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LOMA LINDA UNIVERSITY
School of Behavioral Health
in conjunction with the
Faculty of Graduate Studies

Parental Stress and Child Behavior Problems in Families of
Children with Autism

by

Allyson Davis

A Thesis submitted in partial satisfaction of
the requirements for the degree
Doctor of Philosophy in Clinical Psychology

June 2015

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Each person whose signature appears below certifies that this thesis in his/her opinion is adequate, in scope and quality, as a thesis for the degree Doctor of Philosophy.

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ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to each member of my committee, Dr. Cameron Neece, Dr. Kim Freeman, and Dr. David Vermeersch, for all of your guidance and feedback. A special thanks to Dr. Neece for supporting and encouraging me throughout this project.

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ABBREVIATIONS

ASD	Autism Spectrum Disorders
DD	Developmental Delays
CBCL	Child Behavior Checklist
MAPS	Mindful Awareness for Parenting Stress
GARS	Gilliam Autism Rating Scale
PSI	Parenting Stress Index

ABSTRACT OF THE THESIS

Parental Stress and Child Behavior Problems in Families of Children with Autism

by

Allyson Davis

Doctor of Philosophy, Graduate Program in Clinical Psychology
Loma Linda University, June 2015
Dr. Cameron L. Neece, Chairperson

Background: Studies have shown that parents of children with autism spectrum disorders (ASD) exhibit higher levels of stress than parents of typically developing children or children with other types of developmental disabilities. This relationship appears to be mediated by elevated levels of behavior problems observed in children with ASD. However, little is known about what specific child behavior problems are most common in this population, how these behavior problems relate to parental stress, and/or how these behavior problems may impact the efficacy of a stress-reduction intervention. We examined the relationship between parenting stress and child behavior problems in parents of young children with ASD participating in a Mindfulness-Based Stress Reduction (MBSR) intervention.

Method: The current study utilized data from the Mindful Awareness for Parenting Stress Project and included 39 parents of children with ASD.

Results: The most commonly endorsed child behavior problems included attention problems, language problems, and externalizing behavior problems. Two specific behavior problems, “doesn’t answer when people talk to him/her” and “tantrums or hot temper,” were significantly related to parental stress levels at intake and

both of these behavior problems significantly predicted changes in parenting stress from pre to post intervention.

Conclusions: Identifying the behavior problems that are most difficult for parents to handle will allow clinicians to tailor interventions to the specific needs of families. Those behavior problems that have the greatest negative impact on parental stress are ideal targets for interventions.

CHAPTER ONE

INTRODUCTION

Parents of children with developmental disabilities have been found to have very high levels of parental stress (Baker et al., 2003; Baxter, Cummins, & Yiolitis, 2000; Oelofsen & Richardson, 2006; Webster, Majnemer, Platt, & Shevell, 2008), and the stress experienced by these parents appears to be better accounted for by the elevations in child behavior problems seen in children with developmental disabilities rather than intellectual or developmental functioning (Baker, Blacher, & Olsson, 2005; Baker, Blacher, Crnic, & Edelbrock, 2002; Beck, Hastings, Daley, & Stevenson, 2004; Hastings, 2003; Neece, Green & Baker, 2012). Among children with developmental delays, children with autism spectrum disorders (ASD) have been found to have the highest levels of behavior problems and, in turn, parents of these children typically show the highest levels of stress (Eisenhower, Baker, & Blacher, 2005; Estes et al., 2009; Jang, Dixon, Tarbox, & Granpeesheh, 2011; Kozlowski & Matson, 2012). The relationship between stress and behavior problems appears to be reciprocal such that elevated child behavior problems lead to increases in parental stress which further exacerbate the child's behavior problems (Baker et al., 2003; Pesonen et al., 2008; Neece et al., 2012).

Despite the host of research demonstrating a link between child behavior problems and parenting stress among families of children with ASD, little research has examined the association between specific behavior problems that are most common in children with ASD and parental stress. In addition to knowing little about the specific behavior problems that are endorsed by parents and their relationship to parental stress, our understanding of how parental stress changes in a stress-reduction intervention or

how behavior problems may impact the outcome of such interventions is also limited. Due to the increased levels of parenting stress in this population and the reciprocal relationship between parenting stress and child behavior problems, a stress-reduction intervention might prove beneficial to both parents of children with ASD and the children themselves. Furthermore, given the robust relationship between stress and behavior problems, the outcomes of such an intervention may be moderated by the level of child behavior problems. The goals of the current study were twofold: (1) to further examine the relationship between behavior problems exhibited by children with ASD and parental stress by determining which behaviors are most commonly endorsed by parents on a measure of child behavior problems and how these behaviors relate to parental stress, and (2) to determine whether behavior problems impact the efficacy of a stress reduction intervention for parents of children with ASD.

Stress among Parents of Children with ASD

Studies have consistently shown elevated levels of parenting stress, or the extent to which the parent perceives stress in his or her parental role (Abidin, 1995), in parents of children with developmental disabilities (Baker et al., 2003; Baxter, Cummins, & Yiolitis, 2000; Webster et al., 2008; Neece & Baker, 2008; Neece et al., 2012). Parents of children with developmental delays regularly report much higher levels of stress than the parents of typically developing children (Oelofsen & Richardson, 2006), with many parents in these studies reporting stress levels in the “clinical range” (Oelofsen & Richardson, 2006; Webster et al., 2008) suggesting a need for intervention in this population.

Among parents of children with developmental delays, those who have children with ASD generally report the highest levels of parental stress (Baker-Ericzn, Brookman-Fraze, & Stahmer, 2005; Duarte, Bordin, Yazigi, & Mooney 2005; Montes & Halterman, 2007; Rao & Beidel, 2009). In studies examining the clinical profile of these parents, approximately one third of both mothers and fathers reported clinical levels of parental stress (Davis & Carter, 2008). Estes et al. (2009) showed that mothers of children with ASD reported higher levels of parenting stress and distress than parents of children with a different developmental delay. When compared to mothers of children with Down syndrome, mothers of children with ASD showed more overall stress and different stressors (Pisula, 2007; Sanders & Morgan, 1997). Parents of children with ASD also reported more family problems, less social support, fewer social and recreational opportunities for their child, and most important to the current study, child characteristics including behavior problems as sources of stress (Pisula, 2007; Sanders & Morgan, 1997). Furthermore, these mothers reported their children to have a higher negative impact on their well-being compared to mothers of children with cerebral palsy, undifferentiated diagnoses, or Down syndrome (Eisenhower et al., 2005; Blacher & McIntyre, 2006). Researchers have also reported lower scores for parents of children with ASD on other measures of parental well-being and satisfaction, including lower parental competence (Rodrigue, Morgan, & Geffken, 1990). These elevated levels of parenting stress in families of children with ASD are alarming due to the associated negative consequences, including poorer physical health (Eisenhower et al., 2009; Oelofsen & Richardson, 2006), depression (Hastings et al., 2006), and marital conflict (Kersh et al., 2006; Suarez & Baker, 1997). Given that parents of children with ASD are

at an increased risk for significant parental stress and poor psychological well-being, they are a key target population for stress-reduction interventions.

Child Behavior Problems and Parental Stress

Children with developmental delays generally have increased levels of behavior problems compared to their typically developing peers. Among children with delays, those with ASD display higher levels of behavior problems than children with other developmental disorders, including those with Down syndrome and undifferentiated developmental delays (Eisenhower et al., 2005; Estes et al., 2009). More specifically, parents of children with Autistic Disorder reported higher levels of problem behaviors compared to children with PDD-NOS (Kozlowski & Matson, 2012), and the majority of children with ASD are reported to engage in some form of “challenging behavior” (Jang et al., 2011). Comorbid psychiatric disorders, such as Attention-Deficit/Hyperactivity Disorder (ADHD) and anxiety disorders, have commonly been found in children with ASD and are associated with even higher levels of problem behaviors (Simonoff et al., 2008).

Research has shown a strong correlation between children’s behavior problems and parental stress. Behavior problems experienced by children have been found to serve as a predictor of parental stress, principally maternal stress (Beck et al., 2004; Hassall, Rose, & McDonald, 2005; Hastings, 2003). Interestingly, elevations in children’s behavior problems appear to account for the relationship between the delay and parental stress (Baker et al., 2002; Baker et al., 2003; Lecavalier, Leone, & Wiltz, 2006; Neece et al., 2012). Similarly, behavior problems have also been found to mediate the association

between ASD diagnosis and parental stress (Herring et al., 2006). Thus, the negative impact of developmental delays on parental stress appears to be the result of behavior problems associated with delays, rather than the presence of the delay itself. Both internalizing and externalizing behaviors have been linked with increases in parental stress (Donenberg & Baker, 1993). Furthermore, parents often directly attribute much of their stress in parenting and the declines in their psychological well-being to the behavior problems of the child (Suárez & Baker, 1997). The relationship between stress and behavior problems appears to be reciprocal such that increases in parental stress may further exacerbate child behavior problems.

The Impact of Parental Stress on Behavior Problems

While behavior problems have been shown to predict parental stress, it has also been suggested that parental stress has a negative effect on behavior problems. These two variables appear to have a mutually escalating reciprocal relationship such that child behavior problems lead to increases in maternal stress, which further increase child problem behaviors and difficult dispositions in the child (Pesonen et al., 2008). Thus, elevated levels of parenting stress appear to further contribute to the problem behaviors of children with developmental disabilities (Baker et al., 2003; Neece et al., 2012).

Not only does parenting stress lead to an increase in behavior problems, it also has an adverse effect on the outcomes of behavioral interventions (Osborne, McHugh, Saunders, & Reed, 2008; Robbins, Dunlap, & Plienis, 1991; Strauss et al., 2012). Parental stress has been shown to serve as an important predictor of intervention outcomes for children with ASD in that elevated parental stress predicts lower levels of

developmental progress in behavioral interventions, including decreased development of language, communication, and adaptive behaviors (Makrygianni & Reed, 2010).

Furthermore, adding a component to behavioral interventions that addresses parental stress appears to improve the effectiveness of the intervention in reducing behavior problems, at least with typically developing children (Kazdin & Whitley, 2003).

Behavior problems and parental stress are interwoven and continually affect each other so the need for a better understanding of the factors, such as the specific behavior problems, involved in this reciprocal relationship is clear.

Given the relationship between parental stress and child behavior problems, the need for a stress-reduction intervention for parents of children with ASD is apparent. However, few studies have examined interventions for parenting stress in this population. Mindfulness-Based Stress Reduction (MBSR) is an evidence-based stress-reduction intervention program supported by over two decades of extensive research showing its effectiveness in reducing stress, anxiety, and depression, and promoting overall well-being (Chiesa & Serretti, 2009; Fjorback, Arendt, Ornbol, Fink, & Walach, 2011; Grossman, Niemann, Schmidt, & Walach, 2004). Researchers have begun examining MBSR as a stress-reduction intervention for parents of children with DD and ASD. Results have shown that MBSR significantly reduces parenting stress for parents of children with DD (Bazzano et al., 2013; Dykens, Fisher, Taylor, Lambert, & Miodrag, 2014; Neece, 2013) as well as behavior problems in the children themselves (Neece, 2013). Based on these early trials, MBSR appears to serve as an effective stress-reduction intervention for parents of children with ASD.

The Current Study

The current study further examined the relationship between child behavior problems and parenting stress among children with ASD. We chose to focus the study on parents of children with ASD, rather than parents of children with any DD, due to the elevated levels of both behavior problems and parenting stress frequently observed in this population. The questions we examined were: 1) Which behaviors on the Child Behavior Checklist (CBCL) do parents of children with an ASD most commonly endorse, 2) Among behaviors most commonly endorsed by parents of children with ASD, which items are associated with parenting stress and, among those associated, which items uniquely predict parental stress levels, and 3) Do the specific behaviors that uniquely predict parental stress moderate the outcomes of a stress-reduction intervention? To the author's knowledge, this is the first study to examine the specific behaviors related to parenting stress and, therefore, all research questions were exploratory.

CHAPTER TWO

MATERIALS AND METHOD

Participants

The current study included 39 parents of children with ASD who participated in the Mindful Awareness for Parenting Stress (MAPS) Project at Loma Linda University, which included parents of children, ages 2.5 to 5 years old, with developmental delays. The sample for the current study was restricted to parents of children with ASD, which eliminated 7 children from the original sample (7 children had a developmental disability other than ASD). Participants were primarily recruited through the Inland Regional Center, although some were recruited through the local newspaper, local elementary schools, and community disability groups. In California, practically all families of young children with ASD receive services from one of nine Regional Centers. Families who met the inclusion criteria were selected by the Regional Center's computer databases and received a letter and brochure informing them of the study. Information about the study was also posted on a website which allowed interested parents to submit their information.

Criteria for inclusion in the study were: 1) having a child ages 2.5 to 5 years, 2) child was determined by Regional Center (or by an independent assessment) to have an autism spectrum disorder, 3) parent reported more than 10 child behavior problems (the recommended cutoff score for screening children for treatment of conduct problems) on the Eyberg Child Behavior Inventory (ECBI; Robinson, Eyberg, & Ross, 1980), 4) the parent was not receiving any form of psychological or behavioral treatment at the time of referral (e.g. counseling, parent training, parent support group, etc.), 5) parent agreed to

participate in the intervention, and 6) parent spoke and understood English. Exclusion criteria included parents of children with debilitating physical disabilities or severe intellectual impairments that prevented the child from participating in a parent-child interaction task that was a part of the larger laboratory assessment protocol. In order to be included, parents must also have completed all initial measures and attended the initial assessment before the beginning of the first intervention session. For the larger study from which the current sample was drawn, 95 families were screened, 63 were determined to be eligible, and 51 parents enrolled originally. Five parents completed the initial assessments but dropped out of the study before the intervention began leaving a final sample of 46 parents; however, for this study, the sample was further restricted to families of children with ASD, which resulted in a sample of 39 parents. There were no demographic differences between participants who completed the intervention and those who dropped out of the study. Similarly, there were no demographic differences between families of children with ASD and those with other developmental disabilities.

The current study included 39 parents of children with ASD. In the sample, 72.5% of the children were boys. Parents reported 32.5% of the children as Caucasian, 32.5% as Hispanic, 7.5% as Asian, 2.5% as African American, and 25.0% as “Other.” The mean age of the children was 3.7 years with a standard deviation of .94. The majority of parents (76.8%) reported that their child’s diagnosis was Autistic Disorder, and the remaining children were reported to have another diagnoses on the autism spectrum. According to the Gilliam Autism Rating Scale (GARS, see Measures Section), 83.3% of the children had a “very likely” diagnosis of autism and the remaining 16.7% had a “possible” diagnosis. At the time of the intake assessment, 90.9% of the children were

reported to receive special education services in school and 78.8% of the children were enrolled in a special education classroom. Most parents were married (77.5%) and were mothers (70.0%). The mean age of the participating parent was 33.4 years with a standard deviation of 7.18. Families reported a range of annual income; 47.5% reported an annual income of more than \$50,000 and incomes range from \$0 to over \$95,000. Parents completed an average of 14.55 years of school with a standard deviation of 2.69.

Procedures

Interested parents contacted the MAPS project by phone, postcard, or submitting their information on the project website. Study personnel then conducted a phone screen to determine the eligibility of the parent(s). If the parent(s) met inclusion criteria, a pre-treatment laboratory assessment was scheduled. Prior to the initial assessment, parents were mailed a packet of questionnaires that was to be completed before arrival at the assessment. The questionnaires examined numerous aspects of both parental and child well-being and were completed within the six weeks prior to the intervention and six weeks after treatment. The questionnaires relevant to the current study are detailed below.

The intake assessment took place in the MAPS lab in the Psychology Department at Loma Linda University. At this assessment, parents were given an informed consent form that was reviewed by study staff. After completing the informed consent and an interview to collect demographic information, the parents drew a piece of paper out of a box which informed them of whether they were in the immediate treatment or wait-list control intervention group. For the purposes of this paper, the two groups were combined

for an analysis of the impact of behavior problems pre to post treatment, rather than a comparison of their impact between the treatment groups.

The Mindfulness Based Stress Reduction (MBSR) intervention followed the manual outlined by Dr. Jon Kabat-Zinn at the University of Massachusetts Medical Center (Blacker, Meleo-Meyer, Kabat-Zinn, & Santorelli, 2009). This intervention consisted of three main components: 1) didactical material covering the concept of mindfulness, the psychology and physiology of stress and anxiety, and ways in which mindfulness can be implemented in everyday life to facilitate more adaptive responses to challenges and distress, 2) mindfulness exercises during the group meetings and as homework between sessions, and 3) discussion and sharing in pairs and in the larger group. The MBSR program included eight weekly 2-hour sessions held consecutively, a daylong 6-hour meditation retreat after class 6, and daily home practice based on audio CDs with instruction. Formal mindfulness exercises included the body scan, sitting meditation with awareness of breath, and mindful movement. The instructor for the group had over 20 years experience practicing mindfulness and teaching MBSR, completed the Advanced MBSR Teacher Training at the University of Massachusetts Medical Center, and had received supervision with Senior MBSR Teachers through the Center for Mindfulness at the University of Massachusetts Medical Center.

The MBSR intervention was delivered in two groups, which served as the immediate treatment and wait-list control intervention groups for the larger study. Approximately half of the total sample was in each group. After each round of MBSR, parents participated in a post-treatment assessment and completed the measures again. After the completion of the project (all assessments were conducted) parents received a

short summary of their child's current and previous behavioral functioning in order to reinforce parents' efforts to improve their parenting skills as well as raise awareness of remaining concerns

For this study groups were combined and quasi-experimental design was used in order to optimize power. . Based on the regression analyses that required the highest power, we had 52.8% power to detect a large effect size ($f^2 = .25$), 34.2% power for a medium effect size ($f^2 = .15$), and only 8.2% power to detect a small effect size ($f^2 = .02$) in the current study. Given the inadequate power in the randomized design, the two groups were combined to examine pre-post differences and the resulting power was 85.7% for a large effect size ($f^2 = .25$), 65.0% for a medium effect size ($f^2 = .15$), and 13.2% for a small effect size ($f^2 = .02$).

Measures

Demographic Data

Demographic data, such as participants' birthdays, marital status, and family income, were collected during an interview with the participating parent.

Child Behavior Checklist for Ages 1 ½ - 5 (CBCL, Achenbach, 2000)

The CBCL 1 ½ to 5 was used to assess child behavior problems. The CBCL contains 99 items that are rated as "not true" (0), "somewhat or sometimes true" (1), or "very true or often true" (2). Each item represents a problem that distinguishes clinically referred populations, such as "acts too young for age" and "cries a lot." The CBCL yields a total problem score, 2 broad-band externalizing and internalizing scores, 7 narrow-band

scales, and 6 DSM-oriented scales; however, the current study analyzed the individual items. The mean reliability for the total problem score for our sample was high (Cronbach's $\alpha=.93$) and previous research indicates that this instrument has strong convergent validity (Achenbach, 2000). Studies have demonstrated the validity of using the CBCL in samples of children with ASD (Biederman et al., 2010; Halleröd et al., 2010). While the CBCL is typically used as a broadband measure, it also allows for the examination of individual behavior problems, which makes it an ideal measure for the current study (Lengua, Sadowski, Friedrich, & Fisher, 2001; Turk, 1998).

Parenting Stress Index – Short Form (PSI, Abidin, 1995)

The PSI was used to assess parenting stress pre and post intervention. It contains 36 items that are rated on a 5-point Likert scale ranging from “Strongly Agree” (1) to “Strongly Disagree” (5) and contains three subscales, Parental Distress, Parent-Child Dysfunctional Interaction, and Difficult Child, which are combined into a Total Stress score (Abidin, 1995). The PSI also includes a validity index which measures the extent to which the parent is answering in a way that he/she thinks will make them look best. A score of 10 or less on this index suggests that the reporter is responding in a defensive manner and indicates that caution should be used in interpreting any of the scores. One participant had a defensive responding score less than 10 at the pre-treatment assessment and this score was removed from the present analyses.

With respect to the individual subscales, we used the Parental Distress subscale, which measures the extent to which the parent is experiencing stress in his or her role as a parent. This subscale was chosen because it assesses parental stress independent of child

behavior issues, which were also a key outcome variable of the current investigation. The reliability of the Parental Distress subscale in the current sample was adequate (Cronbach's $\alpha = .83$).

Gilliam Autism Rating Scale (GARS, Gilliam, 1995)

The GARS was used to provide support for the parent-reported ASD diagnoses. The GARS contains 42 items that are rated on a 4-point scale ranging from “Never Observed” (0) to “Frequently Observed” (3). Three subscales, stereotyped behaviors, communication, and social interaction, are combined to create an autism index score. The index score indicates an unlikely, possible, or very likely ASD diagnosis. The reliability of the GARS in the current sample was also adequate (Cronbach's $\alpha = .91$).

Data Analytic Plan

The distributions of CBCL and PSI were examined for normality and the presence of outliers. Data points that were more than three standard deviations above or below the mean of a variable were considered to be outliers. None of the data points were greater than 3 standard deviations from the mean, so no participants were determined to be outliers. Additionally, demographic variables listed in Table 1 that had a significant relationship ($p < .05$) with one or more of the independent variables *and* one or more of the dependent variables were tested as covariates in the analyses. However, none of the demographic variables were significantly correlated with both the independent variables and the dependent variables and, thus, no covariates were included in the analyses.

In order to examine which behavior problems parents endorsed most often, a total endorsement score was calculated by summing the scores across participants for each individual CBCL item. The 10 items that had the highest total endorsement scores were then correlated with the PSI using Spearman's rho correlations, which accounted for the ordinal nature of the data. The items that correlated significantly ($p < .05$) were used in a regression model to determine what items uniquely predicted parenting stress.

A linear regression model was used to predict parenting stress from the behavior problems that were most commonly endorsed on the CBCL. Prior to analysis, the items that significantly correlated with parental stress were recoded using a contrast coding system that allowed for appropriate interpretation given the categorical nature of the responses on the CBCL. By using contrast coding, we were able to make specific comparisons based on the level at which behavior problems were endorsed. Two contrasts were made for each behavior problem: (1) those who endorsed the behavior problem at any level compared to those who did not endorse the behavior problem and (2) those who endorsed the behavior problem as occurring "sometimes" compared to those who endorsed the behavior problem as occurring "often". The dependent variable was the pre-treatment PSI score. The independent variables were the contrast codes for the behavior problems that significantly correlated with the parental distress scores on the PSI.

The final research question examining behavior problems as a moderator of treatment outcomes was analyzed with a hierarchical linear regression. The dependent variable for this question was the post-treatment PSI parental distress scores. The first step included the pre-treatment parental distress scores on the PSI. The subsequent step

included contrast codes for the individual behavior problems that uniquely predicted pre-treatment parenting stress levels.

CHAPTER THREE

RESULTS

Endorsement of CBCL Behavior Problems

The severity scores for the 10 most frequently reported behavior problems are presented in Table 1. The most commonly endorsed behavior problem was “speech problem” which is not surprising given that language delays and impairments are a core symptom of ASD. The next three problems that were endorsed most frequently involved impulsivity (i.e. “Can’t stand waiting; wants everything now” and “Demands must be met immediately”) and attention problems (i.e. “Can't concentrate, can't pay attention for too long”). Other common behavior problems included difficulties with frustration tolerance (i.e. “Easily frustrated” and “Temper tantrums or hot temper”), inappropriate social behavior (i.e. “Picks nose, skin, or other parts of body” and “Acts too young for age”), hyperactivity (i.e. “Can't sit still, restless, or hyperactive”) and other communication problems (i.e. “Doesn’t answer when people talk to him/her”).

Pre-Treatment Parental Stress Levels and Behavior Problems

The 10 behavior problems that were most commonly endorsed were then correlated with the pre-treatment PSI scores (see Table 1). Two of the 10 behavior problems were significantly related with the pre-treatment parental stress scores ($p < .05$) and showed at least moderate effect sizes, including: (1) “doesn’t answer when people talk to him/her” ($\rho = .379, p < .05$) and (3) “temper tantrums or hot temper” ($\rho = .441, p < .01$).

Table 1

Behavior Problems: Severity and Correlation with PSI Parental Distress

Behavior Problem	Total Endorsement Score	ρ
Speech problem	66	.10
Can't stand waiting; wants everything now	60	.09
Can't concentrate, can't pay attention for too long	56	.18
Demands must be met immediately	56	.18
Doesn't answer when people talk to him/her	53	.39*
Easily frustrated	53	.20
Can't sit still, restless, or hyperactive	50	-.03
Temper tantrums or hot temper	49	.35*
Picks nose, skin, or other parts of body	47	-.16
Acts too young for age	47	.26

* $p < .05$

The two behavior problems that significantly correlated with pre-treatment parental stress levels were used in a hierarchical linear regression model to determine which problems, if any, uniquely predicted parental stress. These results are presented in Table 2. The overall model was significant ($F(3, 32) = 6.08, p < .01$) and accounted for 36% of the variance in parental stress scores ($R^2 = .36$). The mean stress score of those parents who endorsed “doesn’t answer when people talk to him/her” as “very true or often true” was 7.45 points higher than the mean score of those who endorsed the behavior as “sometimes or somewhat true”, $b = 7.45, 95\% \text{ CI} = [2.56, 12.33], p < .01$. All parents endorsed this behavior problem at some level, so there was no comparison between those who endorsed at some level and those who did not endorse. On average, the parental stress score of those who endorsed “temper tantrums or hot temper” as “very

true or often true” was 6.09 points higher than the score of those who endorsed the behavior problem as “sometimes or somewhat true”, $b = 5.46$, 95% CI = [.17, 10.76], $p < .05$. There was a trend towards significance when examining parents who endorsed this item at some level and those who did not endorse, with parents who endorsed this item showing an average parental stress score that was 7.09 points higher than parents who did not endorse the item ($b = 7.09$, 95% CI = [.01, 14.17], $p = .05$).

Table 2

Results of Linear Regression Predicting Pre-TX Stress

	<i>b</i>	<i>t</i>	Sig.	95% CI (<i>b</i>)
(Constant)	37.07	30.87	.000	[34.63, 39.52]
Doesn't answer when people talk to him/her (1 v. 2)	7.45	3.11	.004	[2.57, 12.33]
Temper tantrums or hot temper (Endorsed v. Not Endorsed)	7.09	2.04	.05	[.01, 14.17]
Temper tantrums or hot temper (1 v. 2)	5.46	2.10	.04	[.17, 10.76]

Note: 1 v. 2 indicates a comparison between endorsement at a level of 1 and a level of 2

Intervention Results

Prior to the intervention, 80.8% of parents in the sample reported clinical levels of parental distress, defined as stress levels above the 90th percentile (Abidin, 1995). This percentage decreased significantly after completing the intervention where 53.8% of participants reported clinical levels of parenting stress, $X^2 (1, N = 26) = 4.79$, $p < .05$, OR = 3.00 (95% CI [1.64, 5.49]). There was also a significant change in PSI parental distress

raw scores from pre-treatment ($M = 36.46$, $SD = 8.29$) to post-treatment ($M = 31.65$, $SD = 8.50$), $t = 2.54$, $p < .05$, $d = .58$. These results are depicted in Figure 1.

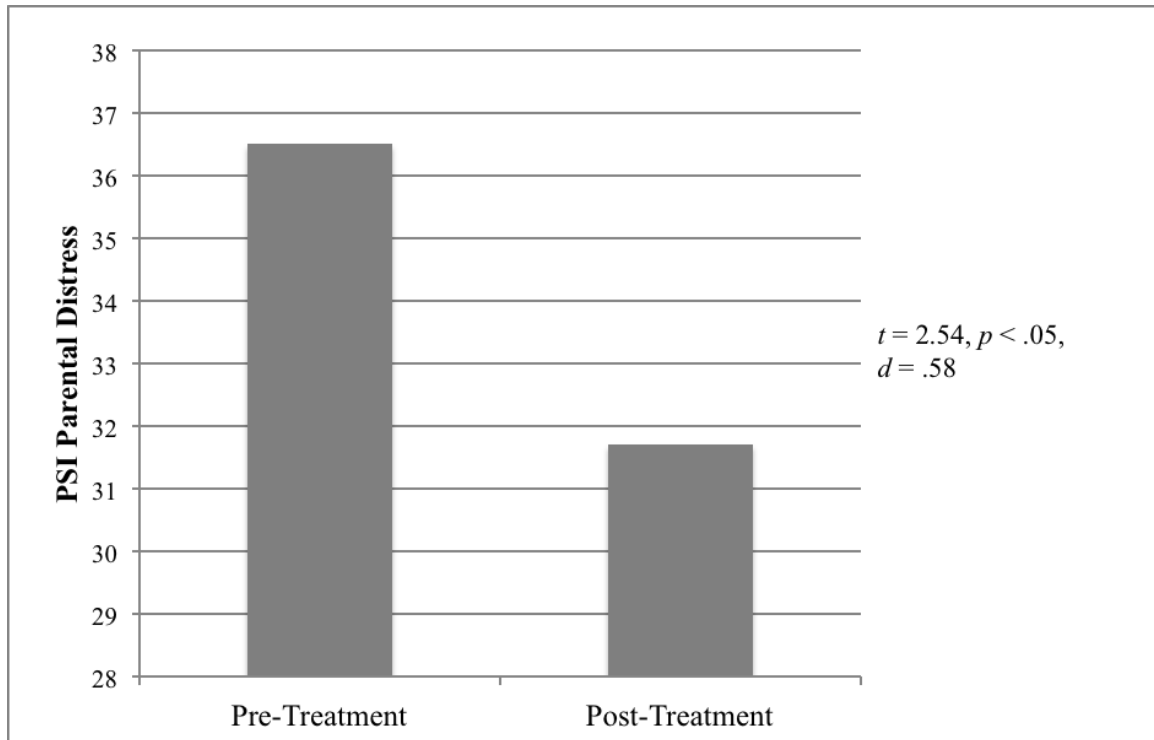


Figure 1. Pre-treatment to post-treatment changes in parental stress.

Post-Treatment Parental Stress Levels and Behavior Problems

The two behavior problems that significantly related to parental stress at intake were used in the hierarchical linear regression model predicting post-treatment parental stress. By including pre-treatment parental stress scores as the first step in the model, we controlled for these scores so as to examine changes in parenting stress from pre-treatment to post-treatment. The overall model predicting post-treatment parental stress from child behavior problems was significant ($F(4, 21) = 3.57$, $p < .05$) and accounted for 41% of the variance in post-treatment parental stress scores ($R^2 = .41$). About 12% of this

variance was accounted for by pre-treatment stress scores ($R^2 = .12$ for Step 1) and the majority of the variance explained was accounted for by the two behavior problems ($\Delta R^2 = .29$ for Step 2). The mean decrease in parental stress from pre-treatment to post-treatment was 9.10 points greater for parents who endorsed “doesn’t answer when people talk to him/her” as “very true or often true” compared those who endorsed the behavior as “sometimes or somewhat true”, $b = -9.10$, 95% CI = [-15.82, -2.38], $p < .05$. Additionally, the average decrease in the parental stress score of parents who endorsed “temper tantrums or hot temper” at some level was 9.42 points greater than the decrease for parents who did not endorse this item at any level, $b = -9.42$, 95% CI = [-18.68, -.16], $p < .05$. There was no significant difference in parental stress scores between parents who endorsed this item as “sometimes or somewhat true” and those who endorsed it as “very true or often true.” These results are reported in Table 3.

Table 3

Results of Hierarchical Regression Predicting Post-TX Stress

	<i>b</i>	<i>t</i>	Sig.	95% CI (<i>b</i>)	ΔR^2
Step 1					.12
(Constant)	18.90	2.57	.02	[3.72, 34.07]	
Pre-TX PSI	.35	1.78	.09	[-.06, 0.76]	
Step 2					.29
(Constant)	7.99	1.06	.30	[-7.73, 23.71]	
Pre-TX PSI	0.63	3.15	.005	[.22, 1.05]	
Doesn't answer when people talk to him/her (1 v. 2)	-9.10	-2.82	.01	[-15.82, -2.38]	
Temper tantrums or hot temper (Endorsed v. Not Endorsed)	-9.42	-2.12	.047	[-18.68, -.16]	
Temper tantrums or hot temper (1 v. 2)	-2.31	-.65	.52	[-9.68, 5.06]	

Note: 1 v. 2 indicates a comparison between endorsement at a level of 1 and a level of 2

CHAPTER 4

DISCUSSION

We examined the individual behavior problems most commonly endorsed among parents of children with ASD and how those behavior problems related to parental stress among parents participating in a stress reduction intervention. Overall, parents of children with ASD showed significant reductions in parenting stress over the course of the MBSR intervention, consistent with the larger sample of parents of children with DD, which used a randomized experimental design (Neece, 2013). The most commonly endorsed behavior problems included attention problems, language problems, and externalizing behavior problems. A subset of these behavior problems had a significant association with levels of parental stress, particularly those involving difficulties with frustration management and speech delays. These two problem behaviors, the degree to which the child was verbally responsive to others and the level of emotional outbursts, were also associated with changes in parental stress from pre to post treatment.

Interestingly, the behavior problems that were most commonly endorsed were not necessarily the same ones that had the strongest relationship with parental stress. For example, “speech problem” and “can’t stand waiting; wants everything now” were reported to be very common among our children with ASD, but neither was correlated with parental stress scores ($\rho = .10, p > .05$; $\rho = .09, p > .05$, respectively). Alternatively, “doesn’t answer when people talk to him or her” was reported to be less common, but this behavior problem had the strongest association with parental stress ($\rho = .39, p < .05$). The behavior problems that correlated significantly with stress appeared to be those that were likely problematic in social settings, possibly increasing parental embarrassment

and concern about social evaluation (e.g. temper tantrums and not responding to others). Thus, social isolation and embarrassment may be mediating factors through which these child behavior problems contribute to parental stress levels. The lack of relationship between “speech problem” and parental stress compared to the significant association between “doesn’t answer when people talk to him or her” and elevated parental stress levels appears to highlight the possible importance of social evaluation. While language delays are a core symptom of ASD, our results indicate that it may not be the delay itself that is stressful for parents, but the potential impact of the delay on social situations. Similarly, emotional and behavioral outbursts are likely to be especially problematic in public settings and social situations and, therefore, are a potential source of embarrassment or negative social attention. Other behavior problems, such as inattention, restlessness, and impatience, may be common in this population, but less disruptive to parents’ social life and, therefore, less stressful. Consistent with previous research pointing to social evaluation as a key source of stress for parents of children with ASD, our findings suggest that behaviors less acceptable in social settings are the most stressful to parents (Hutton & Caron, 2005; Myers, Mackintosh, & Goin-Kochel, 2009).

Interestingly, the same two behavior problems that were associated with parental stress at pre-treatment (i.e. temper tantrums and not responding to others) were also associated with changes in parental stress from pre to post-treatment. Parents who reported that their child had temper tantrums or a hot temper at any level also reported increased levels of stress at pre-treatment compared to those who did not endorse the item as being problematic for their child. This finding is consistent with previous research (Lecavalier et al., 2006) and indicates that disruptive behavior problems, specifically

behavioral outbursts, are especially stressful for parents. Externalizing behavior problems are often the primary targets of behavioral interventions for children; however, our findings and those of previous researchers suggest parents of children with these difficulties may also require their own treatment given the associated risk for elevated stress. At post-treatment, the parents who endorsed temper tantrums or hot temper at a higher level showed greater decreases in stress compared to those who endorsed this behavior problem at lower levels. Thus, it is possible that interventions such as MSBR that increase parents' awareness of and reduce their reactivity to episodes of child emotion dysregulation may be particularly successful, and our preliminary findings indicate that this intervention may be effective in reducing parental stress.

Similarly, the second behavior problem, "doesn't answer when people talk to him or her," was also associated with changes in parental stress from pre to post-treatment. Parents who reported that their child "doesn't answer when people talk to him or her" often or almost always reported higher levels of stress at intake, but greater reductions in stress compared to parents who reported that their child exhibited this behavior sometimes. Given the current sample, this item may be an indicator of language delay, one of the core symptoms of ASD. The ratings of one versus two on this item may be a proxy measure of the child's expressive language abilities suggesting that in the absence of intervention, parents of children with more severe language delays are more stressed. This finding is particularly concerning given that child language delays and levels of parental stress have both been associated with negative outcomes in behavioral interventions for children with ASD (Ben Itzhak & Zachor, 2011; Darrou et al., 2010; Eisenmajer et al., 1998; Osborne et al., 2008; Robbins et al., 1991; Strauss et al., 2012;

Szatmari, Bryson, Boyle, Streiner, & Duku, 2003). Therefore, not only might stress-reduction interventions necessary for the mental health of parents, but they may also be important for the developmental outcomes of their children with ASD.

The findings of the current study must be considered within the context of several study limitations. The first limitation is the relatively small sample size. Given a larger sample size, more behavior problems may have significantly predicted pre-treatment parenting stress levels. Furthermore, increased sample size may allow use to detect additional behavior problems that are associated with outcomes of stress reduction interventions. A second limitation was our method of data collection. Since the same parents reported both their stress levels and their children's behavior problems, the two reports were not truly independent. Parents who were more stressed may have viewed their child's behaviors as more problematic. Future studies should compare the participating parent's report of behavior problems to that of an independent reporter, such as a teacher. Additionally, the child's ASD diagnosis was obtained through parent report and not our own independent assessment and, thus, the methods used to determine diagnosis likely varied across participants. Lastly, the current study showed reduction in parental stress levels from pre-treatment to post-treatment, but we were unable to use the experimental design in order to compare changes in parenting stress in the treatment group relative to the control group due to insufficient power. This is also a concern in interpreting the impact of child behavior problems in predicting changes in parental stress. Parents who endorsed higher levels of the problem behaviors identified (e.g. temper tantrums and not responding to others) also reported more stress at pre-treatment and, thus, it is possible that this finding represents a regression to the mean. On the other

hand, it is also possible that the core skills learned in MBSR, such as remaining non-judgmental and non-reactive, along with the emphasis on acceptance are especially beneficial for alleviating the stress resulting from perceived negative social evaluations. It will be important to include a control group in future studies in order to address these questions.

Future directions for this line of research include replicating the study with a larger sample, which includes a control group for comparison. In addition to validating the results of the current study, this may facilitate the identification of additional behavior problems that are especially problematic for parents. The more behavior problems we can identify, the better we can tailor interventions to meet the needs of both children with ASD and their parents. It would also be helpful to directly ask parents how stressful specific behavior problems are for them so as to understand which behavior problems parents experience as the most distressing. Finally, future investigations should consider ways to integrate stress reduction into other interventions for children with ASD, specifically parent training and behavioral interventions for children, such as applied behavior analysis. Therefore, parents of children with ASD would not only learn to successfully manage their children's behavior problems, but also to manage the stress that they experience in response to those behavior problems.

Given the reciprocal relationship between behavior problems and parenting stress in parents of children with ASD, parental stress serves as an important target for intervention. Studies like this one examining the particular behavior problems that predict parenting stress provide clinicians with more specific targets for behavioral interventions and may encourage parents to become engaged in treatment. Thus, interventions can be

tailored not only to the needs of the children, but also to those of parents, thereby improving overall family functioning.

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