.08 years (\( M = 63 \) months). The samples in six of the articles consisted solely of children without intellectual disabilities (IQ over 70). 22 articles investigated group-level differences, with comparison groups across the articles including typically developing children (\( n = 16 \)) and non-ASD clinical comparisons (\( n = 16 \)). Nineteen articles investigated individual differences within a total sample of children with ASD, with comparisons within ASD samples including differing ASD diagnoses, longitudinal within-ASD-sample designs, and between intervention and control groups of children with ASD.

Child attachment was measured across the articles using a variety of techniques, including observations of parent-child interactions, interviews with caregivers, self-report and caregiver-report questionnaires, and symbolic representations. The
Strange Situation Paradigm, the gold standard measure of child attachment, was employed in 22 of the 40 articles. Proxy measures of child attachment were commonly used, including measures assessing the perceptions of the quality of the relationship between the child and caregivers (e.g. the Inventory of Parent and Peer Attachment (n = 2) and the Maternal Perceptions of Child Attachment (n = 2)). Attachment security measures included both categorical classification techniques and continuous measures reporting high-low attachment security values. Future reviews could consider the suitability of these attachment measures for use in populations with ASD. The attachment status of caregivers was also assessed in five articles, with one article using the gold standard measure of adult attachment, the Adult Attachment Interview.

3.2. Child characteristics

The systematic review identified 17 articles reporting on child factors associated with attachment in children with ASD. Two predictors consistently identified in the literature are the severity of autism symptoms and developmental delay, whereby children with ASD and intellectual disability are more likely to present with insecure attachments than children with ASD without an intellectual disability. Greater severity of autism symptoms is consistently associated with lower attachment security (Naber et al., 2006; Rogers & DiLalla, 1990; Rutgers et al., 2007), poorer parent-child interaction (Beukens, Hobson, & Hobson, 2013), fewer pro-social responses to caregivers (Grzadzinski, Luyster, Spencer, & Lord, 2014; van Ijzendoorn et al., 2007), attachment disturbances (Kyriakopoulos et al., 2015), and lower cortisol responses to separation from caregivers (Naber et al., 2006).

Studies have considered what particular autistic trait/s can best predict insecure attachments. van Ijzendoorn et al. (2007) reported that less severe social impairments in (n = 55) toddlers with ASD predicted higher attachment security ratings using the Strange Situation Paradigm. These results are supported by Beukens et al. (2013), who informally note that the social-affect difficulties of children with ASD were associated with parent-child relatedness in an observed play interaction. Further, investigations into the comorbidity of ASD and psychotic symptoms in (n = 84) older children with ASD reported that participants without psychotic features were marginally more likely to present with disturbed or ambivalent attachments, as reported on the Multiple Complex Developmental Disorder (MCDD) Scale (Kyriakopoulos et al., 2015). This finding contradicts the research criteria for MCDD, requiring further research to determine the value of the disturbed attachment criterion in effectively discriminating children with MCDD from other children within the autism spectrum. Both van Ijzendoorn et al. (2007) and Kyriakopoulos et al. (2015) report different attachment quality between children with ASD when looking at particular symptoms of autism, highlighting a promising line for future research.

As well as the severity of autism symptoms, developmental delay is consistently identified as a risk factor for insecure attachment. Rogers, Ozonoff, and Maslin-Cole (1991) demonstrated an association between higher security scores and higher cognitive, language and gross motor levels in (n = 60) preschoolers with ASD. Further, a series of studies conducted on (n = 45) Israeli preschoolers with ASD reported that all of the children classified as insecure/disorganised also had an intellectual disability (Dolev, Oppenheim, Koren-Karie, & Yirmiya, 2014; Koren-Karie, Oppenheim, Dolev, & Yirmiya, 2009; Marcu, Oppenheim, Koren-Karie, Dolev, & Yirmiya, 2009; Oppenheim, Koren-Karie, Dolev, & Yirmiya, 2012). Rutgers et al.’s (2004) meta-analysis found that children with ASD demonstrated significantly less attachment security than their respective comparison group only when they also presented with more developmental delay. The lack of a significant difference between children with ASD without intellectual disability and typically developing children has since been reported in studies by Chandler and Dissanyake (2013) and Bauminger, Solomon, & Rogers (2010a). Further, associations between developmental delay and disorganised attachment are reported. Naber et al. (2006) compared attachment security in toddlers with ASD and a non-ASD comparison group consisting of typically developing toddlers, toddlers with language development disorder, and toddlers with developmental delay. More developmental delay increased the chances of disorganised attachment across groups.

The association between both developmental delay and attachment quality as well as the severity of autism symptoms and attachment quality raises questions of whether cognitive impairment or autism affects the attachment process. While earlier studies reported that developmental delay was a stronger predictor of insecure attachment than the severity of autism symptoms (e.g. Bauminger-Zvieli & Kugelmass, 2013; Rogers et al., 1993; Rutgers et al., 2004), results from recent studies are more mixed. Rutgers et al. (2007) investigated attachment security in a sample of (n = 89) toddlers with ASD, intellectual disability, and/or language delay, and typically developing children. They found that the presence of autism was a stronger predictor of low attachment security than an intellectual disability. Naber et al. (2006) compared attachment security in toddlers with ASD and a non-ASD comparison group consisting of typically developing toddlers, toddlers with language development disorder, and toddlers with intellectual disability. Greater severity of autism symptoms predicted less attachment security, even after differences in children’s developmental level were controlled for. Further, greater severity of autism symptoms significantly predicted lower cortisol responses to separation after controlling for developmental level and basal cortisol.

In sum, children with greater severity of autism symptoms and developmental delay are likely to demonstrate less secure attachments. Children with severe impairments in reciprocal social interactions may be slower to develop secure attachments, with children without intellectual disability able to employ cognitive strategies to compensate for social deficits (Dissanayake & Sigman, 2000; Rogers, Ozonoff, & Maslin-Cole, 1991; Rogers et al., 1993; Rutgers et al., 2004). A key debate in the literature investigating attachment in children with ASD is whether the severity of autism symptoms is a stronger risk factor than developmental delay for the development of insecure attachment. There is a lack of consensus on
the extent to which attachment insecurity is a function of either developmental delay or the severity of autism symptoms. Most studies investigate associations between attachment security and severity of autism symptoms or developmental delay, leaving scope for future work to consider such associations with disorganised or disordered attachment.

3.3. Caregiving environment

Attachment theory emphasises the impact of the caregiving environment on the infant’s neurobiological development. Caregivers’ accessibility, responsivity, and sensitivity to children’s emotional signals shape the quality of the child’s attachment. The sensitivity–security hypothesis predicts that prompt and appropriate caregiver responses to the needs of the child will lead to more secure child attachments (Ainsworth, Bell, & Stayton, 1971; Ainsworth, Bell, & Stayton, 1974). In addition, caregivers’ own internal working models developed from their early childhood attachment experiences shape their caregiving practices with their children. An inter-generational transmission of attachment patterns is predicted to occur from caregivers to children. Mechanisms for this transmission focus on caregivers’ ability to focus on both their own and their child’s subjective experiences, such as in mind-minded and reflective parenting (Fonagy et al., 1991; Meins, 1999; Slade, Grienenberger, Bernbach, Levy, & Locker, 2005). Importantly, the child-caregiver relationship is considered a bidirectional transaction – child behaviours influence parent behaviours, and vice versa (Sameroff, 2009). The difficulties in social-communication experienced by children with ASD may pose a challenge for caregivers to tune-in to their child’s subjective state, and for children themselves to understand and predict their caregiver’s behaviour (Cortina & Liotti, 2010; Stern, 2004). Thus, children with ASD may be at greater risk for attachment insecurity than typically developing children.

The systematic review identified five articles investigating the sensitivity-security hypothesis in children with ASD, one article investigating parents’ own internal working models of attachment, two articles investigating the parent-child relationship more broadly, one article investigating factors contributing to parents’ perceptions of child attachment, and two articles investigating cultural differences in attachment, which are reviewed below. Early conceptualisations of the origins of autism emphasised the role of the caregiving environment, particularly concerning a perceived neglect of the child’s emotional needs from cold, distant caregivers (Bettelheim, 1959; Bowlby, 1973; Kanner, 1943). Our understanding of the underlying causes of autism has since shifted toward biological models. Research investigating the caregiving environment of children with ASD has described the difficulties of parenting a child with ASD. Caregivers of children with ASD report significant difficulties beyond caregivers of typically developing children or children with other developmental disabilities, including higher caregiver stress levels and greater risk of caregiver mental health concerns (Hastings et al., 2005; Yirmiya & Shaked, 2005).

Two studies were identified that investigated parent sensitivity to children with ASD, highlighting that parents are sensitive to their child’s needs. van Ijzendoorn et al. (2007) compared the sensitivity of (n = 55) mothers of toddlers with ASD, non-ASD intellectual disability, language disorder, or typical development. Higher parental sensitivity predicted increased attachment security in all groups but the children with ASD group, where no association was found. No differences in parent sensitivity were found between toddler groups; however, toddlers with ASD showed more attachment disorganization. Disorganised behaviours are typically associated with anxiety about the availability of caregivers, as well as inconsistent and unpredictable parental behaviour. Children with ASD and other developmental disabilities are more at risk for such caregiving behaviours than typically developing children, with reports from community mental health settings finding that one in five children with ASD had experienced physical abuse and one in six had experienced sexual abuse (Janssen, Schuengel, & Stolk, 2002; Mandell, Walrath, Manteuffel, Sgro, & Pinto-Martin, 2005). However, many disorganised behaviours may potentially have a neurological basis, posing difficulties in disentangling symptoms of autism from attachment behaviours (van Ijzendoorn, Schuengel, & Bakermans-Kranenburg, 1999).

A group of articles was identified relating to a project investigating the relationship between maternal sensitivity, maternal insightfulness – the ability of caregivers to appreciate the child’s perspective – and child attachment in a sample of (n = 45) pre-schoolers with ASD (Dolev et al., 2014; Koren-Karie et al., 2009; Oppenheimer et al., 2009; Oppenheimer et al., 2012). Mothers of securely attached (B) children had higher sensitivity scores than mothers of children with either organised or disorganised insecure attachments (A, C, or D). Higher levels of children’s responsiveness are associated with significantly increased mothers’ sensitivity. Mothers who were insightful and resolved on their child’s diagnosis were more likely to have securely attached children than mothers who were neither insightful nor resolved. Mothers classified as both insightful and resolved were more likely to have children classified as secure (83%), whereas mothers classified as neither insightful nor resolved or mixed were more likely to have children classified as insecure (70% and 80%, respectively). Maternal sensitivity was found to mediate the association between maternal insightfulness/resolution and child attachment in children with ASD. Combined, these studies point toward the concept of caregivers’ reflective capacity – mothers with a greater capacity to understand and accept their child’s inner world and disorder were more likely to be sensitive in interactions, resulting in secure attachments.

The systematic review identified one study that investigated the internal working model of caregivers of children with ASD. Seskin et al. (2010) investigated parents’ internal working models, assessed using the Adult Attachment Interview (AAI), and the quality of relational and functional behaviours in 40 parent-child with ASD dyads. Child relational and functional behaviour was improved in dyads where the parent demonstrated secure attachment representations compared to parents with insecure attachment representations, including an ability to initiate and respond in two-way, purposeful communication, behavioural organization, problem-solving, and internalization, and representational capacity. Future
studies could consider the reflective capacity of parents of children with ASD, which may assist in our understanding of the intergenerational transmission of attachment as well as the deficits in mentalising observed in children with ASD.

Two articles were identified that investigated caregivers’ parenting and the parent-child relationship. Beurkens et al. (2013) evaluated the relationship and relatedness of \( n = 25 \) children with ASD and their caregivers. Parents reported relationship difficulties with their child, including difficulties engaging and communicating with their child, and low levels of involvement with their child. Further, parent-child relatedness was observed to be significantly lower than a secure, typically-developing sample in a play interaction, with similarities drawn between the ASD sample and a typically-developing disorganised sample. Falk, Norris, & Quinn (2014) also explored the parent-child relationship within an ASD sample \( n = 479 \) using a subset of the PCRI — the same measure used by Beurkens et al. (2013). Parents in the Falk et al. (2014) study reported lower rates of limit-setting ability, satisfaction with parenting, and perceived parental involvement with their child than parents in Beurkens et al. (2013). These parent-child relationship factors were then examined for their contribution to parents’ mental health, which is discussed in Correlates below.

One article was identified that investigated factors contributing to parents’ perceptions of their child’s attachment. Goodman and Glenwick (2012) investigated factors contributing to parents’ perceptions of their child’s attachment in a sample of \( n = 86 \) families of pre-schoolers with ASD. Fathers’ perceptions of child attachment were negatively correlated with child’s age and parenting stress, and positively associated with parents’ own affective attachment. Interestingly, these factors were not significant for mothers, although a negative correlation between parenting stress and perceived child attachment was nearing significance. Both parents reported a significant correlation between their own affective attachment to their child and parenting stress, perceptions of child’s level of functional impairment, and parenting sense of competence.

Finally, two studies investigating cultural differences in the attachment security of children with ASD were identified in this review. Bauminger, Solomon, and Rogers (2010b) investigated the impact of culture on the attachment security of children with autism without intellectual disability in middle-childhood, comparing U.S. and Israeli samples. A cultural effect was reported with higher attachment security in the US Sample than the Israel sample. Further, no differences were found between the autism without intellectual disability and typical development groups within either nationality. These findings are contrasted by comparisons between Italian and Cuban samples (Sotgiu et al., 2011). Sotgiu et al. (2011) compared the attachment security of children with mixed-ability ASD and typically developing children in Italy and Cuba. Children with ASD in both countries had lower attachment security scores and higher insecure attachment scores than the typically developing comparison group. No differences were found between cultural groups. Combined, these studies suggest that the observations of attachment in Western children with ASD are consistent cross-culturally; children with ASD demonstrate lower levels of attachment security than typically developing children except where children with ASD do not also have an intellectual disability. Further, the higher rates of attachment insecurity in Israeli children than U.S. children is consistent with the wider attachment literature, highlighting the contextual determinants expectant in an evolutionary system (Van Ijzendoorn & Sagi-Schwartz, 2008; van Ijzendoorn & Kroonenberg, 1988).

In sum, parents of children with ASD appear to be as sensitive as parents of children without ASD; however, reports of the association between attachment security and parent sensitivity are mixed. Maternal sensitivity appears to mediate the relationship between attachment security and maternal insightfulness in parent-child with ASD dyads. Cultural differences in the attachment security of children with ASD are reported between U.S. and Israeli samples, but not between Italian and Cuban samples. Further, it appears that parents’ internal working models of attachment impact children with ASD’s relational and functional behaviours, similarly to that reported in typically developing samples. More studies are required to clarify whether parent sensitivity is associated with children’s attachment, and what factors may contribute to parents’ own affective attachment.

### 3.4. Attachment security

The presence and quality of attachment in children with ASD may provide evidence for differing theoretical models of autism, as detailed in Rogers et al. (1993). Models that conceptualise autism as a global social/emotional deficit (e.g. Cohen, Paul, & Volkmar, 1987) predict that children with ASD are incapable of forming selective, secure attachments to caregivers. Alternatively, models that argue that autism is a biological disorder of the attention and arousal system (e.g. Dawson & Lewy, 1989) would lead to predictions of a clear preference for caregivers simply due to their familiarity. This attachment is likely to be insecure due to the child finding social interactions overstimulating. Finally, some models conceptualise autism as a set of specific social deficits, resulting in some children having difficulties inferring other people’s internal states (Baron-Cohen, 1989; Happé & Booth, 2008; Mundy & Sigman, 1989). The difficulties in intersubjectivity experienced by children with ASD compromise the child’s ability to understand, predict, and control a caregiver’s behaviour. This in turn affects their trust in the availability and responsiveness of caregivers and thus quality of their attachment (see Cortina & Liotti, 2010; Stern, 2004). These models argue that secure attachments can form; however they will develop more slowly and will be expressed by unique behavioural patterns (Rogers et al., 1993).

The systematic review identified 20 articles reporting on the comfort-seeking and exploratory behaviours of children with ASD. Reports of the rates of attachment classifications in children demonstrate that most children with ASD form secure, organised attachments to their caregivers. Organised attachment describes patterns in how children adapt their comfort-seeking and exploratory behaviours depending on what they may reliably expect from their caregiver. Organised
attachment strategies include secure, insecure-avoidant, and insecure-resistant, with securely attached children exhibiting a balance of both comfort-seeking and exploratory behaviours (Ainsworth et al., 1978).

Rates of secure attachments in children with ASD ranged from 40% to 63%, compared with 60% in the typically developing literature (Ainsworth et al., 1978; Willemsen-Swinkels, Bakermans-Kranenburg, Buitelaar, van Ijzendoorn, & van Engeland, 2000). An earlier systematic review by Rutgers et al. (2004) identified four samples that assessed attachment security in children with ASD using the Strange Situation paradigm, with most children categorised as secure (53%, n = 72). This review provides an update on this estimate, with 47% of children categorised as secure (n = 186) within seven samples of children with ASD that assessed and reported attachment security classifications using the Strange Situation paradigm (Capps, Sigman, & Mundy, 1994; Naber et al., 2008; Oppenheim et al., 2012; Rogers et al., 1993; Shapiro, Sherman, Calamari, & Koch, 1987; Willemsen-Swinkels et al., 2000; van Ijzendoorn et al., 2007). However the quality of their attachment appears to differ from other children, including more contact resistance and less contact-seeking behaviours (Rogers et al., 1993); fewer pro-social responses to caregivers (Grzadzinski et al., 2014); and deficits in social interaction (e.g. show, give, mutual play) (Akdemir, Pehlivan土耳其, Ünal, & Özusta, 2009; Dissnayake & Crossley, 1997, 1996). Reports on the proportion of ASD samples with insecure attachments ranged from 14 to 60%. Articles that compared the attachment security between groups of children consistently reported lower rates of attachment security in autism samples than both typically developing children and children with other developmental disabilities (Grzadzinski et al., 2014; Naber et al., 2007; Rutgers et al., 2007; Sotgiu et al., 2011). These articles contradict earlier reports of no differences in attachment security between children with ASD and matched clinical comparisons (e.g. Rogers et al., 1991).

As well as lower rates of attachment security and higher rates of insecure attachments than typically developing children, children with ASD also demonstrated higher rates of disorganised attachment. The distinction between disorganised attachment and clinically disturbed attachments, discussed in the following section, remains muddled due to the lack of an overlap between the frames of reference of attachment theory and the clinical approach to disorders of attachment (Newman & Mares, 2007). Disorganised attachment is reported in 15% of typically developing cases (van Ijzendoorn et al., 1999). A series of studies investigating attachment in children with ASD in Israel classified 22.2% of their (n = 39) ASD sample as insecure/disorganised. van Ijzendoorn et al. (2007) investigated maternal sensitivity and attachment in mother-child dyads of toddlers with ASD, non-ASD intellectual disability, language disorder, and typically developing toddlers. Children with ASD demonstrated more attachment organisation and less child involvement. While the prevalence of disorganised behaviours in children with ASD is concerning, there is evidence of an increase in the likelihood of disorganized behaviours in children with neurodevelopmental disorders, raising questions about the validity of assessment techniques used in atypical samples (van Ijzendoorn et al., 1999; van Ijzendoorn et al., 2007).

In sum, there is considerable evidence that children with ASD are capable of forming secure, selective attachment relationships with caregivers. This systematic review found further support for Rutgers et al.'s (2004) findings of approximately 50% of children with ASD demonstrating secure attachments, and significantly lower attachment security in children with ASD than their non-ASD counterparts. The review also demonstrates mixed reports on any differences in attachment security rates in children with ASD compared with clinical comparisons, with a substantial body of new research finding lower rates of attachment security in children with ASD. Future studies should aim to include a comparison group, with a gap in the literature particularly surrounding disorganised attachment in children with ASD.

3.5. Disorders of attachment and ASD

Beyond descriptive classifications of attachment behaviour, children can present with patterns of attachment that are persistent and clinically disturbed, known as disorders of attachment (Boris & Zeanah, 1999; Lieberman & Zeanah, 1995). Reactive Attachment Disorder (RAD) and Disinhibited Social Engagement Disorder (DSED) are attachment disorders whereby the child does not appear to have a selective bond with their caregiver, exhibiting either an inhibited (RAD) or disinhibited (DSED) attachment disturbance (American Psychiatric Association, 2013). Importantly, disorders of attachment require a history of significant neglect or maltreatment to meet diagnostic criteria. Along with disorders of non-attachment, the clinical attachment literature also explores disturbances in the attachment relationship between a child and their discriminant attachment figure, known as secure-base distortions. This perspective of relationship-specific psychopathology is controversial, with the traditional psychiatric model restricting disorders to within-the-child. These relational disorders of attachment have a limited evidence-base due to difficulties in the development of an appropriate measure, rather than a lack of clinical reports or theoretical validity (Newman & Mares, 2007).

The similar social impairment of both autism and disorders of attachment has sparked debate over whether these conditions are related, or are simply different disorders with similar symptoms (Bailey, Phillips, & Rutter, 1996; Baron-Cohen, 2002; Green, 2003). Children with ASD are restricted from co-morbid diagnoses with RAD or DSED due to difficulties in untangling the aetiology of the disordered attachment behaviours demonstrated (American Psychiatric Association, 2013). Children with ASD are at heightened risk of exposure to disruptions in attachment relationships, abuse and neglect, adding further difficulty in distinguishing the underlying cause of disturbed attachment behaviour (Mandell et al., 2005; Schuengel, Schipper, Sterkenburg, & Kef, 2013; van Ijzendoorn et al., 1999).

Three studies were identified by the systematic review that attempted to distinguish symptoms of autism and disturbed attachment behaviours. Sadiq et al. (2012) investigated differences in the pragmatic language skills between (n = 126) school-age children with RAD, ASD (without intellectual disability), or typical development. Significant impairments in
social communication were found in both children with RAD and children with ASD, with each group having distinct profiles with similar degrees of impairment. Children with RAD were significantly more likely than children with ASD to be in the clinical range for some aspects of pragmatic language and social functioning, including the use of language appropriate for the social context, volunteering information or starting up conversations, and popularity with other children. A significant minority (40%) of children with RAD met parent-report ADI-R criteria, however after expert clinician assessments, only one child was suspected of both ASD and RAD.

Giltaij, Sterkenburg, and Schuengel (2015) assessed for DSM-IV attachment disorders and autism in a sample (n = 102) of children with mild intellectual disability presenting at a clinic for a mental health assessment. No significant association was found between inhibited or disinhibited attachment disturbances and ASD. Further, no associations were found between inhibited attachment disturbances and ASD classifications, nor between disinhibited attachment disturbances and ASD classifications. Finally, Davidson et al. (2015) examined the usefulness of different measurement techniques in distinguishing ASD and inhibited or disinhibited attachment disturbances. They assessed (n = 115) school-aged children with ASD or RAD/DSED using a parent interview, a teacher-report questionnaire, and structured observation. The parent report measure identified significantly less indiscriminate friendliness in children with ASD than the RAD/DSED group. 36 children with ASD appeared to meet RAD/DSED criteria, however structured observation dismissed a RAD/DSED diagnosis for all but one child.

In sum, RAD, DSED, and ASD appear to have distinct behavioural phenotypes, however evidence of an overlap between autism and disorders of attachment was also reported. With only three studies identified by the systematic review, further research is required to document attachment disturbances in children with ASD and develop effective tools to distinguish between RAD/DSED and ASD behaviours.

3.6. Correlates

3.6.1. Behaviour and emotional problems

A substantial body of literature investigating attachment in typically developing children demonstrates that children with insecure or disorganised attachment are at increased risk of behaviour and emotional problems, including anxiety disorders, disruptive behaviour disorders, dissociative disorders, substance use, and delinquency (Clegg & Sheard, 2002; Fearon, Bakermans-Kranenburg, Van Ijzendoorn, Lapsley, & Roisman, 2010; Zeanah & Smyke, 2008). Associations between attachment and behaviour and emotional problems are pertinent to research and clinical practice with children with ASD. Children with ASD report significantly higher levels of behaviour and emotional problems than both typically developing children and children with other developmental disabilities (Breteron, Tonge, & Einfeld, 2006; Einfeld et al., 2008; McCarthy et al., 2010). Given the evidence for the association between attachment and behaviour and emotional problems in typically developing children, it is important to investigate the role of attachment in children with ASD.

The systematic review identified one article investigating associations between attachment and behaviour and emotional problems in children with ASD. Bauminger, Solomon, and Rogers (2010a) compared associations between child-parent relationship variables and behaviour and emotional problems in a sample of 8–12-year-olds with ASD (without intellectual disability) against a matched typically-developing group. The study involved children recruited from both the U.S. and Israel, allowing for cross-cultural comparisons. Children with ASD demonstrated significantly more behaviour and emotional problems than typically developing children, with children from the U.S. reporting more behaviour and emotional problems than children from Israel. Surprisingly, neither security of attachment nor quality of parent-child relationships contributed significantly to the variance in behaviour and emotional problems, with parenting stress emerging as the most important predictor.

In sum, very little research has investigated the relationship between attachment and behaviour and emotional problems in children with ASD. This gap in the literature persists despite over 20 years of theoretical papers outlining a rationale for such research (Huebner & Thomas, 1995; Janssen et al., 2002; Silber, 1989; van Ijzendoorn, Goldberg, Kroonenberg, & Frenkel, 1992). Children with ASD are identified as having substantial levels of both behaviour and emotional problems and attachment difficulties, providing a strong rationale for inquiry. The clinical application of any association between attachment and behaviour and emotional problems is yet to be investigated, with implications for family life, schooling, clinical outcomes of treatment, and wellbeing into adulthood.

3.6.2. Social and cognitive development

The systematic review identified six articles investigating associations between the attachment of children with ASD to caregivers and their social and cognitive development. Two studies investigated play behaviours and attachment in children with ASD, and one study investigated joint attention and attachment. Associations between joint attention, play behaviours, and attachment are pertinent research objectives for understanding the social impairments of autism. Children with ASD have known deficits in joint attention, symbolic play behaviours, and other skills necessary for effective interaction with another person. Differences in attachment quality may affect the ability of children with ASD to engage in the social aspects of play. Investigating the underlying psychological and biological deficits may improve our understanding of the social impairments of autism and the developmental trajectory of the disorder (Mundy, Sullivan, & Mastergeorge, 2009; Sivaratnam, Newman, Tonge, & Rinehart, 2015).

Associations between attachment and play behaviours have been investigated in children with ASD. Marcu, Oppenheim, Koren-Karie, Dolev, and Yirimiya (2009) investigated symbolic play in (n = 45) preschoolers with ASD. The Strange Situation
Paradigm was employed to categorise children’s attachment as either organised or disorganised. Children with organized attachment showed significantly higher frequency, duration, diversity and complexity of symbolic play compared to children with disorganized attachment. Further, Naber et al. (2008) investigated manipulative, functional and symbolic play in young children with ASD, with comparison groups of non-ASD developmental disability, atypical controls, and typically developing children. For all groups, children with a secure attachment demonstrated higher levels of play and more time spent in symbolic play than children without a secure attachment. Children with ASD with a secure attachment demonstrated higher levels of play and spent more time actually playing than children with ASD without a secure attachment, even after controlling for differences in age and developmental level. Children with ASD with disorganized attachment demonstrated lower levels of playing and spent less time playing than children with ASD without disorganized attachment, even after controlling for differences in age and developmental level.

Naber, Swinkels, Buitelaar, Dietz, et al. (2007) investigated the association between basic and associated joint attention and attachment in toddlers with ASD, non-ASD developmental disability, and typical development. Basic joint attention refers to the initial joint attention behaviours expressed between 6 and 12 months of age in typically developing children, such as pointing out objects to others and checking others’ gaze direction toward objects. Associated joint attention behaviours emerge as joint attention skills develop, including showing, taking, and giving objects and responding to names (Charman, 2003; Mundy, Sigman, & Kasari, 1990). For all children, secure attachments were associated with improved basic and associated joint attention compared with insecure or disorganised attachments. Children with organised attachments also demonstrated improved basic and associated joint attention. For children with ASD specifically, contrast analyses revealed significant differences for disorganised attachment only – children with disorganised attachment displayed less basic joint attention than children with ASD and organised attachment. Regression analyses revealed that attachment security and attachment disorganisation did not contribute significantly to the variance in joint attention behaviour. Instead, higher developmental level and fewer symptoms of autism were responsible for most of the variance.

Two studies were identified that investigated associations between attachment and social development in children with ASD. Bauminger et al. (2010) explored the attachment security and mother-child relationship qualities of children with ASD (without intellectual disability), and their associations with children’s friendship qualities. Mother-child relationship qualities such as trust, communication, and anger/alienation, were found to contribute uniquely to better peer friendship qualities, while attachment security did not. Finally, Bauminger-Zvieli and Kugelmass (2013) investigated jealousy and attachment security in children with ASD (without intellectual disability), compared to a matched group of typically developing children. Typically developing children demonstrated more attachment security than children with ASD. No differences were found between groups in expression of jealousy. A significant negative correlation was found for attachment and jealousy behaviours in the ASD group, including eye gaze and verbalization.

In addition, one study was identified that investigated the educational outcomes of children with ASD. The predictive capacity of early child attachment and maternal insightfulness was examined in the educational placement of (n = 39) children with ASD (Dolev et al., 2014). Regression analyses revealed that children’s IQ and interactive competence scores together explained 20% of the variance of children’s inclusion placement in middle childhood, and 31% of the variance in children’s inclusion placement in early adolescence. Further, children’s attachment and maternal insightfulness together explained an additional 34% of the variance of children’s inclusion placement in middle childhood, and 16% of the variance in children’s inclusion placement in early adolescence.

In sum, secure attachments appear to act as a protective factor in the social and cognitive development of children with ASD. Children with ASD demonstrate more complex play behaviours and joint attention when concurrently demonstrating secure attachment. Secure attachment is also associated with improved social skills, such as more friends and less jealousy. Finally, the educational opportunities and outcomes of children with ASD appear to improve when children have developed secure attachments. These findings are consistent with observations from the typically developing literature and with predictions from attachment theory. Further research is required to determine the significance of attachment in contributing uniquely to these social and cognitive developments.

3.6.3. Parent mental health

The systematic review identified one article that investigated correlates between child attachment and parent mental health. Falk, Norris, and Quinn (2014) investigated predictive models of parenting stress, anxiety and depression in (n = 479) parents of children with ASD. Perceived limit setting ability, an attachment construct of the Parent-Child Relationship Inventory, contributed significantly to the stress, anxiety and depression of both mothers and fathers, contributing to five of the six regression models significantly. Falk et al. (2014) highlight the need for interventions addressing the mental health of caregivers of children with ASD to consider factors beyond children’s autism symptom severity or behaviour problems. Further, the difficulties in untangling the direction of the relationships between variables needs to be addressed in future work.

3.7. Neurobiology

Investigations of the neurobiology of attachment in children with ASD are rising in popularity, with an expectation that such studies could provide insight into the neurological underpinnings of autism and attachment alike. The social deficits of children with ASD make an interesting natural comparison group when investigating the neurobiology of attachment. However, caution must be exercised in assuming that the presence of autism inherently negates secure attachment,
requiring careful consideration of study design (Gallese, 2007; Gernsbacher et al., 2005). Almost a quarter (24.3%) of all articles identified through the search strategies centred on the neurobiology of attachment in autism, however only 2 articles met the eligibility criteria for inclusion in the review. A limitation of articles screened during the systematic review, and ultimately excluded from the synthesis, was the failure to meet inclusion criteria (ii), (iii) and (iv). Most studies did not utilise human participants, let alone a sample of children with ASD (criteria ii and iii), and of the those that did only two reported statistical findings relevant to attachment in autism (criteria iv).

The two studies that were identified by the systematic review are discussed below. Both investigated hormonal pathways associated with attachment in children with ASD. Naber et al. (2006) investigated patterns in the stress hormone cortisol during a Strange Situation Paradigm with children with ASD, compared against a sample (n = 80) of children with non-ASD intellectual disability, language development disorder, or typical development. They found that greater autism symptom severity was associated with lower attachment security and lower cortisol responses to separation after controlling for developmental level and basal cortisol. Feldman, Golan, Hirschler-Guttenberg, Ostfeld-Etzion, and Zagoory-Sharon (2014) compared baseline oxytocin of pre-schoolers (n = 80) with ASD (without intellectual disability) against typically developing pre-schoolers during a controlled parent-child interaction. Children with ASD showed lower baseline oxytocin levels than the typically developing group. Over the course of interactions with parents, the oxytocin levels of children with ASD improved to levels comparable of typically developing children, however within 15 min of parent-child interaction finishing salivary oxytocin levels significantly declined.

In sum, children with ASD appear to present with lower cortisol and oxytocin levels than their peers, however an increase in stress is recorded during separation-from-caregiver episodes. There is substantial scope for future research to investigate the neurobiology of attachment in children with ASD. Current studies are considering the roles of hormones in distinguishing the attachment difficulties children with ASD from other children, including oxytocin, cortisol, and arginine vasopressin. Such studies should employ a robust research design, including the use of human participants and measures of child attachment, where possible.

3.8. Interventions

Attachment-based interventions for children with ASD are emerging as a tool to improve the emotional bond between parents and children. Such improvements are theorised to also improve the child’s emotion regulation, cognitive ability, and other social-emotional development. Beurkens, Hobson and Hobson (2013) emphasise the transactional nature of parent-child interaction by highlighting the success of interventions targeting the interactive behaviours of parents of children with ASD across a range of factors, such as children’s behaviour and emotional problems (e.g. Whittingham, Sofronoff, Sheffield, & Sanders, 2009), joint attention (e.g. Aldred, Green, & Adams, 2004), and emotion regulation (e.g. Gulsrud, Jahromi, & Kasari, 2010). Such interventions were not included in this review unless the paper directly assessed child attachment.

The systematic review identified two studies evaluating interventions aimed at improving child attachment. Siller, Swanson, Gerber, Hutman, and Sigman (2014) conducted a randomised clinical trial evaluating a parent-based intervention, Focused Playtime Intervention, to increase attachment-related behaviours in children with ASD and limited/no use of spoken language. Experimental group parents’ perceptions of child attachment increased over the course of the intervention, while the control group found no differences. Further differences between groups were found for improvements in avoidant behaviour and proximity-seeking behaviour – however, these differences were likely due to worsened behaviour in the control group rather than improvements in the experimental group.

Poslansky et al. (2015) assessed an attachment-based video intervention to promote positive parenting in a randomised clinical trial. After the intervention, the parents who received the Video-feedback Intervention to promote Positive Parenting adapted to Autism (VIPP-AUTI) program showed decreased intrusiveness, whereas intrusiveness increased in the control group. Parental sensitivity and parental structuring did not show significant intervention effects. Parents in the VIPP-AUTI group showed an increase in their feelings of competence after the intervention, which was not evident in the control group. No interaction effect between time and group was found for parental sensitivity, parental structuring, daily hassles, child responsiveness, or child involvement.

In sum, preliminary investigations attempting to improve child attachment in children with ASD demonstrate mixed results. Parent behaviours appear to improve, however results on improvements in child secure-base and safe-haven behaviours are inconclusive. Future research is required in developing and testing attachment-based interventions. Studies could investigate the role of attachment as a moderating factor in other interventions for children with ASD, such as those addressing child behaviour and emotional problems. Many of the studies discussed previously in this review have ready applications for the development of attachment-based interventions. These could include targeting the sensitivity-security link in children with ASD and improving known social-communicative deficits in children with ASD that also impact the attachment system (e.g. joint attention).

4. Summary and future directions

In summary, attachment in children with ASD appears to serve the same important functions as identified in the typically developing literature, including safety when distressed and a secure-base when exploring. A substantial number of children with ASD are able to form secure attachments to caregivers, with 47% of children with ASD classified as secure using the
Strange Situation procedure \((n = 186)\). The severity of autism symptoms and developmental delay are both associated with less secure attachments, however the extent to which each of these factors impact attachment quality is yet to be confirmed. The influence of caregivers’ own internal working models is demonstrated on children’s relational and functional behaviours; however the expected association between caregiver sensitivity and child security has mixed results. Evidence for improved outcomes for children with ASD with secure attachments is emerging, including improved joint attention, play behaviours, and educational outcomes. Neurobiological studies of attachment in children with ASD demonstrate that children experience significant increases in cortisol during stressful separation episodes and increases in oxytocin during interactions with caregivers, despite reporting lower levels of both hormones than typically developing children at baseline.

The research reviewed provides some insight into the underlying challenges to the attachment system faced by children with ASD. The combination of evidence demonstrating equally sensitive caregiving but higher rates of insecure attachment behaviour compared with the typically developing literature suggests a challenge in the formation of the child’s internal working model. The difficulties of children with ASD in interpersonal relatedness may pose a challenge to children and caregivers alike in understanding each other’s needs and intentions (Cortina & Liotti, 2010; Stern, 2004). Children without developmental delay or with less severe symptoms of autism may be able to overcome their attachment-related social difficulties using cognitive strategies, resulting in more secure attachments (Dissanayake & Sigman, 2000; Rogers et al., 1991, 1993; Rutgers et al., 2004). Further, caregivers themselves may have their own difficulties in reflective capacity that disrupts the transmission of attachment representations.

The literature highlights unresolved questions for future research to address. Further work is required to determine what constellations of both child and caregiving environment factors act as risk and protective factors in the development of attachment in children with ASD. Mixed findings on the importance of the severity of autism symptoms and developmental delay require further investigation, along with studies investigating specific autism symptoms. Research should aim to include more children with mixed cognitive ability, as the research is currently biased towards children without intellectual disability. Caregiving environment factors including family social support, parent mental health, caregiving history, and cultural factors should also be considered. The sensitivity-security hypothesis of attachment theory needs further investigation, with the systematic review identifying opposing reports of the association between parent sensitivity and attachment security in children with ASD. The lack of clarity surrounding the sensitivity-security hypothesis in children with ASD has implications for the design of attachment-based interventions.

A notable gap in the literature is studies investigating correlates of attachment in children with ASD, and the role of attachment as a risk and protective factor. While the association between attachment and behaviour and emotional problems is well established in typically developing children, very little research has investigated this relationship in children with ASD. This is surprising given the higher rates of behaviour and emotional problems and attachment difficulties in children with ASD. A significant gap in the literature is longitudinal studies investigating the impact of childhood attachment in children with ASD across the lifespan, including educational outcomes, mental health, and adult relationships.

Finally, the clinical application of attachment theory in children with ASD requires further investigation. Further work is needed to distinguish the differences between attachment disorders and autism, as well as descriptions of how attachment disorders present in children with ASD. Evidence for or against secure-base distortions in children with ASD is also yet to be reported. Attachment-based therapies to date have demonstrated mixed success, perhaps due to the lack of consensus on the nature of attachment in children with ASD and their caregivers. Parent-based interventions targeting children with ASD should consider both child and parents’ own attachment to optimise effectiveness.

To conclude, attachment research in children with ASD is demonstrating exciting advances in the field, particularly over the last decade. Overall, there is a consensus that children with ASD are capable of forming secure attachment relationships with caregivers. However significantly fewer children with ASD form secure attachments than typically developing children or children with non-ASD developmental disabilities. The literature has a general bias towards children with ASD without intellectual disability, which may be problematic given the attachment differences observed for severity of autism symptoms and developmental level.

References


