

Parents of Children with ASD Experience More Psychological Distress, Parenting Stress, and Attachment-Related Anxiety

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Abstract There has been limited study of the relationship between child attachment and caregiver wellbeing amongst children with autism spectrum disorder (ASD). This study examined self-reported child attachment quality alongside caregivers' report of their own psychological distress, parenting stress and attachment style, amongst 24 children with high-functioning autism or Asperger's disorder (ASD; aged 7–14 years) and 24 typically developing children (aged 7–12 years), and their primary caregiver. Children with ASD were no less secure, but their caregivers were more stressed and reported more attachment-related anxiety, compared to typically developing dyads. Child attachment security was related to caregiver psychological distress and attachment style, but only amongst typically developing children. Impacts of emotion processing impairments on caregiver-child relationships in ASD are discussed.

Keywords Autism spectrum disorder · Attachment · Middle childhood · Parenting stress

Introduction

The study of attachment in ASD has primarily focussed on characterising group differences in attachment security between ASD and non-ASD groups (Rutgers et al. 2004). This research has generally indicated that while children with ASD display clearly discriminated and enduring attachments to significant caregivers (Dissanayake and Crossley 1996; Rogers et al. 1991; Sigman and Mundy 1989; Sigman and Ungerer 1984), they may be less responsive, consistent, and comprehensible in their attachment behaviours with caregivers (Dissanayake and Crossley 1996, 1997; Grzadzinski et al. 2014; van Ijzendoorn et al. 2007; Willemsen-Swinkels et al. 2000). Research amongst young children has indicated increased rates of insecure attachment in children with ASD compared to typically developing and clinical comparison groups (Naber et al. 2007; Rutgers et al. 2004; van Ijzendoorn et al. 2007) when measured using observation-based paradigms such as the Strange Situation (Ainsworth et al. 1978), while research during middle childhood suggests no between-group differences in security when using questionnaire-based measures (Bauminger et al. 2010; Chandler and Dissanayake 2014; Wu et al. 2015). While this disparity regarding the group differences in attachment security requires further investigation, there remains a poor understanding of what this attachment quality means for children with ASD, that is, what are the correlates and consequences of attachment security for children with ASD?

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There is growing appreciation for the importance of unpacking the developmental correlates of attachment quality for children with ASD (Dissanayake and Sigman 2001; Rogers et al. 1991, 1993; Sivaratnam et al. 2015; Slade 2009). This interest comes with the recognition that children with ASD exhibit early-emerging and biologically-driven impairments in social and emotional capacities, such as facial emotion recognition, social communication, reciprocity, and theory of mind (American Psychiatric Association 2013; Baron-Cohen et al. 1985; Cassel et al. 2007; Dawson et al. 2004; Nuske et al. 2013), that are central to typical processes underlying attachment formation and ongoing relating within child-caregiver relationships (Fonagy et al. 1991). There may be a unique and complex interplay between biologically-based impairments in ASD and the environmental factors that direct attachment formation and quality (Sivaratnam et al. 2015). In beginning to unpack these relationships and processes, it is important to first understand how attachment quality in ASD relates to known correlates of attachment quality in typical populations. Understanding the caregiver correlates of attachment in ASD seems a particularly pertinent question given the unique challenges inherent in parenting a child with ASD (Falk et al. 2014; Lee 2009) and suggestions that the interactive deficits displayed by children with ASD may make attunement and sensitivity to the child's signalling a more difficult task (Beurkens et al. 2013; Hoppes and Harris 1990; Oppenheim et al. 2012; Siller et al. 2014).

Child attachment quality has long been understood in the context of caregiver factors within typically developing dyads (Ainsworth et al. 1978; Bowlby 1969/1982), and similar enquiry is beginning in ASD. For instance, studies of parenting sensitivity in ASD have generally indicated, consistent with findings in typically developing children, that children with ASD who have sensitive parents are more likely to be securely attached (Capps et al. 1994; Koren-Karie et al. 2009). One notable exception is that of van Ijzendoorn et al. (2007) who reported that security was associated with parent sensitivity only within a typically developing group, and not within a group of children with ASD. Nonetheless, related concepts such as maternal insightfulness into the child's inner world (Hutman et al. 2009; Oppenheim et al. 2008, 2009, 2012), caregiver synchrony during play interaction (Kuhn 2007; Siller and Sigman 2002, 2008), emotional availability (Dolev et al. 2009) and responsiveness (Siller et al. 2014) have also been associated with better attachment and developmental outcomes for children with ASD, consistent with findings in typically developing children (Belsky 1999; Koren-Karie et al. 2002). Thus, despite experiencing biologically-based deficits in social interaction, emotion understanding, and theory of mind (American Psychiatric Association 2013), available empirical evidence suggests that young children

with ASD may benefit from more optimal caregiving in similar ways to typically developing children when it comes to their attachment quality.

Parents of children with ASD face numerous unique challenges that are not experienced by parents of typically developing children or children with other disorders (Lee 2009), and research has begun to take this experience into account by considering novel factors that may form barriers to optimal parenting in these dyads (Dolev et al. 2009). Parents' resolution to their child's diagnosis (Marvin and Pianta 1996) has been linked, along with insightfulness, to child security (Oppenheim et al. 2009, 2012). Parents who resolve their own feelings of grief or sadness regarding their child's disability, and are insightful into their child's inner world, are thought to give children with ASD a sense of containment and acceptance that promotes the development of security. Parents of children with ASD report significantly greater stress relative to parents of typically developing children (Bouma and Schweitzer 1990; Hoffman et al. 2009; Montes and Halterman 2007) or parents of children with other disabilities (Abbeduto et al. 2004; Baker-Ericzen et al. 2005; Bouma and Schweitzer 1990; Dabrowska and Pisula 2010).

Parenting stress is known to have negative implications for child attachment in typical dyads (Belsky 1999), supposedly because stressed parents are less able to be consistently sensitive and responsive to their child's needs. However, when exploring parenting stress in ASD, Hoffman et al. (2009) noted that while parents of children with ASD showed significantly elevated parenting stress relative to parents of typically developing children, they continued to report emotional closeness with their child, suggesting that parenting stressors may not compromise affective aspects of the parent-child relationship. It is worth noting that this finding only pertains to parents' own self-report of relationship quality, and the child's experience of their parent is yet to be explored in the context of parenting stress.

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

Parents' own attachment style may have implications for parent–child interaction in ASD. Parents of children with ASD appear to report a similar degree of attachment security within their adult romantic relationships as parents of typically developing children (Lau and Peterson 2011), however studies have suggested that caregivers' internal working models of attachment may have unique implications for the way in which caregivers and children with ASD interact. Seskin et al. (2010) studied attachment representations of parents of children with ASD and found that secure parents showed greater capacity to support symbolic play and reflective functioning in their children, and had children who exhibited better reciprocal social interaction skills. Direct links between parent attachment style and child attachment security are yet to be explored, but studies of typically developing dyads have clearly established that secure parents are more likely to have secure children (van IJzendoorn 1995). It has been suggested that this intergenerational transmission of attachment quality warrants specific exploration within ASD, due to the possibility that the social and emotional impairments of children with ASD may interrupt or alter this usual transmission of security from parent to child (van IJzendoorn et al. 2007).

The Current Study

There have been a small number of good quality research studies conducted in ASD during middle childhood, and these have concluded that there are no differences in self-reported attachment security between ASD and typically developing groups (Bauminger et al. 2010; Chandler and Dissanayake 2014; Wu et al. 2015). Nonetheless, the ways in which attachment security relates to known correlates of attachment security in typically developing children, particularly factors that describe the caregiver's experience within this complex and challenging parenting role, are poorly understood. Accordingly, the current study aims to explore child attachment quality and its relationship to several caregiver factors amongst children with high-functioning (IQ > 70) ASD and typically developing children, and their primary caregivers, during middle childhood (i.e. 7–12 years). The first aim is to examine between-group differences in child attachment and caregiver factors (psychological distress, parenting stress, and romantic attachment style), and the second aim is to explore within-group patterns of relationships between child attachment and caregiver factors. Several hypotheses are proposed; (1) that children with high-functioning ASD will report similar attachment quality compared to typically developing children, (2) that caregivers of children with ASD will report greater psychological distress and parenting stress, but similar romantic attachment styles within their own adult relationships, compared to caregivers of

typically developing children, and (3) that caregiver psychological distress, parenting stress, and attachment insecurity will be associated with poorer attachment quality in children with ASD and typically developing children.

Methods

Participants

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

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

Materials

Child Intellectual Functioning

Intellectual ability was assessed for children with ASD using the *Wechsler Intelligence Scale for Children, fourth edition, Australian version* (WISC-IV; Wechsler 2005), and for typically developing children using the *Wechsler*

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

Child Attachment

The *Security Scale* (Kerns et al. 1996) is a 15-item scale which was employed to assess children's perceptions of security in their relationship to an identified attachment figure, and has demonstrated sound reliability and validity during middle childhood (Granot and Mayseless 2001; Kerns et al. 1996, 2000, 2007). Items employ Harter's (1982) "some kids... other kids..." format, believed to reduce defensive responding, in which children are provided with a description of two types of children, and are required to identify which child they are more alike (i.e. "Some kids find it easy to trust their mum, BUT other kids are not sure if they can trust their mum"), and to what degree (i.e. "Really true for me" or "Sort of true for me"). Each item is scored on a 4-point scale, with eight items reverse-scored. A Total security score is derived from 2 sub-scales; Availability and Dependency. The Availability subscale comprises 6 items which assess the extent to which children view their attachment figure as available and responsive to their needs, and the Dependency subscale comprises 9 items assessing the extent to which the child is able and willing to use their attachment figure when distressed. Scores on each scale are averaged to give a continuous score. For the present study, two items were modified with the aim of making the language more concrete and hopefully more intelligible for children with ASD (e.g. on item 2 "butts in" was replaced with "interrupts", and on item 3 "count on" was replaced with "rely on").

The *Coping Strategies Questionnaire* (CSQ; Finnegan et al. 1996) was used to assess self-reported use of avoidant and preoccupied coping strategies within the child-caregiver relationship and has demonstrated good psychometric properties in middle childhood (Finnegan et al. 1996; Kerns et al. 2000, 2006, 2011). The CSQ comprises 20 items; 10 items assess avoidant coping strategies (i.e. a failure to seek comfort when distressed and a denial of affection for the mother), while 10 items assess preoccupied coping strategies (i.e. an excessive need for the caregiver in new or distressing situations and an inability to be soothed by the caregiver; Finnegan et al. 1996). While items were originally designed to assess avoidant and preoccupied coping strategies, rather than internal working

models of attachment, the authors have since suggested that avoidant or preoccupied internal working models can be inferred from these scales given that avoidant and preoccupied coping strategies are likely to arise in the context of preoccupied or avoidant working models of attachment, respectively (Yunger et al. 2005). Nonetheless, to avoid confusion, scales are referred to as "Avoidant coping" and "Preoccupied coping" hereafter. Items adopt the same "some kids... other kids..." response format as the Security Scale, and are scored 0–2, with 0 given to both non-avoidant/preoccupied response options, while 1 was given to the less avoidant/preoccupied response, and 2 given to the most avoidant/preoccupied response option. Total scores were averaged to give a continuous score for each scale, with higher scores reflecting a greater degree of self-reported avoidant or preoccupied coping.

Caregiver Wellbeing

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

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

Caregiver Attachment Style

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

Socioeconomic Status

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

Procedure

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

Data Analysis

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

Results

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

Sample Characteristics

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

Differences Between Groups

Descriptive statistics for child attachment and caregiver variables are presented in Table 1. Independent samples *t* tests were used to compare ASD and TD groups on child

attachment and caregiver variables (psychological distress, stress, and attachment), and are presented in Table 1. No differences in child attachment were observed between ASD and TD groups, however parents of children with ASD reported significantly greater psychological distress on the K-10 [$t(41) = 3.25, p < .01$], significantly more parenting stress across all domains of the PSI-SF [PSI-Total; $t(46) = 7.71, p < .01$, PSI-PD; $t(46) = 3.28, p < .01$, PSI-PCDI; $t(46) = 6.63, p < .01$; PSI-DC; $t(46) = 8.91, p < .01$], and significantly greater attachment-related anxiety on the ECR-R [$t(41) = 2.53, p = .02$]. Caregivers did not differ in their report of attachment-related avoidance ($p > .05$). Exploring the clinical significance of caregiver stress, 79 % of caregivers of children with ASD reported PSI-SF Total Stress scores in the clinical range (i.e. ≥ 90 th percentile), compared to 8 % of caregivers of typically developing children, a significant difference ($\chi^2 = 24.47, df = 1, p < .01$).

Correlations Amongst Variables

To explore the nature of distress, stress, and attachment in caregivers, Pearson's correlations were conducted amongst caregiver-related variables within each group, and are presented in Table 2. Amongst caregivers of children with ASD, psychological distress on the K-10 was related to more Parental Distress and Total Stress and on the PSI-SF, and greater attachment-related Anxiety and Avoidance on the ECR-R. Similarly, amongst caregivers of typically developing children, psychological distress on the K-10 was related to greater Parental Distress, Difficult Child and Total Stress scores on the PSI-SF, and greater attachment-related anxiety on the ECR-R, with a non-significant trend ($p = .06$) towards more attachment-related avoidance. Regarding associations between stress and attachment, there were relatively consistent positive associations between parenting stress on the PSI-SF subscales and anxiety and avoidance on the ECR-R for caregivers of typically developing children, while for caregivers of children with ASD only the Parental Distress subscale on the PSI-SF was related to attachment-related Anxiety and Avoidance on the ECR-R.

To explore the relationship between child attachment and caregiver-related variables, Pearson's correlations were conducted within each group (see Table 3). Within the ASD group, no associations were observed between self-reported child attachment quality and parent-reported psychological distress, parenting stress or attachment. However, within the TD group, there were significant negative correlations observed between caregiver psychological distress and child-reported security, and between caregiver attachment-related anxiety on the ECR-R and child-reported security. These associations to child security

seemed to relate particularly to the Availability subscale of the Security Scale. No associations in either group were observed between child attachment and parenting stress.

Discussion

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

The current finding that children with ASD report no differences in their perceived attachment quality compared to typically developing children is consistent with the few previous studies that have employed self-report to assess attachment security in ASD during middle childhood (Bauminger et al. 2010; Chandler and Dissanayake 2014; Wu et al. 2015). Current findings also extend upon previous research by examining the use of preoccupied and avoidant coping strategies, which are regarded as reflecting insecure working models of attachment (Yunger et al. 2005). Mean Security Scale and CSQ scores reported here for both groups bear striking similarity to those reported previously in typically developing samples (Brumariu and Kerns 2008; Kerns et al. 2006, 2011), adding weight to the suggestion that despite impairments in social interaction, theory of mind, and emotion understanding that characterise ASD, these children continue to report similar feelings of security within their relationship to their primary caregiver as typically developing children.

The finding that caregivers of children with ASD report significantly greater psychological distress and parenting stress relative to caregivers of typically developing children has been well-replicated elsewhere (e.g. Hoffman et al. 2009; Yirmiya and Shaked 2005). Less studied has

Table 1 Child attachment and caregiver variables across groups, mean (standard deviation)

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

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

Table 2 Pearson’s correlations among caregiver variables for ASD and typically developing (TD) groups

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

PCDI PSI-SF Parent–Child Dysfunctional Interaction subscale

[†] $p = .06$; * $p < .05$; ** $p < .01$; *** $p < .001$

been the attachment style of these parents. Current findings indicate that caregivers of children with ASD report higher levels of attachment-related anxiety but no different attachment-related avoidance, compared to TD caregivers. This is in contrast to Lau and Peterson (2011) who previously reported no differences in romantic attachment style between parents of children with and without ASD. This inconsistency may arise from differences in methodology, as Lau and Peterson assessed participants’ degree of identification with three attachment vignettes (secure, avoidant, and anxious), while the current study assessed

two dimensions of attachment (anxiety and avoidance) across 36 items rated on a 7-point scale. The current methodology may offer greater sensitivity and specificity to detect patterns and variations in anxiety or avoidance amongst parents, nonetheless further replication of this finding is required to resolve these inconsistencies. The increased attachment-related anxiety reported by caregivers of children with ASD may be partly attributable to the phenotypic overlap between ECR-Anxiety scale items and general anxiety symptoms, which are reported more frequently amongst parents of children with ASD

Table 3 Pearson's correlations between child attachment variables and caregiver variables, for ASD and typically developing (TD) groups

Group	Measure	Scale	K-10	Parental distress	PCDI	Difficult child	PSI-SF total	ECR-R anxiety	ECR-R avoidance
ASD	Security scale	Dependence	-.332	-.223	.200	.160	.019	-.167	-.141
		Availability	.016	.151	-.141	-.089	-.006	.353	.315
		Total	-.240	-.101	.088	.081	.12	.027	.030
	CSQ	Preoccupied	-.218	-.210	.168	.217	.042	-.282	-.217
		Avoidant	.207	.108	.123	-.111	.057	.252	.186
TD	Security scale	Dependence	-.229	-.171	-.016	-.061	-.106	-.204	-.264
		Availability	-.592**	-.324	-.168	-.347	-.325	-.480*	-.233
		Total	-.501*	-.298	-.117	-.256	-.265	-.416*	-.287
	CSQ	Preoccupied	.220	-.068	-.264	-.231	-.188	-.148	-.219
		Avoidant	-.246	-.167	-.021	-.139	-.135	-.101	-.028

* $p < .05$; ** $p < .01$

compared to other groups (Yirmiya and Shaked 2005). Because both general anxiety and attachment-related anxiety have been associated with poorer child outcomes (van IJzendoorn 1995), future research is needed to distinguish attachment-related worries from general anxiety in parents of children with ASD, and explore any attachment-specific impacts upon children.

Perhaps a novel finding in the current study was the observation that parenting stress on the PSI-SF was related to romantic attachment style amongst caregivers of typically developing children, but not amongst caregivers of children with ASD (with the exception of the Parental Distress scale of the PSI-SF). The Parental Distress scale is regarded as a general measure of the parent's own psychological wellbeing, and does not directly pertain to the relationship with the child (i.e. PSI-PCDI) or the child's challenging characteristics (i.e. PSI-DC). With this in mind, it would seem that the current pattern of findings suggests that for caregivers of children with ASD, stressors that are more closely linked to the child-caregiver interaction are not related to the caregiver's own attachment insecurities, but these factors appear closely related for caregivers of typically developing children. One explanation for this pattern may be that for parents of typically developing children, their ability to cope with the demands of parenting may be strongly influenced by internal, psychologically-based, traits such as their attachment style, while parents of children with ASD may experience their attachment style as exerting less influence on their subjective coping because they face daily parenting challenges that are extreme, complex, and closely tied to their child's disorder. Indeed, studies of parenting stress regard the experience of parents of children with ASD as being

shaped by external factors such as degree of child impairment (Abbeduto et al. 2004; Davis and Carter 2008; Tomanik et al. 2004) and social support (Falk et al. 2014). This finding is significant in suggesting that the aetiology of stress in parents of children with ASD may be different to that of parents of typically developing children, and highlights the need for parent-centred interventions to be individually tailored around the unique aetiological factors that underlie stress for parents of children with ASD.

Perceptions of security by children with ASD were unrelated to the psychological distress or attachment style of the child's caregiver. This finding was unexpected as it contrasts with both current and previous findings within typically developing dyads, and is seemingly inconsistent with previous findings in ASD suggesting that more optimal parent functioning, in terms of greater parenting sensitivity (Capps et al. 1994; Koren-Karie et al. 2009), insightfulness (Oppenheim et al. 2009), and responsiveness (Siller et al. 2014), is associated with better attachment quality for children with ASD. In the current study, parents of typically developing children who reported more psychological distress and more attachment-related anxiety had children who reported less attachment security, particularly in the domain of perceived parent availability. The fact that these relationships were not also reported for children with ASD is significant, and several interpretations are possible. Firstly, it has been suggested that despite the challenges faced by parents of children with ASD, parents continue to report an emotional closeness with their child (Hoffman et al. 2009). Given that the factors measured in the current study (i.e. psychological distress, attachment style) are peripheral to the mechanisms thought to directly transmit security (i.e. parenting sensitivity,

reflective functioning), it may be that parents are able to provide a caregiving environment that promotes child security in spite of the added stress or psychological burden that they may experience. This possibility could be explored in future through the concurrent assessment of caregiver attributes that are known to directly promote child security (i.e. sensitivity, reflective functioning), alongside other caregiving factors such as those studied here. This would allow examination of whether similar or different relationships between caregiver wellbeing, parenting, and child attachment are observed in ASD, relative to typical development.

A second possible interpretation for the observed patterns of findings is that, as van Ijzendoorn et al. (2007) have previously suggested, there is a true difference in the relationship between child attachment and caregiver factors within ASD. Van Ijzendoorn and colleagues failed to find the expected associations between parenting sensitivity and child security that were observed in a typically developing group, and that have been reported elsewhere (Capps et al. 1994; Koren-Karie et al. 2009). They suggested that ASD-specific impairments in emotion processing, social communication, and theory of mind, may prevent children from recognising and benefitting from the parent's sensitivity in the same way as typically developing children. Current findings may reflect a similar phenomenon in which children with ASD experience difficulties recognising and comprehending their caregivers' mental states, and therefore cannot take this into account when reflecting on their own sense of security and the perceived availability of their caregiver. Children with ASD show well-documented deficits in processing emotional expressions by others (for a review see Nuske et al. 2013), and these difficulties may also be experienced within their attachment relationship. Emotion processing deficits may have implications for the caregiver-child cohesiveness and synchrony given that, with age, children must use increasingly complex, and cognitively-based strategies to interpret and predict the caregiver's goals, motivations, and intentions, in order to better ensure the attainment of their own attachment needs from the caregiver (Kerns et al. 2006; Rogers et al. 1991). There is a need to further explore emotional processing capacities of children with ASD in the context of their attachment relationship in order to better understand the nature and impact of any impairment.

The current pattern of findings may have important implications for our understanding of the intergenerational transmission of attachment in ASD (van IJzendoorn 1995; van Ijzendoorn et al. 2007). It has been widely established within typical dyads that attachment quality is transmitted across generations, from parent to child; secure parents are more likely to have secure children, supposedly due to the secure parent's capacity to provide more emotionally attuned, sensitive and responsive caregiving (van IJzendoorn

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

Current findings must be interpreted in the context of several limitations. Firstly, the sample size studied is relatively small, and this may have limited the statistical power of the current analyses. Nonetheless, the current sample size approximates those utilised in similar research studies and features a greater representation of females than previously reported, thereby strengthening the generalisability of findings across genders. Secondly, the accuracy of self-report in assessing internal working models of attachment has been questioned (Dwyer 2005). Internal working models are complex, largely unconscious (Bowlby 1980), and may evoke defensive responding in insecure children (Cassidy 1988). With specific regard to ASD, it could also be questioned whether these children can accurately report on their internal working models given their difficulties in areas of theory of mind and emotion processing. However, Chandler and Dissanayake (2014) have demonstrated good agreement between child- and parent- report on child attachment security using the Security Scale (Kerns et al. 1996), within a middle childhood sample of children with ASD, thereby providing some support for the validity of this measure within this population. In future, concerns regarding self-report may be overcome through the use of multimodal experimental designs which utilise self-report alongside projective or interview-based attachment measures (Haltigan et al. 2011), or by relating self-report to known correlates of attachment, to explore whether expected associations are observed (Chandler and Dissanayake 2014).

The current study has contributed novel findings regarding the parenting correlates of child attachment amongst children

with ASD. Findings suggest that while caregivers of children with ASD experience greater psychological distress, stress and attachment insecurity, their children report feeling equally secure as typically developing children. Furthermore, child security was related to caregiver distress and caregiver attachment-related anxiety only within typically developing dyads, but not within ASD dyads. The patterns of findings observed here need replication and expansion within a larger sample, however these preliminary findings may point to a mismatch between the caregiver and the child within ASD dyads. Parents are obviously challenged in many ways in their experience of parenting a child with ASD, but children do not seem to reflect these challenges in their reported feelings of security. This may indicate that caregivers of children with ASD manage to provide their children with a secure caregiving environment in spite of their parenting challenges. Equally however, current findings may reflect a failure of children with ASD to recognise and take account of these caregiver factors in order to adaptively adjust their attachment behaviour. Insecure attachment is seen as adaptive within the context of an insecure caregiving environment because it serves as a strategy for maximising the attainment of the child's attachment needs (Ainsworth et al. 1978). Children with ASD may be less able to adapt in this way. Future research is needed to explore the impacts of caregiver-centred factors (i.e. stress, psychopathology, attachment style) and the impacts of child-centred factors (i.e. emotion processing, theory of mind) on the functioning of the attachment system in ASD.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institution and national research committee and with the 1964

Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all participants included in the study.

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