

Examination of Bidirectional Relationships Between Parent Stress and Two Types of Problem Behavior in Children with Autism Spectrum Disorder

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Abstract Path analysis within a structural equation modeling framework was employed to examine the relationships between two types of parent stress and children's externalizing and internalizing behaviors over a 4-year period, in a sample of 184 mothers of young children with autism spectrum disorder. Parent stress was measured with the Parenting Stress Index-Short Form and child behavior was measured with Child Behavior Checklist/1.5–5. Across all time points, parent general distress predicted both types of child behaviors, but not vice versa. In addition, there was modest evidence of a bidirectional relationship between parenting distress and both types of child

behaviors from 12 months post-diagnosis to age 6. Results are compared to previous work in this area, with implications for early intervention.

Keywords Autism spectrum disorder · Parenting stress · Externalizing behavior · Internalizing behavior

Introduction

Children with autism spectrum disorder (ASD) experience a range of complex social, emotional, and behavioral difficulties that present significant, ongoing concerns for parents. Accordingly, increased levels of parenting stress are often reported. In a recent meta-analysis of 10 studies, Hayes and Watson (2013) found that families of children

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with ASD experienced significantly higher levels of stress compared to parents of typically developing children (mean effect size = 1.58). They also examined 16 studies that compared parenting stress in children with ASD and children with disabilities or disorders such as Down syndrome, cerebral palsy, attention deficit hyperactivity disorder, and fetal alcohol spectrum disorder. This second meta-analysis revealed that families of children with ASD reported significantly more stress than families of children with other disabilities or disorders, with a mean effect size of 0.64. The authors concluded that "...the question remaining...is no longer 'are families with ASD more stressed than families without ASD?' but 'why are families under more stress and what are the specific moderators of stress that facilitate family resilience?'" (p. 639).

Child problem behaviors are among the factors that have been identified in response to the "why?" question raised by Hayes and Watson (2013). Two types of problem behaviors are often observed among children with ASD: externalizing behaviors such as aggression, tantrums, non-compliance, and self-injurious behavior; and internalizing behaviors such as withdrawal, anxiety, and fearfulness. A number of studies have found strong associations between parent stress and child problem behaviors in general (Estes et al. 2009, 2013; Herring et al. 2006; Lecavalier et al. 2006; Tomanik et al. 2004), as well as between parent stress and externalizing and/or internalizing behaviors specifically (Bauminger et al. 2010; Hall and Graff 2012; Hastings et al. 2006; Zaidman-Zait et al. 2011). However, with few exceptions (Herring et al. 2006; Lecavalier et al. 2006), most studies to date have examined the association between parent stress and problem behaviors in children with ASD at a single point in time. Longitudinal research is needed to understand the temporal nature of this association.

In addition, evidence that higher levels of child problem behaviors are significantly related to increased parent stress is not sufficient to infer a causal relationship that is unidirectional in nature (Bauminger et al. 2010). As an alternative, Hastings (2002) proposed a transactional model in which child problem behavior increases parenting stress, which in turn disrupts parenting behavior that then feeds back to increase child problem behavior. Research within a behavior analytic framework provides empirical support for such a model of coercive processes in family routines for children with developmental disabilities, primarily ASD (Lucyshyn et al. 2004, 2011). Research with children, adolescents, and adults with intellectual disabilities has also found evidence of a bidirectional relationship between problem behavior and parent stress over time periods that vary from 12 months (Baker et al. 2003) to 6 years (Orsmond et al. 2003). However, research with participants with ASD has provided mixed results. Lecavalier et al. (2006) found evidence for a bidirectional relationship

between problem behavior and parent stress over a 12-month period in a sample of 81 children and adolescents with ASD (ages 3–18 years). However, two studies by Osborne and Reed (2010a, b) provided evidence that did not support bidirectionality. They found that, over 9–10 months, parenting stress at Time 1 predicted children's problem behavior at Time 2 but not the reverse in both young (ages 30–48 months, $M = 40$ months) and older (ages 5–16 years, $M = 7.5$ years) children. Hence, additional research is needed to understand how a transactional model might apply to specific types of behavior problems in children with ASD and to specific psychological variables and stressors that affect their parents, in both the long and short term. Such information is needed to assist practitioners involved in early intervention to provide appropriate supports to both young children with ASD and their families.

Both the long and short forms of the Parenting Stress Index (Abidin 1995) have been used extensively in ASD research. The PSI-Short Form (PSI-SF) includes three subscales: Parental Distress (PD), Parent–Child Dysfunctional Interaction (PCDI), and Difficult Child (DC), each containing 12 items. Parents rate each of the 36 items on a 5-point scale ranging from strongly disagree (1) to strongly agree (5), and the total score is seen as an indicator of the parent's overall experience of parenting stress. However, two recent studies identified problems with the psychometric properties of the PSI-SF in samples of parents of young children with ASD. In the first study, Zaidman-Zait et al. (2010) used item response theory to examine the discriminability of PSI-SF items in a sample of 141 parents (mainly mothers). They found that several items on the PCDI and DC subscales functioned poorly to discriminate parents across a range of total stress severity. In the second study, Zaidman-Zait et al. (2011) conducted a confirmatory factor analysis of the PSI-SF with a sample of 411 parents (again, mainly mothers) of young children with ASD, and found that the published three-factor model did not function adequately in this sample. They suggested a five-factor model as an alternative, based on an exploratory factor analysis.

The five factors proposed by Zaidman-Zait et al. (2011) can be divided into two broad categories: those that measure childrearing stress and those that measure personal stress/distress. These two categories were also identified in a factor analysis of the PSI-SF with parents who did and did not have histories of physical abuse toward their children (Haskett et al. 2006). The childrearing stress factors identified by Zaidman-Zait et al.—Rewards Parent, Child Demandingness, and Difficult Child—all measure aspects of stress that are directly related to the parent–child relationship and are likely to be affected by the presence of child problem behaviors. On the other hand, the personal

stress/distress factors—General Distress (GD) and Parenting Distress (PD)—contain items that were mainly derived from the original Parenting Distress subscale. The GD factor includes items describing the distress a parent experiences as a function of individual personal characteristics (e.g., depression and isolation), rather than distress specifically related to parenting. In contrast, the PD factor consists of items describing distress that is directly related to parenting (e.g., feeling trapped by the parenting role). Although Zaidman-Zait et al. (2011) found that the GD and PD subscales were moderately correlated ($r = 0.67$), they also found differences in the magnitude of their associations with both internalizing and externalizing child behaviors (as measured by the CBCL) and autism severity (on the Social Responsiveness Scale; Constantino and Gruber 2005), suggesting that each measures different aspects of stress. The distinction between the two subscales was further supported by the finding of a unique association between parental psychopathology symptoms (as measured by the Symptom Checklist 90-Revised; Derogatis 1994) and the GD subscale, after controlling for other dimensions of stress.

The goal of this study was to examine reciprocal relationships between the problem behaviors of young children with ASD and their mothers' personal stress/distress, over a 4-year period. Thus, we restricted our analysis to the GD and PD subscales from the Zaidman-Zait et al. (2011) factor analysis, in order to avoid content overlap between our measure of child behavior and the three childrearing subscales that are affected by the temperamental and behavioral characteristics that make children easy or difficult to manage. The use of selected subscales from the PSI-SF has a precedent in previous studies of children with ASD (McStay et al. 2013; Solish and Perry 2008) and other disabilities (e.g., attention deficit hyperactivity disorder; Theule et al. 2011).

Methods

Participants

Data for this study were drawn from an ongoing multi-site longitudinal study (*Pathways in ASD*) examining the developmental trajectories of children with ASD in a large inception cohort recruited across five Canadian provinces. The study was approved by the Research Ethics Boards at all participating sites and all families gave permission for their data to be used in publications related to the study. Data were included in this analysis for children who were between 24 and 47 months of age at the time of diagnosis. Initial data collection (Time 1; T1) occurred within 4 months after diagnosis.

The study sample included 184 mothers of children with ASD whose mean age was 36.4 months ($SD = 6.6$ months) at T1. The children were primarily males (83.7 %) and had been diagnosed by multidisciplinary clinical teams with autism expertise, using DSM-IV criteria (American Psychiatric Association 2000) and both the Autism Diagnostic Interview-Revised (Rutter et al. 2003) and the Autism Diagnostic Observation Schedule (Lord et al. 2002). At T1, the children's mean standard score on the Vineland Adaptive Behavior Scales, 2nd edition (VABS-II; Sparrow et al. 2005) was 72.94 ($SD = 10.01$), placing them (on average) almost two standard deviations below the mean. Their mean receptive and expressive language standard scores on the Preschool Language Scale, 4th edition (PLS-4; Zimmerman et al. 2002) were 63.54 ($SD = 18.94$) and 60.78 ($SD = 15.84$), respectively, reflecting significant deficits in both language domains. Cognitive development was assessed for 153 of the children (83 %) using the Merrill-Palmer-Revised Scales of Development (M-P-R; Roid and Sompers 2004). The children's mean Developmental Index (DI) on the M-P-R was 55.01 ($SD = 22.04$), well below average. The DI a general index (comparable to an IQ) that is comprised of subtests measuring cognition, fine motor, and receptive language abilities.

Data Collection and Measures

Two parent report measures, the Parenting Stress Index-Short Form (Abidin 1995), and the Child Behavior Checklist/1.5–5 (Achenbach and Rescorla 2000) were used in this study. The CBCL was completed within 4 months of an ASD diagnosis (T1), 12 months after T1 (T2), and when the children were 6 years of age (T4). The PSI-SF was completed at T1, 24 months after T1 (T3), and at T4.

Parenting Stress Index: Short Form (PSI-SF)

The PSI-SF is a self-report questionnaire in which parents rate their agreement with statements on a 5-point Likert scale ranging from “strongly disagree” to “strongly agree.” As noted previously, we used only the GD and PD subscales identified by Zaidman-Zait et al. (2011) because we were specifically interested in the impact of both general distress that a parent experiences as a function of individual personal characteristics and distress that is directly related to the parenting role. In the present study, internal consistency estimates (Cronbach's α) for the GD subscale were 0.86 (T1), 0.87 (T3), and 0.91 (T4). For the PD subscale, internal reliability was 0.82 (T1), 0.83 (T3), and 0.88 (T4).

Child Behavior Checklist for ages 1.5–5 (CBCL)

The CBCL is a well-standardized measure of externalizing and internalizing behavior problems in preschool children.

The parent responds to 99 items using a 3-point scale (0 = not true, 1 = somewhat/sometimes true, and 2 = very/often true). The externalizing behavior scale consists of the attention problems and aggressive behavior subscales, for a total of 24 items and a maximum raw score of 48. The internalizing behavior scale consists of the emotionally reactive, anxious/depressed, somatic complaints, and withdrawn subscales, for a total of 36 items and a maximum raw score of 72. A recent study provided support for the factor structure of the CBCL 1.5–5 in a voluntary sample of 128 preschoolers with ASD (89 % male) with a mean age of 42.43 months (SD = 10.19) (Pandolfi et al. 2009).

Data Analytic Approach

First, bivariate correlations were calculated to examine the relationships between GD and PD and between externalizing and internalizing behaviors. Then, with models derived from computed covariance matrices, the bidirectional influence of externalizing and internalizing behaviors was tested for GD and PD separately, using path analysis within a structural equation modeling (SEM) framework. This technique was chosen because it allows (a) examination of direct, indirect, and total effects simultaneously; (b) the testing of multiple dependent variables and complex mediational chains; and (c) the testing of specific indirect effects within those complex chains (Holmbeck 1997; Kline 2011). Additionally, SEM software provides global indices of fit between the data and a proposed theoretical model and is also capable of estimating models using appropriate methodology that takes missing data and non-normality of the data into account (Bryan et al. 2007).

Our sample size (N = 184) satisfied the criterion of a minimum of 100 participants to conduct a path analysis with sufficient power (Hoyle 1995). However, Westland (2010) suggested that approximately 10 observations are required per path estimate. Using this criterion, our sample size necessitated the testing of two models rather than including both internalizing and externalizing behaviors in one model; thus, for each model, the ratio was a sample size of 184 across 10 path estimates.

The hypothesized models were tested with Mplus software (Muthén and Muthén 2012), using the Full Information Maximum-Likelihood method of parameter estimation (FIML). In reporting the results of a path analysis, several indices of fit are typically provided. The most basic indicator is a Chi square (χ^2) test that reflects the degree of discrepancy between the observed covariance matrix from the data and that predicted by the model. A non-significant χ^2 ($p > 0.05$) implies that one cannot reject the null hypothesis that the tested model fits the data. It should be

noted that although the χ^2 test of goodness-of-fit is highly influenced by sample size (hence, models that deviate even trivially from the data may be spuriously rejected; Brown 2006), we chose to report it along with the other fit statistics because it provides a fuller picture of model fit. Other fit indices used include the root-mean square error of approximation (RMSEA), where values below 0.05 represent an excellent fit and values between 0.05 and 0.08 represent an acceptable fit (Brown 2006); and the comparative fit index (CFI) and Tucker–Lewis index (TLI), for which values between 0.90 and 0.95 represent a reasonable model fit and values above 0.95 represent an excellent model fit. Modification indices were examined to identify additional parameters that, if fitted, would improve the model fit. Paths that reduced the model χ^2 by 10.0 or more and thus produced significant improvements in the model fit ($p < 0.01$) were added to the existing model and fit indices were re-estimated.

Results

Means, ranges, and standard deviations for both measures of parental stress and child behavior at each time point are presented in Table 1.

Across all time points, both GD and PD means were in the middle of the scoring range (1–5), indicating moderate parental stress; however, the wide range of scores in both domains reflects considerable variability in the parent sample. The mean raw scores for both externalizing behavior (maximum score = 48) and internalizing behavior (maximum score = 72) were quite low but the range of

Table 1 Raw score means, standard deviations (SD), and ranges for parental stress and child problem behavior subscales

Variables	Time 1 Mean (SD ^c , range)	Time 2 Mean (SD, range)	Time 3 Mean (SD, range)	Time 4 Mean (SD, range)
PSI-SF ^a General Distress	2.40 (0.84, 1–5)	–	2.64 (0.84, 1–5)	2.43(0.94, 1–5)
PSI-SF Parenting Distress	2.62 (0.94, 1–5)	–	2.59 (0.94, 1–5)	2.55 (1.06, 1–5)
CBCL ^b internalizing behavior	15.70 (8.53, 2–48)	13.31 (7.73, 0–50)	–	13.46 (8.54, 0–44)
CBCL externalizing behavior	17.92 (8.67, 1–44)	15.59 (8.67, 0–40)	–	15.19 (8.94, 0–39)

^a *PSI-SF* Parenting Stress Index-Short Form

^b *CBCL* Child Behavior Checklist 1.5–5

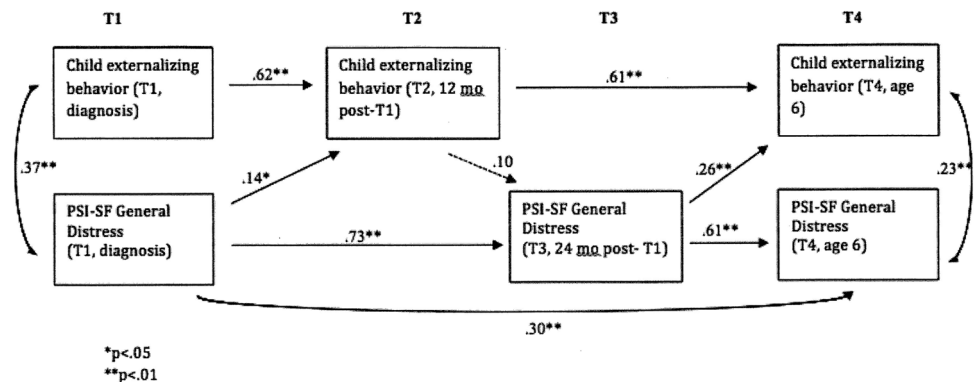
^c Standard deviation

Table 2 Pearson correlations among variables included in the models

Variable	Parenting distress (PD)			General distress (GD)			Externalizing behavior (Ext)			Internalizing behavior (Int)		
	T1	T3	T4	T1	T3	T4	T1	T2	T4	T1	T2	T4
PD T1	–	0.65*	0.70*	0.68*	0.54*	0.53*	0.31	0.30*	0.35*	0.30*	0.27*	0.29*
PD T3		–	0.81*	0.52*	0.71*	0.62*	0.25*	0.33*	0.49*	0.27*	0.33	0.45*
PD T4			–	0.62*	0.72*	0.74*	0.31*	0.45*	0.49*	0.27*	0.38*	0.44*
GD T1				–	0.74*	0.77*	0.37*	0.40*	0.41*	0.39*	0.39*	0.45*
GD T3					–	0.82*	0.30*	0.38*	0.47*	0.34*	0.36*	0.50*
GD T4						–	0.34*	0.42*	0.51*	0.35*	0.39*	0.53*
Ext T1							–	0.66*	0.47*	0.68*	0.50*	0.42*
Ext T2								–	0.71*	0.59*	0.79*	0.64*
Ext T4									–	0.46*	0.59*	0.79*
Int T1										–	0.61*	0.62*
Int T2											–	0.75*

* $p < 0.05$

Fig. 1 General Distress and child externalizing behavior model. (Key: *T1* Time 1, *T2* Time 2, *T3* Time 3, *T4* Time 4, *PSI-SF* Parenting Stress Index-Short Form)



scores was wide at all time points, indicating generally low levels of problem behavior with high variability across children in the sample.

Bivariate correlations among the study variables can be seen in Table 2.

As expected, significant positive correlations in the low-moderate range were found between both externalizing and internalizing problem behaviors and between PD and GD at each time point and over time.

General Distress and Child Problem Behavior

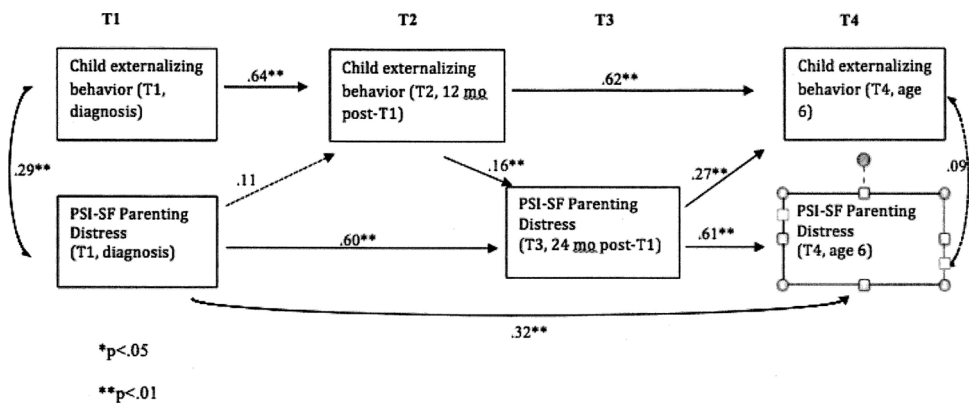
The fit of the initial model for parental GD and externalizing behavior was fair to poor: $\chi^2(6) = 16.79, p < 0.05, CFI = 0.98, TLI = 0.95, RMSEA = 0.09$. After examining the modification indices, a direct path from GD at T1 to GD at T4 was added to the path model. It is important to note, however, that stabilities and mutual influence paths among all the other variables did not change when this path was included. The final model, as depicted in Fig. 1, adequately fit the data: $\chi^2(5) = 2.29, p = 0.081, CFI = 1.00, TLI = 1.01, RMSEA = 0.00, p = 0.92$.

In path analysis, the beta weight (β) reflects the relative importance of a predictor on a criterion variable; the larger the absolute value of β , the more influence the associated factor has on predicting the criterion (Kline 2011). Results indicated that GD at T1 predicted GD at T4 (β minimum–maximum = 0.61–0.73, $p < 0.01$) and children’s externalizing behavior at T1 predicted externalizing behavior at T4 (β minimum–maximum = 0.61–0.62, $p < 0.01$). Higher GD at T1 was positively associated with higher externalizing behavior problems 12 months later (T2). Similarly, higher GD 24 months after T1 (T3) continued to predict higher externalizing behavior problems when children were age 6 (T4). However, children’s externalizing problems 12 months after T1 did not predict GD 24 months later. These paths suggest unidirectional GD effects on externalizing behavior. Because the path model for GD and internalizing behavior was identical to that for externalizing behavior and had very similar values, we have included it as a supplementary Figure only (Fig. 3).

Parenting Distress and Child Problem Behavior

The fit of the initial model was not adequate $\chi^2(6) = 30.94, p < 0.01, CFI = 0.94, TLI = 0.87, RMSEA = 0.09$.

Fig. 2 Parenting Distress and child externalizing behavior model. (Key: *T1* Time 1, *T2* Time 2, *T3* Time 3, *T4* Time 4, *PSI-SF* Parenting Stress Index-Short Form)



RMSEA = 0.15. Modification indices were examined and, once again, a direct path from PD at T1 to PD at T4 significantly improved the model fit ($p < 0.01$). The final model (see Fig. 2) fit the data: $\chi^2(5) = 5.78, p = 0.33, CFI = 0.99, TLI = 0.99, RMSEA = 0.03, p = 0.57$.

As was the case with GD, PD at T1 predicted PD at T4 (β minimum–maximum = 0.60–0.61, $p < 0.01$), and children’s externalizing behavior at T1 predicted externalizing behavior at T4 (β minimum–maximum = 0.62–0.64, $p < 0.01$). PD at T1 did not predict externalizing behavior problems 12 months later (T2), but T2 externalizing behavior problems did predict PD 24 months later (T3), which in turn predicted children’s externalizing behavior problems at age 6 (T4). Again, the path model for PD and internalizing behavior was identical to that for externalizing behavior and the values were comparable, so the Figure for this analysis is included as a supplement only (Fig. 4).

Discussion

Although there is a plethora of research demonstrating concurrent associations between overall parent stress and problem behaviors in children with ASD (Estes et al. 2013; Hall and Graff 2012; Zaidman-Zait et al. 2011), little is known about how these related variables function over time. The main objective of this study was to examine bidirectional relationships between two types of parental stress (i.e., General Distress and Parenting Distress) and both internalizing and externalizing child problem behaviors. These relationships were examined for parents and their young children with ASD, from the time of diagnosis (around age 3), until the time of school entry (i.e., around age 6).

Overall, both GD and PD were quite stable across the 3–4-year period after children’s diagnoses (Table 1). These findings are consistent with previous studies of mothers of young, typically developing children (Crnic et al. 2005); mothers of individuals with developmental disabilities other than ASD (Baker et al. 2003; Orsmond et al. 2003) and mothers of individuals with ASD (Baker et al. 2011;

Lecavalier et al. 2006). Child problem behavior was relatively low at the time of diagnosis (T1), decreased slightly (but non-significantly) over the 12 months thereafter (T2), and then remained quite stable (Table 1). Stability over time in children’s problem behavior has also been reported in previous studies of children with ASD (Lecavalier et al. 2006). However, there is also evidence that the severity of problem behavior decreases over time in young children with ASD (Osborne and Reed 2010a), which is what should be expected if the child were involved in an appropriate program of early intervention (Smith et al. 2010; Stock et al. 2013). Unfortunately, we did not have information that enabled us to examine relationships between changes in problem behavior and either the goals, quality, or amount of the early intervention programs in which our child subjects participated.

Results indicated that, across all time points in the study, models of General Distress and both types of child problem behaviors favored parental effects rather than child effects, such that higher GD predicted elevated levels of internalizing and externalizing child behaviors but not the reverse. Recall that the GD subscale measures distress a parent experiences as a function of individual personal characteristics (self-efficacy, depression, and isolation) that are not directly related to the parenting role. For example, Zaidman-Zait et al. (2011) found a unique association between parental psychopathology symptoms and the GD subscale, after controlling for other dimensions of stress. Our findings for GD are consistent with previous research that has identified associations between problem behaviors in children with ASD and general psychological distress in parents (Estes et al. 2013; Lecavalier et al. 2006) as well as between child problem behaviors, ineffective parenting practices (e.g., negative affect and low levels of parental warmth and support), and maternal depression (Embry and Dawson 2002; Goodman et al. 2011; Hoffman et al. 2006; Wright et al. 2000). The proposition that psychological distress impacts parenting behavior which, in turn, affects children’s behavior is central to a number of theoretical models that pertain to typical parent–child relationships

(Deater-Deckard 1998; Hastings 2002). Such models posit that parents' emotional reactions serve to organize and motivate them to respond to their young children's emotional, social, and behavioral needs. As parents monitor and respond to their children's needs, they simultaneously provide supports that encourage development of the self-regulatory skills that children require for coping with unexpected events or disappointments. When parents experience high levels of psychological distress, their ability to respond sensitively and effectively to their children's emotional needs is adversely affected, which in turn impedes their ability to promote self-regulation and results in more frequent or more intense child behavior problems (Silva and Schalock 2012).

In contrast, we found modest evidence of a bidirectional relationship between Parenting Distress and both types of child problem behaviors during the period from 12 months post-diagnosis (T2) to age 6 (T4), although this relationship was not evident during the 12-month period immediately following diagnosis (T1–T2). PD reflects stress that is directly related to the parenting role; thus, this result is consistent with a previous study demonstrating that parenting stress and child behavior problems exacerbated one another over a 12-month period in parents of children with ASD who ranged in age from 3 to 18 (Lecavalier et al. 2006). Similarly, in a subsample of 4 to 6-year-old children with ASD, Osborne and Reed (2010b) found a significant reciprocal relationship between parenting stress and two types of parenting behaviors over a 9–10 month period. Specifically, they reported that low levels of parenting stress at baseline predicted better parent–child communication and fewer parental difficulties with limit-setting (e.g., giving into the child to avoid a tantrum) at follow-up, and vice versa.

In the present sample, the influence of both GD and PD on child problem behavior was found to be stronger from T3 (child ages 4–5) to T4 (around age 6) than from T1 (ages 2–3) to T2 (ages 3–4). In fact, as noted previously, no association between PD and child problem behaviors was evident from T1 to T2, when only GD was predictive. Perhaps, this is because PD is more related to autism severity than to child behavior problems in the time period immediately post-diagnosis, as reported by Osborne and Reed (2010a). During this time period, newly-diagnosed young children are likely to show many “early autism” skill deficits, such as a lack of joint attention, social responsiveness, communication skills, and interactive play skills—all of which cause considerable concern for their parents, who may question their own parenting abilities as a result. However, as children age, parents may experience increasing stress about the more general (i.e., non-autism-specific) internalizing behaviors (e.g., anxiety, fearfulness) and externalizing behaviors (e.g., tantrums, aggression) that often develop as children with ASD both react to and

attempt to control their environments. In addition, as children age, problem behaviors often become more difficult for parents to manage and are more socially stigmatizing, which further exacerbates caregiver stress.

Another potential reason that GD and PD may be less linked to child behavior in the first 12 months post-diagnosis is that parents may be preoccupied with coming to terms with the diagnosis and obtaining services for their child with ASD during this time period. Relevant here is Volden et al.'s (2012) finding that, in a larger sample ($n = 379$) drawn from the same *Pathways in ASD* database, 19 % of families reported that their children with ASD received no treatment services at T1, compared to only 2 % 12 months later. It may be that, once the initial challenge of locating appropriate treatment supports has been resolved, parents find that behavioral concerns become higher priorities and thus cause more stress. Note also that, while absolute levels of parental stress appear to be relatively stable over time, the specific stressors themselves may vary according to a number of factors (e.g., specific characteristics of the child with ASD, the services and supports available to the child and family, the needs of other family members).

Limitations and Future Research

The limitations of this study need to be noted as they provide directions for future research. First, similar to previous studies examining parental stress and child problem behaviors, only self-report data were used in this study. On the one hand, this is appropriate because parents' self-perceptions of both the quality and the quantity of their own stress and of their children's problem behaviors are of critical importance when considering mutual influences. On the other hand, some parents may either under- or over-report their own stress or their children's problems, for a variety of reasons (e.g., culture-driven shame, depression; Bennett et al. 2012). It would be useful for future studies to use direct observational methods to measure both parent and child behaviors, as a complement to indirect, parent-report measures. Second, the time intervals used in this study may not have been optimal for detecting bidirectional relationships that take into account both contextual and developmental changes that occur over various time periods. It is important to note that there is no “right” starting point for capturing reciprocal effects between parents and their children, and the current study only captures a snapshot of an ongoing, bidirectional process. It would be worthwhile to replicate this study over a longer period of time, with concurrent assessments that enable examination of the direction of child behavior problems and parenting stress during the same time interval. In addition, longitudinal examinations of child problem behaviors, parent stress

domains (e.g., GD and PD), and various aspects of parental psychopathology (e.g., depression, anxiety) are needed to clarify the extent to which these factors are inter-related.

Clinical Implications

These results have two important clinical implications. First, ongoing surveillance of both general and parenting distress should be part of any treatment program, even in the absence of child problem behaviors, since the two factors can function independently over time. The relationship between parent stress and child outcomes has been explored in only a few ASD early intervention studies to date (Osborne et al. 2008; Shine and Perry 2010; Strauss et al. 2012), all of which have suggested that the two factors are related, although the exact mechanism for this remains unclear. Additional research is needed in order to design early intervention programs that accommodate the needs of both children with ASD and their families.

Second, early intervention programs should target both internalizing and externalizing problem behaviors—in addition to autism symptoms, communication skills, and cognitive abilities—by teaching parents how to manage their children’s behavior effectively without inadvertently inducing guilt for past failure to do so. The importance of this was highlighted by Kuhn and Carter (2006), who found that mothers of children with ASD who reported more frequent feelings of guilt (for not doing as much for their child with ASD as they thought they should be doing) also reported lower self-efficacy and higher parenting stress. Of the mothers who reported feelings of guilt, 21 % thought that these feelings interfered with their ability to parent their child with ASD effectively. Parents must be supported to see themselves as part of the solution, not part of the problem. In this regard, several contemporary parent training programs have been developed that incorporate specific strategies aimed at changing negative parenting cognitions (such as guilt) and increasing parent empowerment and self-efficacy while teaching use of evidence-based strategies for behavior management (Karst and Van Hecke 2012; Steiner et al. 2012). Examples include Stepping Stones Triple P (Sanders et al. 2004; Whittingham et al. 2009), the Positive Family Intervention (Durand 2011; Durand et al. 2013); and a family-centred approach to positive behavior support (Lucyshyn et al. 2002, 2011).

Summary and Next Steps

There is still much to learn about the nature of the relationship between parent stress and problem behaviors in individuals with ASD as they develop. By examining

bidirectional relationships between two types of parent stress and two types of child problem behaviors, this study contributes to the growing body of literature on this important topic. We note that many factors were not included in this analysis that are also likely to affect parenting stress. For example, Zaidman-Zait et al. (2013) reported that overall parental stress two years post-ASD diagnosis was predicted by child factors such as autism severity, daily living skills, and problem behaviors. In addition, stress was also associated with four parent factors: stress at the time of diagnosis, overall family functioning, the social supports available to parents, and parents’ use of positive coping strategies. Studies such as this, utilizing additional assessment time-points over longer time periods as well as quantifiable information about the types and amount of intervention provided to children and families over the time period are needed to understand the complex relationships among these variables. This will inform programs that are designed to deliver family-centred early intervention services about the supports that are needed to facilitate optimal outcomes for both children with ASD and their families. Forthcoming data from the *Pathways in ASD* longitudinal study will allow us to examine how certain aspects of parenting stress act as predictors of child outcomes while other aspects reflect the outcomes (i.e., consequences) of specific child characteristics and behaviors. Such longitudinal investigations are needed to understand the mechanisms underlying the developmental pathways of child and parent characteristics and behaviors (with obvious benefits for “tailored interventions”).

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

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