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# Parenting stress and autism: The role of age, autism severity, quality of life and problem behaviour of children and adolescents with autism

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## Abstract

While stress is a common experience for parents caring for a child with a developmental disability, current measures fail to distinguish between general stress in parents and the demands of parenting and perceptions of parenting skills (parenting stress). This study examined differences in 'parenting stress' reported by parents of children with autism and typically developing children. This study examined the role of child characteristics (age, autism severity, child quality of life and problem behaviour) on parenting stress in 150 parents of cognitively able children and adolescents with autism. The results revealed that child hyperactivity was the only factor significantly related to parenting stress in parents of children with autism, overruling measures of autism severity and child quality of life. This finding indicates the significant influence of problematic behaviours on parenting demands and perceptions of parenting skills in parents of children with autism, over other child characteristics conceived as within the parent's control. Study implications for future research are discussed.

## Keywords

age, autism, autism severity, parenting stress, problem behaviour, quality of life

## Introduction

The negative impact of caring for a child with an autism spectrum disorder (ASD) on parental well-being has been well documented. Due to the broad range of difficulties and behavioural problems that these children face, raising a child with an ASD produces chronic stress and strain on parents. Although studies have focused on experiences of parents of preschoolers and adolescents (e.g. Smith et al., 2008) and adolescents and young adults (e.g. Lounds et al., 2007), to date, research has struggled to delineate the experience of stress in parents of children across a broad age range, with little focus on parents of cognitively able children with ASDs (i.e. with IQs within the normal range). In addition, the way in which ASD impacts stress associated with *parenting* skills (i.e. the demands of parenting and perceptions of parenting ability), in comparison to 'general stress' experienced by parents, has yet to be explored. The objective in this study was to assess the role of age, ASD severity, parent's perception of child quality of life (QoL) and problem behaviour in parenting stress in a large sample of parents caring for a cognitively able child with ASD.

Stress is a natural experience related to parenting and the associated responsibilities of caring for a child (Koeske and Koeske, 1990; Peterson and Hawley, 1998; Tahmassian et al., 2011). However, stress related to caring for a child with a developmental disorder, such as ASD, may be qualitatively different from the stress experienced by parents of typically developing (TD) children (Deater-Deckard and Scarr, 1996). Numerous studies have shown that mothers of children with ASD report consistently higher general stress levels than mothers of TD children and children with other disorders, such as Down's syndrome or developmental delay (Baker-Ericzen et al., 2005; Bromley et al., 2004;

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Eisenhower et al., 2005; Estes et al., 2009; Pisula and Kossakowska, 2010).

Research has also focused on the impact of child characteristics on general stress in parents, suggesting that the stress levels of parents of children with ASDs may be mediated by child variables, such as the child's age (Gray, 2002; Orr et al., 1993). However, findings are generally inconsistent. For example, Orr et al. (1993) highlighted age-related changes in maternal stress in mothers of children with developmental delays, with mothers of children aged 6–12 years (middle childhood) reporting significantly higher levels of stress than mothers of children aged 2–5 years (preschool) and 13–18 years (adolescence). Other studies suggest higher stress in parents of younger children (e.g. Barker et al., 2011; Fitzgerald et al., 2002; Gray, 2002; Lounds et al., 2007; Smith et al., 2008) or increasing stress with age (e.g. Konstantareas and Homatidis, 1998; Tehee et al., 2009). In addition, a recent study by Peters-Scheffer et al. (2012) indicated no relationship between children's developmental age, maternal stress or child IQ. Assessing the influence of child age on parenting stress enables researchers to measure the impact of caring for a child with ASD over time, capturing multiple stressors associated with a child's transition across key developmental periods (Lounds et al., 2007; Orr et al., 1993; Smith et al., 2008; Tehee et al., 2009).

A similar inconsistency in findings is evident in research examining the influence of ASD symptom severity (i.e. communication and socialization impairment, repetitive and stereotyped behaviours and interests) on general stress in parents. While the majority of studies examining carer outcomes indicate a positive relationship between ASD symptoms and general stress in parents (e.g. Benson, 2006; Bromley et al., 2004; Davis and Carter, 2008; Hastings and Johnson, 2001; Konstantareas and Homatidis, 1998), some research has also indicated a lack of association between symptom severity and general stress outcomes (Hastings et al., 2005; Manning et al., 2011; Morgan, 1988). These findings are surprising as greater symptom severity is likely to result in higher levels of dependency on parents, increasing the strain associated with caring for a child with ASD. For example, Lyons et al. (2010) highlighted ASD symptom severity to be a strong and consistent predictor of general stress in parents, suggesting that the demands of managing a child's ASD symptoms may threaten a parent's coping resources, resulting in greater stress and concern.

The inconsistent associations between age, ASD severity and parenting stress may be related to methodological concerns apparent in the general stress literature, in particular, the manner in which parent stress is assessed and the varying definitions of stress in parents. Broad conceptualizations of stress may include the balance of any perceived resources and demands associated with parenting (Deater-Deckard and Scarr, 1996). However, this approach likely fails to distinguish predictors of general stress in

parents from predictors of stress that specifically result from the act of parenting. For example, common measures of parent stress capture aspects of stress attributed to the child (i.e. child behaviour problems), parent (i.e. parent-child relationship, parenting) and general life stress (Abidin, 1995). Importantly, predictors of stress in parents of children with ASDs are highly correlated and overlap with outcomes measures, particularly measures assessing child domains. A more accurate definition of parenting stress captures parent's feelings about their parenting skills, tapping into the demands of parenting (Anthony et al., 2005; Deater-Deckard and Scarr, 1996). It is this latter definition of parenting stress that was adopted in this study. Consequently, adopting a more circumscribed measure of 'parenting stress' may help understand the impact of autism on an area of parental well-being that is disentangled from child features that confound common parent stress research.

While child age and ASD symptomatology are suggested to impact general experiences of stress in parents of children with an ASD, other child-related variables may also influence experiences of parenting stress. For example, unhappy children may cause parents to question their parenting skills because they might experience high levels of responsibility for such behaviours. Consequently, parents likely link their child's well-being or perceived QoL to their parenting abilities. This is a new concept in the ASD literature; however, the association between perceived child QoL and negative parent outcomes is supported by research investigating parents caring for children with severe medical conditions. In a study of parents caring for children undergoing treatment for leukaemia, Kazak and Barakat (1997) proposed that poorer child QoL, in particular, greater emotional distress, during treatment was associated with greater post-traumatic symptoms and anxiety in parents post treatment. Unlike child age and the severity of a child's ASD symptoms, children's perceived QoL may be generally conceived as within the parent's control. While research has investigated the influence of parent stress on child outcomes, the impact of the child's perceived QoL on parent's perceptions of their parenting skills is a new concept that has yet to be explored.

Unlike child characteristics previously described, maladaptive behaviours that are not part of the ASD diagnosis per se, such as attentional difficulties, and externalizing and internalizing behaviour problems may affect parenting stress. These problem behaviours have been found to consistently predict greater levels of general stress in parents caring for a child with ASD (Hastings, 2003; Lecavalier et al., 2006; Manning et al., 2011; Orsmond et al., 2006).

For example, parents of children with attention-deficit hyperactivity disorders (ADHDs) have been found to report higher levels of stress than comparison parents (Graziano et al., 2011; Johnson and Mash, 2001). In addition, hyperactivity has been found to be associated with repetitive

behaviours and impulsivity (Burbidge et al., 2010), and challenging behaviours (Davies et al., 2008), which are frequently prevalent in children with ASDs (McClintock et al., 2003; Matson and Nebel-Schwalm, 2007). Such behaviours have been found to increase general stress in parents (e.g. Saloviita et al., 2003) and are likely to increase parenting stress due to the perceived control of parents to manage their child's disruptive behaviour.

As research suggests that comorbidity of ADHD symptoms in ASDs is a common phenomena (Reiersen and Todd, 2008; Simonoff et al., 2008), it is likely that parenting stress is greater in parents of children with ASD and ADHD symptoms than in parents of children with ASD only. This represents an additive effect in which higher levels of parenting stress may be reported in parents of children with co-morbid symptomatology (i.e. ASD and disruptive behaviour disorders). In addition, the use of a circumscribed measure of parenting stress may help to clarify the stance of previous literature and to develop a clearer understanding of the role of child behaviour on parent stress outcomes.

Such findings are further supported by research of comparison groups in children with ASDs and other developmental disorders. This evidence suggests that children with ASDs indicate higher levels of problem behaviour (i.e. behavioural and emotional problems) and higher reports of general stress in parents (Eisenhower et al., 2005; Estes et al., 2009; Totsika et al., 2011).

While the impact of caring for a child with autism on the general stress experienced by parents is well established, 'parenting stress' in relation to the pressures solely associated with *raising* a child with ASD (i.e. parent's perceptions of their parenting skills) has yet to be explored. In order to determine the impact of this new definition of 'parenting stress' on parents of children with ASDs, this study aimed to compare reports of parenting stress in parents caring for a cognitively able child with ASD with reports of parenting stress in parents of TD children. It was predicted that parents caring for a child with ASD would experience significantly higher levels of parenting stress than parents of TD children.

Evidence suggests that caring for a child with autism may be a distinctive experience influenced by factors unique to the role of caring for a child with a developmental disability. A focus on parenting features and the factors that promote or suppress parenting stress experienced specifically by mothers and fathers of children with ASDs will allow a more comprehensive understanding of how ASD impacts the lives of these families. The second aim of this study, therefore, was to investigate the impact of child-related factors (i.e. age, ASD severity, perceived child QoL and problem behaviour) on parenting stress in parents of children with ASDs. It was also predicted that parenting stress would be significantly associated with perceived child QoL and problem behaviours in comparison to measures beyond the parent's perceived control, such as child age and symptom severity.

As a child's IQ has also presented inconsistent findings within the ASD literature, with research supporting an association between child IQ and stress in parents (e.g. Koegel et al., 1992) and a lack of association between these variables (e.g. Bishop et al., 2007), this study controlled for children's verbal ability among other child characteristics within the ASD group.

## Method

### Participants

The sample of participants comprised 150 parents of Dutch children and adolescents with ASDs (131 boys and 19 girls) and 54 parents of TD participants (47 boys and 7 girls). Respondents were mothers (72%), both parents (20%, completing one set of questionnaires) or fathers (8%). Children with ASDs were aged between 6.4 and 18.8 years ( $M = 13.23$  years, standard deviation (SD) = 2.98 years), and TD children were aged between 6.0 and 16.8 years ( $M = 11.72$  years, SD = 2.77 years). The majority of parents were married (90%), well educated (middle to higher vocational education; 84%) and worked in middle-level to higher level jobs (79%).

All children within the ASD group attended a school for children with autism who were cognitively able (commonly referred to as children with high-functioning autism). School admission criteria included IQ within the normal range ( $IQ > 70$ ) and a clinical diagnosis of ASD. The diagnostic classification was given independently from this study, by a psychiatrist using established *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed., rev.; *DSM-III-R*; American Psychiatric Association (APA), 1994) and *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM-IV-TR*; APA, 2000) criteria, and based on examination by multiple experienced clinicians (psychologists, psychiatrists and educationalists). The diagnostic process included a detailed developmental history, and psychiatric and neuropsychological examinations.

In this study, diagnosis of ASD was confirmed with the Dutch version of the Social Responsiveness Scale (SRS; Roeyers et al., 2011). All children received a score of 50 or above, meeting cut-off criteria for ASD (see Table 3). Verbal ability within the ASD group was confirmed by children's performance on the Dutch version of the Peabody Picture Vocabulary Test-III (see Table 3; Dunn and Dunn, 2004). TD children and adolescents were recruited via public primary and secondary schools in the vicinity of Amsterdam.

### Measures

**Parenting stress index.** Parenting stress was measured using the abbreviated Dutch translation (Nijmeegse Parenting Stress Index (NPSI); De Brock et al., 1992) of the Parenting

**Table 1.** Parenting distress items.

PSI item	Domain
1. Being a parent of this child is harder than I thought	Competence
2. I experience many more problems raising children than I thought	Competence
3. I often feel like quitting	Depression
4. I feel that I am not able to take care of my child as well as I thought	Competence
5. Lately, I find it very hard to make decisions regarding my child	Depression
6. I often feel that I cannot cope with things that well	Competence
7. Since I had children, I am tired more quickly than I used to be	Health
8. However well I try raising my child, sometimes I feel I cannot control things very well	Competence
9. Often, I see other parents with their children and think 'I would want to be a father/mother like that'	Competence
10. I often do not understand my child	Attachment
11. I am confident in the future rearing of my child	Depression

PSI: Parenting Stress Index.

Stress Index (PSI; Abidin, 1983). From this measure, the 11-item Parenting Distress Subscale was used to assess parenting stress (i.e. items that solely reflect perceived parenting characteristics; Ashford et al., 2008; Mesman and Koot, 2000). These items have an internal consistency of .85, representing a short index for parenting stress. As shown in Table 1, items capture the four domains of competence (6), attachment (1), depression (3) and health (1). Answers ranged on a 5-point Likert scale ranging from 1 (totally disagree) to 5 (totally agree) resulting in a total stress score, with higher scores representing more stress. The Cronbach's alpha reliability of the NPSI is between .92 and .95 (De Brock et al., 1992). High internal consistency was obtained for the NPSI in this study in both ASD (Cronbach's alpha = .86) and TD (Cronbach's alpha = .87) groups.

**SRS.** Autism symptom severity was measured using the Dutch version of the SRS (Roeyers et al., 2011). This 65-item parent questionnaire was developed to examine autistic traits, and consists of five scales: social awareness, social cognition, social communication, social motivation and autistic mannerisms. A higher total score indicates more autistic traits. This measure has been shown to compare well with the Autism Diagnostic Interview-Revised (ADI-R) in the assessment for ASDs ( $r = .64$ ; Constantino et al., 2003), and good reliability has been reported (Cronbach's alpha = .94; Constantino and Gruber, 2005; Roeyers et al., 2011). High internal consistency was obtained in this study for both ASD (Cronbach's alpha = 0.91) and TD (Cronbach's alpha = .96) groups.

**Pediatric Quality of Life Inventory.** The Pediatric Quality of Life (PedsQL) Inventory (Varni et al., 2001) is a 23-item parent questionnaire developed to assess perceived child QoL. Specifically, the PedsQL assesses the occurrence of problems in the past 4 weeks in several domains of functioning: physical, social, emotional and school functioning. Each item can be answered on a 5-point scale ranging from 100 (never) to 0 (almost always). A Total Scale Score was

obtained by dividing the sum of items by the number of answered items in all domains (to account for missing data), with higher scores indicating greater perceived child QoL. Good reliability and validity have been reported for the Total Score of the PedsQL (Cronbach's alpha = 0.89; Varni et al., 2001). High internal consistency was obtained in this study for both ASD (Cronbach's alpha = 0.83) and TD (Cronbach's alpha = .91) groups.

**Disruptive Behavior Disorders Rating Scale.** The Disruptive Behavior Disorders Rating Scale (DBD; Pelham et al., 1992) is a 41-item parent questionnaire developed to assess problem behaviours in children. It consists of symptom descriptions of four disorders: ADHD inattentive subtype (Attention), ADHD hyperactive/impulsive subtype (Hyperactivity), oppositional defiant disorder (ODD) and conduct disorder (CD). Each statement is rated on how well it describes the child's behaviour on a 4-point scale ranging from 0 (not at all) to 3 (very well). A higher score indicates more symptoms of externalizing problem behaviours.

Adequate psychometric properties of the DBD have been reported for each of the four DBD subscales: Attention (Cronbach's alpha = .92), Hyperactivity (Cronbach's alpha = .90), ODD (Cronbach's alpha = .90) and CD (Cronbach's alpha = .72; Oosterlaan et al., 2008; Pelham et al., 1992). Disruptive behaviour was only measured within the ASD group with high internal consistency obtained in this study: Attention (Cronbach's alpha = .82), Hyperactivity (Cronbach's alpha = .84), ODD (Cronbach's alpha = .87) and CD (Cronbach's alpha = .63).

## Procedure

After receiving written informed consent from parents and participants (if 12 years or older at time of testing), each participant was seen during two individual test sessions at school, separated by 1 week to 1 month. The currently described measures were part of a larger test procedure, administered by trained graduate students in psychology,

**Table 2.** Parenting stress scores in ASDs.

Parenting stress	ASD			
	<i>n</i>	<i>M</i>	<i>SD</i>	Range
6- to 8-year-olds	4	34.75	6.02	27–40
9- to 12-year-olds	51	28.73	8.20	12–47
13- to 16-year-olds	64	30.19	10.39	11–54
17- to 19-year-olds	31	30.19	10.39	11–54

ASD: autism spectrum disorder; SD: standard deviation.

**Table 3.** Characteristics of participants with ASDs.

Child variables	Descriptives		
	<i>M</i>	<i>SD</i>	Range
Verbal ability			
Standard score	105.08	12.78	72–132
Social responsiveness			
Total	83.75	19.78	51–133
Quality of life			
Total	64.12	11.88	22–90
Disruptive behaviour			
Attention	11.62	5.05	1–25
Hyperactivity	9.44	5.23	0–24
ODD	6.76	4.31	0–21
CD	1.16	1.81	0–9
Parenting stress			
Total	29.98	9.42	11–63

ASD: autism spectrum disorder; SD: standard deviation; CD: conduct disorder; ODD: oppositional defiant disorder.

health science or medicine. After children participated in the study, parents received the questionnaires about their child's behaviour and the parenting measure. Parents in the ASD group completed all questionnaires, while parents in the TD group only completed measures of parenting stress.

## Results

### Parenting stress

A one-way between-groups analysis of covariance (ANCOVA) was conducted to examine the influence of group (ASD or TD children) on parenting stress, controlling for child age. The results indicated a significant group difference, with parents of children with ASDs ( $M = 29.98$ ,  $SD = 9.42$ ), reporting significantly greater levels of parenting stress than parents of TD children ( $M = 20.72$ ,  $SD = 8.59$ ),  $F(1, 201) = 38.34$ ,  $p < .001$ , partial  $\eta^2 = 0.17$ .

### Child variables associated with parenting stress in ASD

Outliers were evident in the child CD scores. These outliers were characterized as values that were three inter-quartile

ranges (IQRs) from the median. Such values were re-assigned a value that was 2 IQRs from the median. As violation of normality was also evident in these scores, logarithm transformations were applied for this variable and included in subsequent analyses. To address study aim 2, assessing differences in parenting stress across key developmental periods, children in the ASD sample were grouped into four age cohorts signifying important childhood transitions, including school entrance and departure. Table 2 presents descriptive statistics for parenting stress in the ASD group, stratified by age cohorts. There was no significant difference in parenting stress between the age cohorts in the ASD group,  $F(3, 146) < 1$ . Sample characteristics for the ASD cohort are presented in Table 3.

In preliminary analyses, Pearson's correlations coefficients were conducted to investigate relationships between child characteristics and parenting stress within the ASD sample (see Table 4). Child age and verbal ability (raw score) were the only variables found to demonstrate no association with parenting stress in the current sample. Significant small to moderate positive correlations were found between child social responsiveness, attention, hyperactivity, oppositional behaviour, conduct behaviour and parenting stress. Results also indicated a significant negative correlation between perceived child QoL and parenting stress in the current sample.

A hierarchical multiple regression analysis was performed on the ASD sample to investigate the unique contribution of child age, verbal ability (raw score), ASD severity (social responsiveness), perceived child QoL and disruptive behaviours to the parenting stress (see Table 5). Child age and verbal ability were entered as the first predictors (step 1), followed by social responsiveness (step 2), perceived child QoL (step 3) and the four subscales of disruptive behaviour in the final step (step 4). This model indicated that 18% of the variance in parenting stress was explained by the child measures. Adding age and verbal ability into the regression model did not explain a significant variance in parenting stress. Autism symptom severity at step 2 explained a significant amount of variance (6%) in parenting stress ( $\beta = .25$ ,  $p = .005$ ), indicating that lower levels of social responsiveness were related to higher parenting stress. Adding perceived child QoL into the regression model at step 3 explained a further 3% of variance in parenting stress ( $\beta = -0.21$ ,  $p = .04$ ), with greater perceived child QoL predicting lower levels of parenting stress. After controlling for the effects of all other predictors at step 4, hyperactivity was the only variable that accounted for a significant increment in the variance of parenting stress in the final model (8%;  $\beta = 0.20$ ,  $p = .05$ ), indicating that a higher level of hyperactivity was uniquely related to higher levels of parenting stress. After adding perceived child QoL and disruptive behaviour in step 4, social responsiveness no longer significantly contributed to the equation.

**Table 4.** Pearson's correlations for ASD sample.

Variable	1	2	3	4	5	6	7	8	9
1. Age		0.73**	-0.17*	0.20*	-0.04	-0.26**	-0.19*	-0.08	0.03
2. Verbal ability			-0.13	0.20*	-0.05	-0.23**	-0.18*	-0.08	-0.05
3. Social responsiveness				-0.58**	0.35**	0.45**	0.39**	0.19*	0.24**
4. Quality of life					-0.49**	-0.40**	-0.42**	-0.23**	-0.27**
5. Attention (DBD)						0.52**	0.32**	0.12	0.29**
6. Hyperactivity (DBD)							0.36**	0.16*	0.32**
7. ODD (DBD)								0.60**	0.26**
8. CD OLN (DBD)									0.19*
9. Parenting stress									

ASD: autism spectrum disorder; DBD: Disruptive Behavior Disorders Rating Scale; CD: conduct disorder; ODD: oppositional defiant disorder; OLN: outliers were trimmed back 2 IQRs from the median and then natural logarithm transformed; IQR: inter-quartile range.

\* $p < .05$ ; \*\* $p = .005$ .

**Table 5.** Hierarchical multiple regression analyses of child predictors of parenting stress in ASD.

Predictors	Parenting stress	
	R <sup>2</sup> change	$\beta$
Step 1	0.01	
Age		0.14
Verbal ability		-0.15
Step 2	0.06	
Age		0.17
Verbal ability		-0.14
Social responsiveness		0.25**
Step 3	0.03	
Age		0.18
Verbal ability		-0.12
Social responsiveness		0.13
QoL		-0.21*
Step 4	0.08	
Age		0.21
Verbal Ability		-0.11
Social Responsiveness		0.03
QoL		-0.09
DBD Attention		0.10
DBD Hyperactivity		0.20*
DBD ODD		0.09
DBD CD OLN		0.08
Total R <sup>2</sup>	0.18*	
Total F(8, 136)	3.40***	

ASD: autism spectrum disorder; DBD: Disruptive Behavior Disorders Rating Scale; CD: conduct disorder; ODD: oppositional defiant disorder; OLN: outliers were trimmed back 2 IQRs from the median and then natural logarithm transformed; IQR: inter-quartile range.

\* $p < .05$ ; \*\* $p = .005$ ; \*\*\* $p = .001$ .

## Discussion

This study is the first to date to investigate the effect of child characteristics on the demands of parenting and perceptions of parenting skills ('parenting stress'), in a large sample of parents caring for a child with ASD. This study

investigated whether parents caring for a cognitively able child with ASD experienced higher levels of parenting stress than parents of TD children and examined the impact of child-related factors (i.e. age, ASD severity, perceived child QoL and problem behaviour) on parenting stress in parents of children with ASDs.

The hypothesis that parents caring for a child with ASD would experience significantly higher levels of parenting stress than parents of TD children was supported. A significant group difference in parenting stress was found; however, there was no significant difference in parenting stress between the four ASD age cohorts. The hypothesis that parenting stress would be significantly associated with perceived child QoL and problem behaviours in comparison to measures that coincide with characteristics inherent in the child, such as child age, verbal ability and symptom severity, was partially supported. As predicted, child age, verbal ability and symptom severity were not associated with parenting stress once perceived child QoL and problem behaviours were added into the regression model. While perceived child QoL was not associated with parenting stress in the final regression model, higher levels of child hyperactivity was associated with higher levels of parenting stress.

Contrary to previous findings, suggesting an association between child age and general stress in parents (Barker et al., 2011; Fitzgerald et al., 2002; Gray, 2002; Konstantareas and Homatidis, 1998; Lounds et al., 2007; Orr et al., 1993; Smith et al., 2008; Tehee et al., 2009), this study indicated no age effects. The absent association between age and parenting stress suggests that a child's stage of development, a variable outside parental control, does not influence parent feelings about their parenting skills. The lack of association also suggests that previous findings of an impact of age on general stress in parents may have resulted from the overlapping nature of measures used to capture stress associated with childhood transitions and general stress experienced by parents. Verbal ability also showed no association with parenting stress, suggesting

that a child's verbal IQ does not influence the experience of parenting stress in parents of children with high-functioning autism.

Consistent with previous findings (e.g. Hastings et al., 2005; Peters-Scheffer et al., 2012), ASD severity did not contribute significant variance to parenting stress over and above other child variables (i.e. child hyperactivity). These results indicate that parenting stress may be related to factors conceived of as within or outside a parent's control. In light of the current findings, it may be the case that parents do not attribute innate characteristics of the child (such as age and ASD symptom severity) as within their control. That is, parents may not perceive these factors to be due to their individual parenting styles or parenting skills. Such results could be speculated to indicate that parents do not blame themselves for their child's ASD, as they may attribute this to an external aetiology. Rather, autism may be perceived as an alternative style of functioning that may not in itself cause parenting stress, with ASD symptomatology simply adding to the cumulative affect of stressors impacting general stress in parents caring for a child with ASD. However, these speculations need empirical foundation.

In contrast, a child's perceived QoL and problem behaviours are characteristics that could be perceived to be within the parent's control, with parents more likely to attribute responsibility for their child's well-being and negative behaviour. As a result, parent's worry about their role in the development of such behaviours may increase their levels of parenting stress. The lack of significance of perceived child QoL in the final regression model suggests that implicit factors may be overlooked and considered less problematic than overt characteristics such as a child's degree of hyperactivity. This was also evident with regard to the type of behaviour problems found to impact parenting stress in the current sample.

The significance of hyperactivity is of interest and indicates that an additional factor, such as the perceptions of others, may play a mediating role in the relationship between child problem behaviours and parenting stress. That is, socially inappropriate and disruptive behaviours evident in hyperactive children are more likely to attract external disapproval (i.e. from strangers and family members), impacting levels of parenting stress.

The association between parenting stress and hyperactive behaviour, and absence of associations with age, ASD severity and perceived child QoL has important clinical relevance. These findings highlight the importance of providing parents with support and training in managing their child's behavioural concerns. This may include specific strategies such as reducing their child's hyperactive behaviour, psycho-education surrounding the underlying causes of their child's hyperactivity and effective coping methods to reduce parenting stress. As parents play a pivotal role in many treatment programmes for individuals with autism (Kabot et al., 2003), treatment approaches and workshops should focus on

increasing parent confidence in their ability to assist their children. Increasing parent's perceptions of their parenting skills may decrease experiences of parenting stress and assist parents in their roles as therapists and co-therapists, and with decisions surrounding their child's treatment and future. While this study did not capture the presence of ADHD diagnoses per se, the impact of hyperactivity was a prominent concern in individuals with ASDs in the current sample, supporting changes in *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-V*) in recognizing children with both ASD and ADHD presentations.

This study has some limitations. First, the measure of child behaviour problems (DBD-Revised (DBD)) was limited to the assessment of externalizing behaviours, failing to capture additional internal problems commonly measured in other studies (e.g. Bauminger et al., 2010; Davis and Carter, 2008; Eisenhower et al., 2005). Thus, this study is unable to comment on the impact of internalizing behaviours such as child depression and anxiety found to be common in children with ASDs (Bauminger et al., 2010; Eisenhower et al., 2005). Like perceived child QoL, internalizing behaviours may impact a parent's perception of control and perceived parenting skills increasing levels of parenting stress. Thus, future research is required to assess the impact of both internalizing and externalizing behaviours on parenting stress.

Second, while this study aimed to remove potential overlap between predictor and outcome variables to distinguish predictors of general stress in parents from predictors of stress that specifically result from the act of parenting, the self-reporting nature of the study resulted in parents completing both measures assessing child characteristics and parenting stress. Despite a focus on parenting stress, there remains a potential confound, with parenting stress possibly impacting the manner in which parent's rated their child's characteristics (i.e. perceived child QoL). Finally, due to school requirements, the current sample of children with autism did not exhibit a high rate of challenging behaviours, commonly found in children with ASDs. Such limitations restrict the generalisability of the current findings to parents of children with low levels of ODD and CD.

This is the first study to use a large sample of parents of children and adolescents with ASDs to investigate 'parenting stress', in comparison to parent and general stress outcomes, to capture experiences of stress in parents of children across a broad age range. Similar to outcomes in the general stress literature, this study replicates previous findings of a lack of association between child ASD symptoms (Hastings et al., 2005; Manning et al., 2011; Morgan, 1988) and stress in parents of children with ASDs. Furthermore, this study highlights the significant influence of problematic behaviours, particularly hyperactivity, on parenting demands and parenting stress, which may overrule other, more subtle, child characteristics, such as child happiness and well-being, conceived as within the parent's control. Further research is required to investigate the role

of perceived control and public perceptions on parenting to explore the contributing and protective factors for parents of children with ASDs.

### Conflict of interest

The authors declare that there is no conflict of interest.

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