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Parental Attributions for Positive Behaviours in Children with Autism Spectrum Disorder

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Abstract

Background—The present study examined parental attributions for positive child behaviour in children with Autism Spectrum Disorder (ASD) and their association with parent outcomes.

Method—In total, 175 couples who had a child with ASD (5–12 years) completed measures about the child's positive behaviour, ASD symptoms, functional skills and negative behaviour problems, and their own positive and negative affect and closeness in the parent–child relationship. A comparison group of 170 couples who had a child without a neurodevelopmental disability also completed measures.

Results—Dyadic multilevel models were conducted. Parents of children with ASD believed that their child's positive behaviour was due to factors less internal to the child, less stable and less controllable by the child than the comparison group. Beliefs about stability were associated with closeness in the parent–child relationship. Child age and level of impairment and parent education were associated with parental attributions.

Conclusions—Interventions that alter parental attributions may offer pathways to increase closeness in the parent–child relationship.

Keywords

autism; parental attributions; parental well-being; parent–child relationship; parents; positive behaviors

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterised by impairments in social communication and repetitive behaviours and/or restricted interests (American Psychiatric Association 2013). Approximately 1 in 68 children in the United States meet criteria for ASD (Centers for Disease Control and Prevention 2014). Within ASD research, there has been an overwhelming focus on the impact of the negative behavior problems of children with ASD on parents, with little attention to positive child behaviours. The few studies that have examined positive behaviour in children with ASD or other neurodevelopmental disabilities suggest an association with maternal psychological well-being (Beck et al. 2004; Huang et al. 2014) and adaptive mother–child interactions (Haven et al. 2014). However, theory and research suggest that the benefits of positive child behaviours are contingent on parental attributions (i.e. beliefs about the cause of the positive behaviour)

(White & Barrowclough 1998; Johnston & Ohan 2005). The purpose of the present study is to examine parental attributions for the positive behaviour of children with ASD and their association with parent affect and closeness in the parent–child relationship.

Research on the general population indicates that parents attempt to make sense of child behaviour, and this attributional process shapes their affective and behavioural reactions (Dix et al. 1986; Park et al. 2016). In Weiner's Attributional model (Weiner 1985), parental attributions involve three dimensions. Locus of control relates to whether the behaviour is believed to be internal (i.e. personality trait or skill) or external (i.e. environment) to the child. Stability relates to beliefs about how permanent the cause of the behaviour is (i.e. unstable, and will pass, to stable, and will continue). Controllability relates to beliefs about how controllable the behaviour is by the child (i.e. uncontrollable, and child cannot alter, to controllable, and child can alter). Parents in the general population generally view positive child behaviour as due to factors that are internal to the child, stable and controllable by the child (Chiang et al. 2000; Park et al. 2016). This positivity effect indicates that parents give their child credit for positive behavior (i.e. attribute to permanent skill or trait in child and regulated by child).

To date, there are no published studies comparing parental attributions for positive behaviours in children with ASD versus parents of children who are typically developing. However, evidence from within-group studies suggests that the positivity effect is weakened in parents of children with neurodevelopmental disabilities. In the only study to examine parental attributions for positive behavior in children with ASD (n = 59 parents), Whittingham et al. (2008) found that positive behaviours were not more likely to be attributed to factors internal to the child than negative behaviour problems. However, in other studies, parents of children with attention deficit/ hyperactivity disorder (ADHD) and parents of children with ASD were found to attribute their child's negative behaviour problems to factors more internal than external to the child (Johnston et al. 1998; Hartley et al. 2013). Together, these findings suggest that when a child has a neurodevelopmental disability, on average, parents believe that factors internal to the child contribute to negative behavior problems as opposed to positive behaviours. Yet, children with ASD exhibit positive behaviours (Robinson et al. 2015), and ASD symptoms can be strengths (e.g. detail-orientation and direct communication are assets in the right setting).

In part, the tendency for parents to give a child with a neurodevelopmental disability less credit for positive behaviour may reflect a broader negative societal view of neurodevelopmental disabilities (Livneh 2012). Alternatively, parents of children with ASD report heightened parenting stress (e.g. Hayes & Watson 2013); this context of high stress may detract from the positivity effect. Indeed, individuals undergoing other types of stressors (e.g. work stress) have been found to be less able to identify positive events (Sturgeon, Zautra, & Morris, 2014) and more likely to believe that positive events are uncontrollable and fleeting than individuals not under stress (Bar-Tal et al. 2013). Moreover, in research on the general population, parents under emotional distress were found to exhibit a negative attributional bias (i.e. blamed child for negative behaviour problems) (Geller & Johnston 1995; Smith & O'Leary 1995).

If parents of children with ASD exhibit a diminished positivity effect, this may have important implications for parent affect and parent–child relationship. Research on the general population indicates that parental attributions shape parent affect and the parent–child relationship (Bugental & Johnston 2000 for review). There is substantial evidence that when the child is blamed for negative behaviour problems, parents experience higher levels of negative affect (e.g. frustration and stress) and are more likely to engage in harsh and critical parenting behaviours (Slep & O’Leary 1998; Nix et al. 1999; Park et al. 2016). Scant research has investigated parental attributions for positive child behaviours. However, there is evidence from the general population that when the child is credited for positive behaviour, parents experience higher levels of positive affect (e.g. pride and joy) and are more likely to engage in sensitive and warm parenting behaviours (Hastings et al. 2007; Park et al. 2016). This pattern was also found in a study of parents of children with ADHD; attributing positive child behaviour to factors internal to the child, stable and controllable by the child with ADHD was positively related to parent level of positive affect (Johnston & Leung 2001). Thus, although parents of children with neurodevelopmental disabilities may be less likely to give their child credit for positive behaviour (relative to parents of typically developing children), such attributions may still have beneficial associations with parental affect and the parent–child relationship.

It is important to identify the child and parent factors related to parental attributions in parents of children with ASD. Given evidence that parents of children with ASD or other neurodevelopmental disabilities have a dampened positivity effect (Whittingham et al. 2008), at a within-group level, parents of children with ASD with more impairment (i.e. higher severity of ASD symptoms and global negative behaviour problems, and lower functional skills) may be less likely to attribute positive child behaviour to factors that are internal to the child, stable and controllable by the child than parents of children with ASD with less impairment. Child age may also be associated with parental attributions, as older children may be perceived as better able to manage behavior than younger children. Indeed, research on the general population (Zeedyk 1997) and children with ASD (Hartley et al. 2013) indicates that parents of older children are more likely to believe that factors internal in the child, stable and controllable by the child drive child behaviour than parents of younger children. Finally, highly educated parents are more likely to be involved in their child’s treatment (Twyo et al. 2007) and thus may have more knowledge of child behavior regulation abilities. As a result, parents with higher (rather than lower) education may attribute their child with ASD’s positive behaviour to factors internal to the child, stable and controllable by their child.

The aims of the present study were to (1) compare parental attributions for positive child behaviour in parents who have a child with ASD versus parents who have a child without a neurodevelopmental disability; (2) examine the association between parental attributions for the child with ASD’s positive behaviour and parent level of positive and negative affect and closeness in the parent–child relationship; and (3) evaluate the association between child (severity of ASD symptoms, global negative behaviour problems, functional skills and child age) and parent (education) factors and parental attributions for the child with ASD’s positive behaviour. The first study aim involved a between group comparison of 175 mother–father couples who had a child with ASD and 170 mother–father couples who had a

child without a neurodevelopmental disability. The second and third study aims involved within-group analyses of the couples who had a child with ASD. Models separately examined associations in mothers and fathers, at a within-couple level, in order to model associations at an individual-level and explore potential mother–father differences.

Parents of children with ASD were hypothesised to attribute positive child behaviour to factors less internal to the child, less stable and less controllable by the child than parents of a child without a neurodevelopmental disability. Consistent with findings on the general population (e.g. Park et al. 2016), parents who viewed the positive behaviour of their child with ASD as due to factors more internal to the child, stable and controllable by the child were hypothesized to report a higher level of positive affect, lower level of negative affect and closer parent–child relationship. Parents with lower (rather than higher) education, parents of children with a higher (rather than lower) impairment (i.e. higher severity of ASD symptoms and global negative behaviour problems, and lower functional skills) and parents of younger (rather than older) children were predicted to attribute positive child behaviour to factors less internal to the child, less stable and less controllable by the child with ASD.

Methods

Participants were part of a study in Midwestern, United States. In total, 183 couples who had a child with ASD and a comparison group of 176 couples who had a child without a neurodevelopmental disability (intellectual or developmental disability, ADHD and ASD) participated at Time 1. Participants were recruited through research registries, school mailings and fliers. Eligibility criteria included being the parent of a child aged 5–12 years and having a partner/spouse willing to participate. For the ASD group, parents provided documentation of ASD diagnosis via medical/educational records, using the Autism Diagnosis Observation Schedule (Lord et al., 2000). Moreover, parents completed the Social Responsiveness Scale (SRS-2; Constantino & Gruber 2012) to evaluate current ASD symptoms; all children with ASD scored in problematic range (Total Tscore ≥ 60). If the couple had multiple children with ASD, the oldest was the focus. Screening questions ensured that comparison group children did not have a diagnosed or suspected neurodevelopmental disability, had not received early intervention or special education services and scored in normal range on SRS-2.

Eight couples in ASD group and six in comparison group were removed due to missing data (≥ 80% of items/measure), resulting in 175 couples in ASD group and 170 couples in comparison group. In six couples (four ASD, two comparison), the target child was adopted (≥ 5 years prior). Five couples (two ASD, three comparison) were not married (lived together ≥ 5 years). In 23 couples (13 ASD, 10 comparison), one parent was a stepparent (married ≥ 3 years). Participant socio-demographics are displayed in Table 1. Aside from child differences (expected), maternal education and household income differed between the ASD and comparison group.

Measures

Socio-demographics.—Parents jointly reported child socio-demographics. Other measures were independently completed by mothers and fathers. Child age was coded in

years. Parental education was coded: <high school degree (0), high school/GED, (1), some college (2), college degree (3), some graduate (4) and graduate/professional degree (5). Other family sociodemographics were included in models, as relevant, to control for effect on dependent measures. Child gender [female (1) and male (_1)], parent race/ethnicity [White, non-Hispanic (0) and other (1)] and household income [\$9999 (1) and increasing by \$10–\$20 K to \$160 000 (14)].

Parental attributions.—The Parental Attribution Questionnaire (Whittingham et al. 2008) asks parents to describe a recent good behaviour (positive behaviour) by their child. Parents rated agreement with 12 statements from ‘strongly disagree’ (0) to ‘strongly agree’ (4). Six items assess child-referent attributions, with two questions in regard to each domain: locus of control, stability and controllability. Higher scores indicate ratings more internal to the child, stable and controllable by the child. The Parental Attribution Questionnaire had adequate internal consistency in parents of children with ASD (Whittingham et al. 2008). In our study, internal consistency (Cronbach α = .55–.81) was acceptable given two item scales.

Parent–child relationship.—In the Bengtson Positive Affect Index (Roberts & Bengtson 1993), five items ask the parent to rate their feelings of trust, intimacy, understanding, fairness and respect towards their child, and five items ask the parent to rate the extent to which their child displays these feelings towards them from ‘Not at all’ (1) to ‘Extremely’ (6). Items are summed. The Positive Affect Index had high internal consistency (Cronbach α = .88) in mothers of grown children with ASD (Hartley et al. 2012). Internal consistency (Cronbach α = .85) was high in our ASD group.

Parental affect.—The Positive and Negative Affect Scale (Watson et al. 1988) is a 20-item measure of positive affect (interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive and active) and negative affect (distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous, jittery and afraid) rated on a 5-point scale for the past week. Items are summed to create total positive affect and negative affect scores; higher scores indicate higher positive or negative affect. The Positive and Negative Affect Scale had good internal consistency, test–retest reliability and validity in the general population (Watson et al. 1988) and good internal consistency in our sample (Cronbach α = .86 and .88).

Global child negative behaviour problems.—The Child Behaviour Checklist (Achenbach & Rescorla 2000, 2001) assesses child behavior problems. The Total Child Behaviour Checklist Tscore was found to have good internal consistency in the general population (Cronbach α = .97) and in our ASD group (Cronbach α = .94).

Severity of child Autism Spectrum Disorder symptoms.—The SRS-2 includes 65 items in which respondents rate the degree of ASD symptoms in past 6 months on a four-point scale. Total T-score was used. The SRS- 2 had high internal consistency in previous studies of children with ASD (Cronbach α = .94 to .96) (Bruni 2014) and in our sample (Cronbach α = .86).

Functional skills.—The Adaptive Behaviour Assessment System-II (Harrison & Oakland 2003) assesses functional skills in a variety of areas. The General Adaptive Composite score, which combines the nine subscales, was used. The General Adaptive Composite has been shown to have good internal consistency in previous studies (Cronbach $\alpha = .97$ to $.99$) (Harrison & Oakland 2003) and also did in our ASD group (Cronbach $\alpha = .99$).

Data analysis plan

Distributions of variables and histograms of the residuals were examined. Thirty-two (9.5%) parents had missing items (but 80% of items/measure answered); the mean item score was used for missing items. Pearson correlations and paired sample t-tests were used to examine the within-couple association between mother–father attributions and to identify potential mother–father differences in ratings. Dyadic multilevel models (MLM) using hierarchical linear modelling treated mothers and fathers as nested in couples were conducted to address study aims. The first aim involved the ASD and comparison group. Level 1 variables included mother (1 = mother, 0 = father) and father (1 = father, 0 = mother). Level 2 variables included group (1 = ASD; –1 = comparison), and household income and parental education (socio-demographics that differed by group).

Remaining analyses focused on ASD group. For the second study aim, three dyadic MLMs were conducted to examine the relation between parental attributions (locus of control, stability and controllability), entered in Level 1 along with mother (1 = mother, 0 = father) and father (1 = father, 0 = mother), and parents' level of positive affect, negative affect and closeness in the parent–child relationship as the dependent variable. Child (severity of ASD symptoms, global negative behavior problems, functional skills and child age) and parent (education) targeted variables and family sociodemographics (child gender, parent race/ethnicity and household income) were included at Level 2 to control for between-family differences. To address the third study aim, three dyadic MLMs were conducted in which locus of control, stability and controllability were the dependent variables, mother (1 = mother, 0 = father) and father (1 = father, 0 = mother) were entered at Level 1, and child and parent targeted variables and family sociodemographics were entered at Level 2. In models, Level 1 variables were un centred, Level 2 continuous variables were grand-mean centred and Level 2 dichotomous variables were un-centred.

Results

Distributions of variables and histograms of residuals showed normal distribution of data without skew. Means and standard deviations for parental attributions by group are in Table 2. Within couples, there was a positive association between mother–father ratings of locus of control (ASD: $r = .25$, $P < .01$; comparison: $r = .22$, $P < .01$) and stability (ASD: $r = .15$, $P = .04$; comparison: $r = .25$, $P < .01$), but not controllability (ASD: $r = .12$, $P = .11$; comparison: $r = .01$, $P = .91$). Paired sample t-tests indicated that within couples, there was no significant mother–father difference in ratings of locus of control (ASD: $t(174) = -0.77$, $P = .45$; comparison: $t(169) = -1.29$, $P = .20$) or stability (ASD: $t(174) = 0.38$, $P = .71$; comparison: $t(169) = -1.23$, $P = .22$). Mothers had a higher rating of controllability than

fathers in the comparison group ($t(169) = -2.04, P = .04$). There was no significant mother–father difference in ratings of controllability in ASD group ($t(174) = 0.68, P = .50$).

Autism Spectrum Disorder versus comparison group

Table 3 presents results of the dyadic MLMs examining group (ASD vs. comparison) differences in mother and father ratings of locus of control, stability and controllability controlling for household income and parent education. There was a group effect for mothers and fathers on locus of control and stability; mothers and fathers in the comparison group rated positive child behaviour as due to factors more internal to the child and stable than the ASD group. There was also a group effect for mothers on controllability; mothers in the comparison group rated their child's positive behaviour as caused by factors more controllable by the child than mothers in ASD group.

Parent affect and parent–child relationship

Results of the dyadic MLMs examining the association between parental attributions and positive affect, negative affect and closeness in the parent–child relationship in the ASD group are in Table 4. At the between-family level, fathers' rating of global negative behaviour problems by their child with ASD was positively associated with fathers' level of negative affect. Additionally, household income was positively associated with mothers' level of positive affect. Fathers who rated their child with ASD as having higher global negative behaviour problems (relative to lower) reported a lower level of positive affect. Finally, the child with ASD's age and functional skills were positively associated with mothers' rating of closeness in parent–child relationship. For mothers and fathers, there was a negative association between global negative behaviour problems of the child with ASD and closeness in parent–child relationship. When controlling for between-family effects, parental attributions were not associated with level of positive or negative affect in mothers or fathers in ASD group. Higher ratings of stability were associated with a closer parent–child relationship in mothers and fathers in ASD group.

Child and parent factors

The results of the dyadic MLMs examining the association between child and parent factors and parental attributions in the ASD group are in Table 5. When all variables were entered in the model, the child with ASD's age was positively associated with mothers' ratings of locus of control and stability. The child with ASD's global negative behaviour problems was negatively associated with mothers' ratings of locus of control. The child with ASD's functional skills was positively associated with mothers' ratings of stability. Child factors were not associated fathers' attributions. In fathers of children with ASD, there was a positive association between parent education and ratings of controllability. Parent education was not associated with parental attributions in mothers of children with ASD. Associations had a small effect size.

Discussion

Our study provides the first examination of parental attributions for positive behaviour in children with ASD and association with parent affect and closeness in parent–child

relationship. Within couples, mother and father attributions of locus of control and stability of the child with ASD's positive behaviour were similar and positively associated with one other. In contrast, within couples, mothers and fathers often disagreed about how much the child with ASD had control over the positive behaviour. This pattern largely mirrored our findings for parents of children without neurodevelopmental disabilities. Overall, parents of children with ASD demonstrated a diminished positivity effect; mothers and fathers of children with ASD were less likely to believe that positive child behaviour was due to factors internal to the child and stable than parents in the comparison group. Mothers of children with ASD were also less likely to believe that the son/daughter could control the positive behaviour than mothers in the comparison group. This pattern is consistent with evidence from previous within-group studies (Whittingham et al. 2008; Hartley et al. 2013). This diminished positivity effect may be due to a negative societal view of ASD and/or a context of high parenting stress, which may alter attributions in pessimistic and negative ways.

In our study, parental attributions for the child with ASD's positive behaviour were not associated with parent level of positive or negative affect after controlling for between-family parent and child factors, in contrast to our hypothesis. However, in support of our hypothesis, parental attributions were associated with closeness in the parent-child relationship, albeit the effect was small. Specifically, attributing the child with ASD's positive behavior to factors that were stable was associated with a closer parent-child relationship in mothers and fathers. Evidence from other populations indicates that giving children credit for positive behavior leads to sensitive and warm parenting behaviours (e.g. Park et al. 2016). Thus, parents of children with ASD who believe that stable factors caused the positive child behaviour may behave in ways that foster closer parent-child relationships. However, the present study cannot tease apart causality. A closer parent-child relationship could alter parental attributions.

It is not clear why parental attributions related to stability, but not locus of control or controllability, were associated with closeness in parent-child relationship in parents of children with ASD. Perhaps believing that positive child behaviour is the result of factors external to the child with ASD and outside of the child's control (e.g. due to parenting or intervention) is not maladaptive. Indeed, parents may feel a sense of self-efficacy and empowerment if they believe that their efforts or interventions contributed to positive child behaviour.

Variability in parental attributions was associated with child and parent factors, albeit effects were small. In support of our hypothesis, mothers of children with ASD who had higher functional skills (as compared to lower) believed that the positive child behaviour was due to more stable factors. Moreover, mothers of children with ASD with higher global negative behaviour problems believed that the positive child behaviour was due to factors less internal to the child. Thus, overall, if the child with ASD had higher impairment, mothers gave their son/daughter less credit for positive behaviour.

In support of our hypothesis, mothers of older (rather than younger) children with ASD were more likely to attribute positive child behaviour to factors internal to the child and stable.

This may reflect understanding of developmental gains in behavior regulation ability and mirrors findings from general population (Zeedyk 1997). It is not clear why fathers' beliefs were not associated with child factors as seen in mothers. This mother–father difference could be due to fathers spending less time than mothers in parenting given a marked gender division of labour (Hartley et al. 2014); fathers of children with ASD may be less tuned into the role of child factors on behaviour regulation. Alternatively, previous studies of parental attributions focused on mothers. Mother–father differences in parenting styles and child expectations have been reported (e.g. Horvath & Lee 2015). Thus, fathers' attributions may be influenced by different factors than mothers. In the present study, fathers with higher education (rather than lower) believed that their child with ASD's positive behaviour was more controllable by the child. This finding occurred at a trend level in mothers. Higher educated parents may have more insight into child behavior regulation abilities.

There are strengths to the present study. We included mothers and fathers and had a comparison group. We also utilised a narrow child age range, allowing understanding of findings in a tight developmental context. There are also study limitations. Our sample was largely Caucasian, non-Hispanic and middle socio-economic status. This reflects the Midwestern state sampled and population-level trends in ASD diagnosis (Durkin et al. 2010). To assess parental attributions, parents' reported on a recent positive child behaviour. This allowed parents to think of a specific event when rating; however, the event may not be representative of parental attributions broadly. It is possible that the positive behaviours described by parents of typically developing children are systematically different from those described by parents of children with ASD; this possibility and whether it accounts for group differences in parental attributions should be examined in future studies. Parents reported on all variables; shared method variance is a concern. Longitudinal studies need to test time-order pathways as our study cannot discern whether parental attributions shape parental affect and the parent–child relationship or vice versa. Finally, there was only modest agreement between mothers and fathers in parental attributions; future studies should elucidate mechanisms (e.g. parenting roles or types of positive behaviors identified) contributing to this discrepancy.

In summary, our study adds to the small body of research on positive behaviours of children with ASD. Parents of children with ASD were less likely to give their child credit for positive child behaviour than parents of children without neurodevelopmental disabilities, albeit this effect was small. Within couples, parental attributions of mothers and fathers of children with ASD were largely in tune, with the exception of beliefs about controllability. Parental attributions regarding stability were associated with closeness in the parent–child relationship for mothers and fathers of children with ASD. The level of impairment and age of the child with ASD were associated with mothers' attributions whereas parent education was associated with fathers' attributions. Interventions altering parental attributions, such as Stepping Stones Triple P (Sanders et al. 2004), should focus on positive child behaviours, in addition to negative behaviour problems. Altering parental attributions may lead to closer parent–child relationships in families of children with ASD.

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Table 1.

Socio-Demographic Characteristics of the Autism Spectrum Disorder (ASD) and Comparison groups

	ASD (n = 175)	Comparison (n = 170)	t value or χ^2 , p value
Mother			
Age in years (M [SD])	38.89 (5.68)	39.04 (5.74)	$t(342) = -0.24, p = .80$
Race/Ethnicity (N [%])			
White, Non-Hispanic	159 (90.8%)	149 (88.2%)	$\chi^2(2, N = 344) = 1.73, p = .42$
Other	16 (9.1%)	20 (11.4%)	
Education (N [%])			
No HS Degree	1 (1.1%)	3 (1.7%)	$\chi^2(5, N = 344) = 14.13, p = .02$
HS Degree or equivalency	10 (5.7%)	9 (5.3%)	
Some college	33 (18.9%)	16 (9.5%)	
College degree	82 (46.9%)	66 (39.1%)	
Some Graduate school	11 (6.3%)	15 (8.9%)	
Graduate degree	38 (21.7%)	60 (35.5%)	
Father			
Age in years (M [SD])	40.87 (6.08)	40.82 (6.61)	$t(342) = 0.08, p = .93$
Race/Ethnicity (N [%])			
White, Non-Hispanic	155 (88.6%)	147 (87.0%)	$\chi^2(2, N = 344) = 0.20, p = .65$
Other	20 (11.4%)	22 (13.0%)	
Education (N [%])			
No HS Degree	8 (4.6%)	3 (1.8%)	$\chi^2(5, N = 344) = 10.02, p = .08$
HS Degree or equivalency	19 (10.9%)	11 (6.5%)	
Some college	30 (17.4%)	21 (12.4%)	
College degree	76 (43.4%)	78 (46.2%)	
Some Graduate school	10 (5.7%)	7 (4.1%)	
Graduate degree	32 (18.3%)	49 (29.0%)	
Relationship Length (M [SD])	14.55 (5.49)	15.31 (5.11)	$t(339) = 1.35, p = .18$
Household income (M [SD])	9.15 (3.05)	10.74 (2.72)	$t(340) = -5.08, p < .01$
Number of Children (M [SD])	2.37 (1.06)	2.56 (1.07)	$t(341) = -1.59, p = .11$
Target Child			
Male (N [%])	149 (85.1%)	143 (84.6%)	$\chi^2(2, N = 344) = .02, p = .89$
Age in years (M [SD])	7.95 (2.28)	7.98 (2.38)	$t(342) = -.13, p = .89$
ID (N [%])	63 (36.0%)	0 (0%)	$\chi^2(2, N = 344) = 74.48, p < .01$
SRS (M [SD])	78.05 (8.73)	51.10 (8.64)	$t(341) = 9.30, p < .01$
CBCL (M [SD])	64.90 (8.46)	48.74 (8.59)	$t(341) = 17.56, p < .01$
GAC (M [SD])	64.53 (17.73)	98.15 (15.92)	$t(337) = -18.33, p < .01$

Note. HS = High school; ID = intellectual disability; SRS = Social Responsiveness Scale Second Edition Total T-score; CBCL = Child Behavioural Checklist total T-score, GAC = General Adaptive Behaviour Composite, Adaptive Behaviour Assessment System

Table 2.

Means and Standard deviations for Parental Attributions in Mothers and Fathers of Children with Autism Spectrum Disorder (ASD) and Comparison Group

	ASD		Comparison	
	Mothers	Fathers	Mothers	Fathers
Locus of Control	5.19 (1.64)	5.08 (1.52)	6.37 (1.07)	6.26 (1.03)
Stable	5.57 (1.58)	5.63 (1.31)	6.47 (1.14)	6.31 (1.12)
Controllability	5.45 (1.48)	5.55 (6.2)	6.49 (1.17)	6.20 (1.25)

Table 3.

Dyadic Multilevel Models of Parental Attributions for Positive Child Behaviours by Group (Parents of Children with Autism Spectrum Disorder vs. Comparison Group).

	Locus of Control			Stability			Controllability							
	Mother			Father			Mother			Father				
	Coeff (SE)	t-ratio	Effect size r	Coeff (SE)	t-ratio	Effect size r	Coeff (SE)	t-ratio	Effect size r	Coeff (SE)	t-ratio	Effect size r		
Level 1														
Intercept	5.75 (0.08)**	75.70		5.66** (0.07)	82.61		6.02** (0.08)	80.33	5.94** (0.07)	88.59	5.99** (0.07)	85.41	5.83** (0.07)	79.32
Level 2														
Group	−0.62(0.12)**	5.17	.27	−0.58 (0.11)**	5.13	.27	−0.44 (0.13)*	3.35	−0.40 (0.11)**	3.61	−0.49 (0.11)**	4.41	−0.11 (0.11)	0.97
Parent Edu	−0.03 (0.05)	0.48	.03	0.01 (0.04)	0.01	.00	0.004 (0.06)	0.08	0.04 (0.04)	0.88	0.01 (0.05)	0.17	0.08 (0.05)	1.79
Income	−0.01 (0.03)	0.11	.01	−0.01 (0.02)	0.34	.02	0.02 (0.03)	0.16	0.02 (0.02)	0.72	0.01 (0.03)	0.30	0.03 (0.03)	1.16
				Standard Deviation (Variance)										
Level-1 Intercept			1.28 (1.66)											1.33 (1.76)

Note. Three multilevel models conducted – 1 = predicting locus of control for mothers and fathers, 2 = model predicting stability for mothers and fathers, 3 = predicting controllability for mothers and fathers. Coeff = coefficient. SE = Standard Error.

* $p < .05$,

** $p < .01$.

Group = Parents of Children with ASD (1) vs. Comparison group of parents of children without disabilities (-1). Effect size $r = \sqrt{t^2/(t^2 + df)}$.

Table 4.
Dyadic Multilevel Models of Parental Attributions Predicting Positive Affect, Negative Affect, and Closeness in the Parent-Child Relationship

	Negative Affect			Positive Affect			Parent-Child relationship		
	Mother		Father	Mother		Father	Mother		Father
	Coeff (SE)	t-ratio	Effect size r	Coeff (SE)	t-ratio	Effect size r	Coeff (SE)	t-ratio	Effect size r
Level 1									
Intercept	22.16 (0.73)	30.41		24.01 (0.62)	38.59		9.83 (0.66)	14.96	
Level 2									
Child Functioning	0.03 (0.03)	1.04	.08	0.03 (0.03)	0.99	.07	-0.02 (0.02)	0.70	.02
Child Gender	-1.23 (1.44)	0.95	.07	0.65 (1.17)	0.56	.04	0.15 (1.08)	0.14	.01
Child Age	0.14 (0.22)	0.63	.05	0.05 (0.20)	0.25	.02	-0.15 (0.18)	0.84	.06
Parent Edu	0.13 (0.47)	0.29	.02	0.01 (0.36)	0.99	.07	0.34 (0.31)	1.09	.08
Parent Ethnicity	-0.76 (0.73)	1.03	.08	0.98 (0.58)	1.69	.13	-1.03 (0.69)	1.49	.11
Parent Income	0.24 (0.17)	1.37	.10	-0.01 (0.15)	0.92	.07	-0.35 (0.15)	2.42*	.18
Child Beh Problems	0.11 (0.07)	1.69	.13	0.13 (0.06)	2.13*	.16	0.08 (0.05)	1.51	.11
Child Autism Symp	0.03 (0.08)	0.22	.02	0.03 (0.07)	0.42	.03	0.07 (0.05)	1.29	.10
Locus of Control	-0.41 (0.36)	1.15	.09	-0.05 (0.28)	0.20	.02	0.04 (0.26)	0.15	.01
Stability	0.68 (0.38)	1.77	.13	0.33 (0.38)	0.88	.07	-0.22 (0.25)	0.88	.07
Controllability	0.16 (0.36)	0.44	.03	0.46 (0.31)	1.46	.11	-0.24 (0.32)	0.75	.06
				Standard Deviation (Variance)					
Level-1 Intercept			6.14 (37.73)			5.32 (28.35)			5.98 (35.75)

Note. Three multilevel models conducted – 1 = predicting locus of control for mothers and fathers, 2 = predicting stability for mothers and fathers, 3 = predicting controllability for mothers and fathers. Coeff = coefficient. SE = Standard Error.

Effect size $r = \sqrt{t^2/(t^2 + df)}$.

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Note. Three multilevel models conducted -1 = predicting locus of control for mothers and fathers, 2 = predicting stability for mothers and fathers, 3 = predicting controllability for mothers and fathers. Coeff = coefficient. SE = Standard Error. SD = Standard deviation.

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p .01.

Effect size: $r = \sqrt{t^2/(t^2 + df)}$.