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PARENTING STRESS IN PARENTS OF CHILDREN WITH AUTISM SPECTRUM

SYMPTOMATOLOGY

by

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ABSTRACT
PARENTING STRESS IN PARENTS OF CHILDREN WITH AUTISM SPECTRUM
SYMPTOMATOLOGY

by

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The University of Wisconsin-Milwaukee, 2014
Under the Supervision of Professor Bonita P. Klein-Tasman

Children with developmental disorders commonly display behavioral, emotional, and
adaptive problems. Parents raising these children often undergo stress at clinical levels,
which can lead to a host of negative consequences for both parent and child. Parents of
children with autism spectrum disorder (ASD) report significantly higher stress than
parents of children with other disorders. Thus, some aspects of autism may present a
unique challenge to parents. ASD symptoms are often present in other developmental
disorders, which could significantly increase parenting stress. Additionally, the severity
of ASD symptoms within a group of children with ASD can greatly vary. Despite rising
prevalence estimates of ASD, research on the relationship between ASD symptomatology
and stress is scarce. To help remedy this problem, the present study examines relations
between ASD symptom severity and parenting stress in a group of children who display
varying levels of autism symptoms. This study represents an expansion on prior research
that examined characteristics in preschoolers with autism or developmental delay that
contribute to maternal stress. This study examines whether diagnostic classification
('autism' vs. 'non-autism') is related to parenting stress and whether autism symptom
severity (calculated using the Autism Diagnostic Observation Schedule-2 and a measure
of social responsiveness) relates to parenting stress across and within participant groups.

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Introduction

Parenting any child comes with daily demands and stressors, but raising a child with a disability has a unique effect on parental stress levels. Children with developmental disabilities often display an array of symptoms that place a high demand on parents' time, energy, and abilities. Elevated stress comes with a price, frequently predicting negative outcomes for both parent and child. A child's diagnosis of 'developmental disability' (DD) increases the risk for clinical-range stress, but autism spectrum disorder (ASD), specifically, has been associated with higher parenting stress levels than any other developmental disorder. However, many children with developmental disabilities display some symptoms in common with children who have ASD. Because symptoms of ASD also vary in severity along a broad continuum, it is potentially helpful to study the relationship between the severity of autism symptomatology and parenting stress, regardless of diagnostic classification. In this study I will replicate and extend prior research on the relations between diagnosis, symptoms, and parenting stress. I will examine group differences between children with and without ASD on measures of parenting stress, problem behavior, and adaptive skills. I will then examine the role that autism symptom severity plays in predicting parenting stress.

This introduction will be organized as follows: I will begin by reviewing the current knowledge about the relations between developmental disorders and parenting stress, including the diagnoses or symptom domains (e.g., problem behavior, adaptive deficits) that are related to greatest parental stress. I will suggest that predicting stress based on diagnosis or symptom domain alone is helpful but insufficient, attempting to expose the need for detailed research on autism symptom severity. I will explain the

concept of 'autism symptom severity' and how this differs from research that has been done in the past. I will then describe in more detail the studies by Estes et al. (2009) and Eisenhower, Baker, and Blacher (2005), which examined the influence of diagnosis and various symptom domains on parenting stress. I will describe how the current study expands upon these findings by using two different measures of problem behaviors to predict parenting stress, by including measures of symptom severity (clinician severity ratings and a measure of social responsiveness), and by examining autism symptomatology even in those children who did not reach the level of an 'autism spectrum' diagnosis. I will then present my aims and hypotheses for this study in light of what is presently known about autism symptomatology.

<div align="center">**Literature Review**</div>

Current Knowledge about ASD, DD, Symptom Domains, and Stress

It is well-known that elevated parenting stress predicts negative outcomes on functioning, including parental depression (Maxted et al., 2005), anxiety, marriage problems, family functioning difficulties, lower parental *physical* health (Johnson, Frenn, Feetham, & Simpson, 2011; Johnston et al., 2003; Neece & Baker, 2008), and, if combined with low empathy, a higher risk for child abuse (Letourneau, 1981). To date, several studies have revealed evidence that parents of children with developmental disabilities are at a high risk for experiencing child-related distress (Eisenhower, Baker, & Blacher, 2005; Estes et al., 2009; Tervo, 2012) related to child traits such as poor social skills, behavior (Neece & Baker, 2008) or attention problems (Tervo, 2010), withdrawal, or emotional dysregulation (Tervo, 2012). Many studies have examined the role that these various disorders, including ASD, play in elevating stress, finding that parents of children

with ASD experience higher levels of stress than do parents of children with other developmental disorders (Estes et al., 2009; Rodrigue, Morgan, & Geffken, 1990; Schieve, Blumberg, Rice, Visser, & Boyle, 2007; Silva & Schalock, 2012).

Autism spectrum disorder, which affects about 1 in 88 children (Centers for Disease Control and Prevention, 2012), is defined by deficits in socio-communicative behaviors, the presence of odd or stereotypical behaviors, a restricted range of interests, and, sometimes, language deficits. Mothers of children with ASD may experience *a fourfold increase* in distress (Silva & Schalock, 2012) compared to parents of other child groups and twice as much stress as mothers of children with developmental delay (Estes et al., 2009; Rodrigue et al., 1990; Schieve et al., 2007; Silva & Schalock, 2012), with stress at above the 90th percentile in some samples (Mori, Ujiie, Smith, & Howlin, 2009). Despite this knowledge, there is a lack of empirical research on stress in parents of young children with ASD (Davis & Carter, 2008). Estes et al. (2009) conducted one of the few studies that use current diagnostic criteria and diagnostic methods to confirm diagnosis and clearly distinguish between children with ASD and (non-ASD) DD. They examined the influence of child diagnosis, adaptive functioning, and problem behaviors on parenting stress and psychological distress (anxiety/depression), finding that the ASD group showed more problem behaviors and fewer daily living skills than children with DD. Overall, consistent with prior research, mothers in the ASD group reported significantly more stress, as well as higher depression and anxiety, than did mothers in the DD group.

Some of this stress is likely related to the hallmark characteristics of autism, such as deficits in language, communication, or social skills (Neece & Baker, 2008) and odd,

repetitive, or stereotypical behaviors. These characteristics can be thought of as 'autism symptomatology' and present themselves at higher rates in children with autism spectrum disorders. Other symptoms - which are not limited to ASD alone - have also been theorized as strong predictors of parenting stress, including, most prominently, problem behaviors (Baker et al., 2003; Davis & Carter, 2008; Hastings, 2002; Mori, Ujiie, Smith, & Howlin, 2009; Weiss, Sullivan, & Diamond, 2003). Problem behaviors often associated with autism include social relatedness deficits, emotional functioning or self-regulation difficulties (Davis & Carter, 2008), special service needs (Schieve et al., 2007; Weiss et al., 2003), regulatory problems (e.g., difficulty sleeping or eating)(Dominick, Davis, Lainhart, Tager-Flusberg, & Folstein, 2007), difficulty with adaptive functioning (Weiss et al., 2003) or daily living skills (Estes et al., 2009), tantrums, self-injury, aggression (Dominick et al., 2007; Hall & Graff, 2011), and trouble fulfilling basic self-care needs, which can worsen behavior problems (Dyches, Wilder, Sudweeks, Obiakor, & Algozzine, 2004). Thus, many characteristics of children with ASDs present a great risk for causing clinical-range parenting stress (Davis & Carter, 2008; Dąbrowska & Pisula, 2010; Silva & Schalock, 2012; Weiss, Cappadocia, MacMullin, Viecili, & Lunsky, 2012).

ASD Symptoms in Developmental Disabilities

Children with developmental delays or disorders often display autism symptomatology (Hepburn, Philofsky, Fidler, & Rogers, 2008; Klein-Tasman, Phillips, Lord, Mervis, & Gallo, 2009), including significantly more behavioral and emotional problems than typically-developing peers (Baker et al., 2003; Eisenhower et al., 2005). Given the presence of autism symptoms in other developmental disorders and the fact

that ASD behavioral symptoms are often chronic (Brereton, Tonge, & Einfeld, 2006), consideration of the effects of autism symptomatology in children with non-ASD developmental disorders is necessary.

Parenting a child who displays symptoms associated with autism spectrum disorders – *whether or not the child has an ASD diagnosis* - can potentially contribute to greater exposure to high-stress situations for parents. Since parenting stress increases the risk for many negative outcomes, prevention of this stress is of utmost importance when treating children with DD, especially if the presence of autism symptomatology in these disorders exacerbates stress. The current study will delve into the complexities of this symptom-stress relationship.

Though the cited research has examined the role of particular symptom domains (most prominently, problem behaviors and adaptive skills) in relation to stress, these studies have not clearly investigated the exact nature of these problem behaviors, specifically, the particular role of the *severity* of *autism symptomatology*. It could be that autism-related problem behaviors (e.g., deficits in communication and social interaction; stereotyped behaviors), rather than general problem behaviors, relate to higher stress. This investigation is a necessary "next step," given that an ASD diagnosis has been shown to surpass other developmental disorders in terms of stressful effects on parents. The current study aims to provide a clearer picture of the impact of autism symptomatology on parenting stress.

This study will examine relations between autism symptoms and parenting stress, looking particularly at whether diagnostic classification alone predicts parenting stress or whether autism symptom severity ratings – regardless of overall diagnosis - allow for a

more narrow and individualized approach to estimating stress. As is made evident by the term 'spectrum,' autism symptomatology can range from very mild to very severe across unique individuals. Classifying a child as 'on the spectrum' reveals little about the severity of symptoms and, consequently, about the potential parental stress. Furthermore, classifying a child as 'non-ASD' DD may cause clinicians to overlook the potential for high stress in parents whose children still display some symptoms of ASD. This study attempts to unravel this problem through the use of overall "severity ratings" for autism symptomatology, explained below.

Shifting the Focus from Diagnosis to Severity

Considering severity aligns with the trend toward dimensional conceptualization and the focus on a range of symptoms. Prior research focused on a categorical approach to autism diagnosis. A child could fall into one of three categories on the Autism Diagnostic Observation Schedule (ADOS) (Lord, Rutter, DiLavore, & Risi, 2003), the gold standard instrument used to help diagnose autism based on communication, social interaction, stereotypical/repetitive behaviors, and other symptoms associated with autism. The three categories were: 1) nonspectrum, 2) autism spectrum, or 3) autism. These classifications were based on the DSM-IV (American Psychiatric Association, 2000) categories. Each classification required the display of a certain number of ASD symptoms; i.e., a "cutoff point." No differentiation was made between children who *marginally* achieved an 'autism' diagnosis and those who largely exceeded the cutoff. A wide range of symptoms is possible within these classifications, and "the categorical syndromes do not always fit with the reality of the range of symptoms that individuals experience" (American Psychiatric Association, 2012). The shift toward

viewing ASD as a *scale* of disability means taking <u>severity</u> of the symptomatology into account. This approach aims to help clinicians determine the specific place each child falls within a severity range and design treatments that cater to unique symptom combinations.

Consistent with the change in DSM criteria for 'autism spectrum,' the revision of the gold-standard observational measure (ADOS-2) (Lord et al., 2012) emphasizes a dimensional model by including severity scores. Published research to this point has used the first version of the ADOS, which bases the diagnosis decision on two categories: communication and reciprocal social interaction. With this system the severity of a disorder is not considered, and consequently, clinicians may struggle to determine whether treatment is causing improvement (American Psychiatric Association, 2012). However, the DSM-V (American Psychiatric Association, 2013) changes the criteria for ASD, focusing on 'communication/social interaction' and 'restricted/repetitive behaviors or interests' as the essential criteria. Administration of the ADOS and ADOS-2 is the same and all items are identical, but the ADOS-2 presents revised algorithms for calculating scores, comparisons based on age, updated administration protocols, coding instructions that are more clear and direct, and a severity index deemed helpful to clinicians. This severity index allows clinicians to assess individuals' entire symptom range and gain important information about symptoms *apart from diagnosis*. This dimensional system will also "allow clinicians to rate both the presence and the severity of the symptoms" (American Psychiatric Association, 2012), letting them to track improvement and provide documentation about all symptoms.

Extension of Prior Research

I would like to briefly return to two studies in particular which present somewhat conflicting findings. The first study used the most current standardized diagnostic tools to determine disorder classification. Estes et al. (2009) provides a solid basis for the current study's expansion of research about symptom severity. As mentioned, Estes et al. found higher stress levels in parents of children with ASD compared to (non-ASD) DD. They found that child problem behaviors accounted for variability in parenting stress and psychological distress *over and above* the influence of diagnosis and adaptive skills. Estes et al. also found a positive association between problem behaviors and stress, with stronger relations between these two in the DD group. Their results lend some support to the idea the amount of problem behaviors present, rather than diagnosis, has the greatest impact on stress. Based on their findings, Estes et al. also questioned the idea that adaptive behavior deficits significantly affect parenting stress. These results are in contrast to the findings by Eisenhower et al. (2005), who found that, although behavior problem levels within specific syndromes paralleled variance in maternal stress as the child aged, this variance was still present after behavior problems and cognitive level were accounted for. (This study did not include assessment using standard diagnostic tools or confirmation of autism classification.) Eisenhower et al. suggested that a diagnosis of autism, in particular, contributed to stress above and beyond other factors. (The discrepancy between these two studies could be due to the different measures of problem behavior used.) Thus, Eisenhower et al. suggest that some "unexamined characteristics" associated with *syndrome* influence stress. The current study attempts to address this hypothesis through a replication and extension of the Estes et al. study.

Limitations of Prior Research

While problem behavior was found to account for differences in stress between ASD and DD, the measure of problem behavior used by Estes et al. (2009), the Aberrant Behavior Checklist (ABC), may be weighted with autism symptoms, including social withdrawal, stereotype behaviors, and inappropriate speech, and may not be a very pure measure of general problem behavior. Some portion of the Estes et al. DD group, then, may be showing ASD symptomatology *as reflected by scores on the ABC.* Because the ABC includes scales that may be biased toward symptoms of autism (e.g., Lethargy, Social Withdrawal; Stereotypic Behavior; Inappropriate Speech), comparing ABC scores to autism classification could contrast two instruments that are actually related in terms of the construct being measured. Estes et al. found higher parenting stress in the ASD group, but they also found a stronger relationship between parenting stress and problem behavior in the DD group, *who on average had fewer problem behaviors.* From this limitation, it is possible to conclude that *certain* problem behaviors (e.g., those associated with ASD), rather than general overall problem behaviors, relate to higher stress. Using a broader measure of problem behavior and a purer measure of autism symptom severity across and within domains may provide a clearer explanation of the origins of parenting stress.

Improvements

The current study will improve upon the above limitations in two ways. First, like Eisenhower et al. (2005), it will add a measure of problem behavior with a more general problem behavior measure than the ABC: the Child Behavior Checklist (CBCL) (Achenbach & Rescorla, 2001). This instrument will be used as a measure of problem behavior to predict parenting stress, along with the Daily Living Skills score from the

Vineland Adaptive Behavior Scales (VABS) (Sparrow, Balla, & Cicchetti, 1984).

Second, the current study will examine the *severity of ASD symptomatology* in relation to

stress. Rather than using the ABC, which is not specifically designed to help diagnose

ASD, the current study will use a measure specifically designed to capture autism

symptomatology in our attempt to predict parenting stress: the Social Responsiveness

Scale (SRS) (Constantino & Gruber, 2005), which examines abnormal socio-

communicative behaviors (helping delve into social skills-stress relations), as well as

ADOS-2 severity ratings, will be used to predict stress levels.

In the current study I will use the ADOS classification of 'spectrum' or

'nonspectrum' to first ask whether a difference in parenting stress exists between groups.

I will replicate Estes et al. (2009)'s use of the VABS Daily Living score and will include

the ABC, but I will use a different measure of parenting stress (Parenting Stress Index-

Short Form; PSI-SF) (Abidin, 1995). Estes et al. measured parenting stress using the

Questionnaire on Resources and Stress (QRS: Konstantareas et al., 1992), made up of

285 items and 15 subscales, which is geared toward families raising children with DD.

The PSI and QRS are the most commonly-used measures of stress in families and

demonstrate good concurrent validity with one another. Subscales on the QRS are similar

in construct to those on the PSI. Bivariate correlation coefficients revealed strong positive

correlations between total scores on the two measures (r=.63, p<.001). Bivariate and

multivariate analyses confirmed that the QRS and PSI have "reasonable concurrent

validity, but do not overlap perfectly." (Sexton, Burrell, Thompson, & and Sharpton,

1992). Estes et al. also used the Brief Symptom Inventory (BSI: Derogatis and

Melisaratos, 1983) to measure psychological distress (e.g., symptoms of anxiety and

depression) in parents. The use of alternative and additional measures will help extend the

findings of Estes et al. and make them more robust. Importantly, these measures also differentiate which aspects of autism most contribute to stress and how symptom severity influences stress levels.

Scope of the Current Study

The present study examines child-related variables associated with parenting stress in families raising children with ASD symptomatology. Specifically, I will compare an ASD group and a mixed etiology DD group, ages 2-5. I will examine whether differences in parenting stress exist between the two groups. I will also investigate group differences in adaptive skills and problem behaviors. Using measures of autism symptom severity, I will examine whether severity is related to parenting stress across and within groups. Finally, to more closely investigate the nature of symptoms related to the highest stress, I will examine the contributions of problem behaviors, adaptive skills, and diagnosis to stress using two different measures of problem behavior.

Method

Participants

Forty children were referred to the Child Neurodevelopment Research Lab due to concerns about a possible autism spectrum disorder (ASD). Data from 35 of these children were collected during a study of relations between growth and ASD; 5 additional children were referred for autism assessment at a later time. All participants were diagnosed by a Licensed Psychologist abiding by DSM-IV (APA, 2000) criteria, based on administration of a semi-structured parent interview called the Autism Diagnostic Interview-Revised (ADI-R; Lord, Rutter, & Le Couteur, 1994; Rutter, LeCouteur, & Lord, 2003) and the ADOS, testing observations, and a clinical interview. 19 children

were given an "autism" or "autism spectrum" (PDD-NOS) diagnosis by the clinician, and 21 children were classified as "nonspectrum." A small number of children (n=3) just met threshold for an autism spectrum on the ADOS but were not diagnosed after clinical judgment. Most children in the "nonspectrum" (DD) group were diagnosed with a different disorder. One child was given no diagnosis; however, he was included in the "DD" group due to exhibiting some level of autism symptomatology warranting evaluation for an ASD. Children in the DD group demonstrated a higher level of intellectual functioning than children in the ASD group. Participant information can be found in Table 1.

Materials

The measures and materials used are appropriate for use with young children. They are widely used in research and clinical settings and are all considered reliable and valid for children with developmental disorders. The measures were chosen to provide a picture of the child's intelligence level, autism symptoms, behavior problems, adaptive abilities, and social abilities, as well as the parents' perceived stress. The measures selected for this study are listed in detail below.

Aberrant Behavior Checklist (ABC). The ABC is a checklist designed to assess symptoms of problem behavior in children and adults with intellectual disabilities. The manual includes detailed explanations of all behaviors assessed. It demonstrates good reliability and validity. The ABC consists of five subscales measuring problem behaviors, including (I) Irritability, Agitation, Crying; (II) Lethargy, Social Withdrawal; (III) Stereotypic Behavior; (IV) Hyperactivity, Noncompliance; and (V) Inappropriate Speech. The total score on the ABC was used in this study.

Autism Diagnostic Observation Schedule (ADOS). The ADOS is a standardized semi-structured measure based on play interactions with the administrator. It has strong psychometric properties and high predictive validity. It assesses ASD symptomatology, including abnormal communication (e.g. eye contact), social interaction, and restrictive/repetitive behaviors. It provides an assessment of autism regardless of language level. It is designed for toddlers to adults and takes about 40 minutes to complete. Four modules are available for administration, with Module 1 catering to children with very little language and Modules 2-4 aimed towards individuals with increasing mastery of language. Scores range from 0-3 on most items, with each rating reflecting increases in abnormality based on distinct criteria. A subset of these codes comprise the ADOS algorithm and yield a total score, which is then compared to cutoff scores for classification of autism or the broader range of autism spectrum disorder. The original ADOS was considered the 'gold standard' for autism assessment. It bases classifications on 'reciprocal social interaction' and 'communication.' Gotham, Risi, Pickles, and Lord (2007) published new algorithms and severity scores for autism symptoms, now reflected in the ADOS-2, which allow for empirical calculation of a clinical score and an ASD classification. Scores from the ADOS and ADOS-2 were converted to a severity score, allowing for a direct comparison across modules. Coding of ADOS severity ratings uses new research that provides a conversion algorithm to improve diagnostic validity of the ADOS. Coding scores presents a solution to the problem of comparison between the different modules of the ADOS (which depend on the child's language level). Direct instructions are provided for coding (see Gotham, Risi,

Pickles, & Lord, 2007, and Gotham, Pickles, & Lord, 2009). This method also helps shift research on autism toward a dimensional model.

Child Behavior Checklist, Ages 1 ½ - 5 (CBCL). The CBCL is an empirically-based, standardized measure used widely to asses internalizing and externalizing problem behaviors in young children. Areas assessed include emotional sensitivity, anxiety or depression, somatization, withdrawal, attention difficulties, and aggression. Parents rate their child on 99 items. This study used the CBCL Total score as a measure of overall child behavior problems.

Mullen Scales of Early Learning. The Mullen is a standardized measure used to approximate a child's level of development in regards to both cognitive and motor skills. It is standardized for children ages 0 to 68 months. It has good psychometric properties and is designed to reveal strengths and weaknesses. Scales include a gross and fine motor scales, a visual reception scale, and expressive and receptive language scales. The Mullen provides a picture of intellectual level and is used in many settings to assist with decisions such as educational placement. It typically takes between 15 minutes and one hour to administer. The Early Learning Composite Score was used as a reflection of each child's cognitive functioning.

Parenting Stress Index, Short Form (PSI-SF). The PSI-SF is a questionnaire consisting of 36 items designed to create a comprehensive picture of stress in parents of children with developmental disabilities. This questionnaire is comprised of three scales (Parental Distress, Parent-Child Dysfunctional Interaction, and Difficult Child), which yield a Total Stress score. Performance on the PSI-SF is interpreted using percentile scores. Scores falling between the 15th-80th percentiles are considered normal, while

scores at the 85th percentile or above are interpreted as high. The Parental Distress scale measures the extent to which an individual feels stress associated with the parental role, including parenting competence, restrictions on life due to parenting, parental conflict, depression, and social support. The Parent-Child Dysfunctional Interaction scale measures the extent to which a parent finds interactions with his/her child unrewarding and below expectations. It indicates possible disappointment in or rejection by the child. The Difficult Child scale measures how easy or difficult a parent rates his/her child. This scale may pick up on child self-regulatory, behavioral, or cooperation problems. A Defensive Responding subscale is also included and measures whether a parent attempts to minimize problems (aiding clinician interpretation of other subscale results). The Total Stress score measures how much stress *related to parenting* that the parent experiences. Question scales range from 'strongly disagree' to 'strongly agree,' based on stress levels. It is broadly accepted as a reliable measure of parenting stress for parents of children with and without disabilities and in children with autism (Zaidman-Zait 2010). The Parental Distress raw score was used in order to consider stress apart from the influence of child problem behaviors.

Social Responsiveness Scale (SRS). The SRS is a 65-item parent or teacher questionnaire which measures the degree of social deficits typically associated with ASDs in both children and adolescents. It assesses domains of social awareness, social information processing, reciprocal social communication, social anxiety/avoidance, and stereotypic/repetitive behaviors. It is commonly used to help pinpoint problems and create treatment plans. The SRS Total score was used to measure social responsiveness in this sample.

Vineland Adaptive Behavior Scales, Interview Edition (VABS). The VABS is

a standardized, commonly-used interview administered to caregivers. It was created to

measure the adaptive behavior level of children from ages 0 – 18 years, 11 months,

across the domains of communication skills, daily living, motor skills, and socialization.

For the purposes of this study, the Daily Living Skills domain score was used as a

measure of the child's adaptive abilities in the areas of personal, domestic, and

community living skills.

Procedure

Examiners obtained parental consent, and a diagnostic evaluation and interview

was carried out at the Child Neurodevelopment Research Lab at the University of

Wisconsin-Milwaukee. All data collection took place during the laboratory visit or

through mailed questionnaires, including a written demographic questionnaire and a

series of questionnaires about the child's behavior and socio/communicative abilities, as

well as self-report of parental stress levels. Parents brought these documents to the

session to discuss with a Licensed Psychologist or experienced graduate student

supervised by a Licensed Psychologist. Trained examiners administered an age-normed

neuropsychological assessment battery to each child participant. All sessions were

videotaped. The child assessment included the Mullen Scales of Early Learning and the

language-appropriate module of the ADOS. The Licensed Psychologist diagnosed all

children based on DSM-IV TR (American Psychiatric Association, 2012) criteria and the

ADOS, combined with clinical interpretation of a series of parent questionnaires and the

ADI-R. All examiners were reliable on administration of the ADOS and ADI-R. Some

parental report and questionnaire measures administered at the time of the assessment,

including the ADI-R, are not included as part of the scope of the current study but were used to make a diagnostic decisions. Child cognitive ability level was assessed as part of the battery using the Mullen Scales of Early Learning. The same measure of intelligence was used on all participants.

Study Aims, Hypotheses, and Analytic Strategy.

Examine group differences in daily living skills and problem behavior among children with ASD and DD. Using independent samples t-tests, group differences were examined separately for the Daily Living Skills standard score on the Vineland Adaptive Behavior Scales (VABS), the total raw score on the Aberrant Behavior Checklist (ABC), and the raw Total Problem Behaviors score from Child Behavior Checklist (CBCL). Group differences were predicted such that children with autism were expected to exhibit higher levels of disability than children with DD on all measures.

Compare parenting stress for parents of children with ASD and DD. Using an independent samples t-test, group differences in parenting stress between ASD and DD groups were examined using clinical diagnosis as the grouping variable (spectrum [either autism or autism spectrum] vs. nonspectrum) and the raw score of the Parent Domain of the PSI-SF as the dependent variable. A group difference was predicted such that parents of children with ASD were expected to exhibit higher stress than parents of children with DD.

Determine whether the severity of autism symptomatology is related to parenting stress across and within groups. Severity of autism symptomatology was measured in two ways. The first used recently presented algorithms (Gotham, Risi, Pickles, & Lord, 2007) to code ADOS scores into severity ratings. Severity was also determined using the

total scores from a social responsiveness measure (Social Responsiveness Scale, SRS) that taps into autism symptomatology. Relations between ADOS severity ratings (or SRS total score) and stress as measured by the PSI-SF Parent Domain were examined separately using these two measures to determine whether higher levels of symptomatology are related to higher stress. A positive correlation between level of symptomatology and stress was predicted for the whole sample as well as within groups using both instruments.

Examine the contributions of problem behaviors, adaptive skills, and diagnosis to stress using the Aberrant Behavior Checklist. Hierarchical multiple regression analysis were used to determine the contributions of aberrant behaviors and adaptive skills to parenting stress. The first block used problem behaviors as measured by the raw ABC Total. The second block determined whether additional stress is contributed by deficits in adaptive skills, specifically the Daily Living standard score on the VABS. The third block measured any additional effect of diagnosis (i.e., ASD vs. DD) on parenting stress. Diagnosis and adaptive skills were not expected to have an additional effect on stress beyond the influence of problem behaviors as measured by the ABC. However, given that the ABC may have scales specifically geared toward problem behaviors *associated with autism* and thus incorporates many ASD symptoms, further analyses were performed. This analysis was also run controlling for cognitive functioning (Early Learning Composite) to examine whether cognitive ability made a significant contribution to the model.

Examine the contributions of problem behaviors, adaptive skills, and diagnosis to stress using a general measure of child problem behaviors (CBCL). This exploration

used a hierarchical multiple regression, with the first block using problem behaviors as measured by the raw CBCL Total. The second block measured additional stress contributed by deficits in adaptive skills as measured by the VABS Daily Living standard score. The final block measured any additional effect of diagnosis (ASD vs. DD) on parenting stress. Based on findings from the recent literature, problem behaviors were expected to contribute to parenting stress, but the use of this more general measure of problem behaviors was expected to reveal that adaptive skills and diagnosis significantly influence stress in addition to problem behaviors. Comparing this analysis to the replication in Aim 4 may help clarify findings by Estes et al. (2009) and may support the idea that behavior problems associated with autism (possibly measured by the ABC) relate to higher stress levels more than do general behavior problems. This analysis was also run controlling for cognitive ability to examine whether it made a significant contribution.

Results

This section will be organized as follows. First, group differences on the variables included will be examined. Next relations between measures of severity and stress will also be provided. Finally, results of an examination of the nature of specific contributors to parenting stress will be provided.

IBM SPSS for Windows, versions 20, was used for these analyses. A p-value of .05 was used in interpreting statistical significance. ADOS severity ratings were not normally distributed for the sample; 29 of the 40 (72.5%) were ratings of 5 and under. (See Table 1 for descriptive statistics for severity ratings.) For this reason and because most analyses used a sample size of less than 30, Spearman's rho was used for

correlational analyses. Effect sizes for correlations (Cohen, 1988) are classified as follows: .1=small effect; .3=medium effect; .5=large effect. See Table 1 for group descriptive statistics.

Group Differences:

        Daily Living Skills. Adaptive skills (as measured by the parent-reported Daily Living score and the Adaptive Composite on the VABS) were compared between ASD and DD groups. The ASD group exhibited a significantly lower mean adaptive composite than the DD group. The ASD group also exhibited significantly lower Daily Living skills than the DD group. However, after controlling for cognitive functioning, differences in Daily Living skills between groups were no longer present (p=.24), and while differences on the Adaptive Composite trended (p=.06, they were not significant.

        Problem Behavior. No significant differences were found between groups for behavior problems as measured by the ABC, CBCL, or SRS Total.

        Parenting Stress. Mean scores on the Parental Distress scale fell at the 63rd and 60th percentiles for ASD and DD groups, respectively. Independent samples t-tests comparing stress between mothers of the ASD and DD groups (using raw Parental Distress scale scores) showed no significant differences. Total Stress was at the 78th and 76th percentiles for ASD and DD groups, respectively, showing clinically elevated stress levels but no significant differences between groups. See Table 2 for results of all group comparisons.

Relations of Severity of Autism Symptomatology to Parenting Stress

        ADOS severity and parenting stress. Pearson's correlations were used to examine relations between ADOS severity rating and parental stress as measured by the

raw Parental Distress score on the PSI. Correlations were not significant across the group as a whole. Additionally, no relations were found between ADOS severity rating and any domain of the PSI.

ASD and DD groups were separated and correlations were run to examine relations between ADOS severity rating and stress within groups. In the DD group, no significant relations between severity rating and stress were found, and all effect sizes were small. However, results trended much more toward significance when relations were examined in the ASD group, with medium effect sizes observed for all correlations. See Table 3 for correlations between ADOS severity rating and PSI scores. To further evaluate the strength of effect sizes, regression analyses were run to investigate the interaction between group and severity score. The group by severity score interaction was not significant, although it trended somewhat toward significance (t[36]=1.75, *p*=.090), indicating stronger relations in the ASD group.

SRS total and parenting stress. Correlations were used to examine relations between the SRS and parenting stress across the entire sample. SRS scores were significantly related to the Parental Distress and Total Stress domains of the PSI. Medium effect sizes were noted. ASD and DD groups were also examined separately to examine relations between parenting stress and the SRS total score. Medium effect sizes were seen for the parental distress domain in both DD and ASD groups and in the total stress domain for the DD group. The SRS-by-group interaction was not significant, indicating no group differences in strength of relations between the SRS and stress (t[30]=1.21, *p*=.24). See Table 3 for correlational analyses of relations between the SRS and parenting stress.

Severity rating and SRS. Relations between ADOS severity rating and the SRS were not significant across the entire group. Again, ASD and DD groups were separated to examine relations between SRS and severity rating. No relations were seen in the DD group. In the ASD group, results appeared to trend toward significance, with a medium effect size. See table 3 for correlations between ADOS severity rating and SRS score. The strength of the effect was tested further using multiple regressions investigating the severity rating-by-SRS interaction between groups. This analysis revealed that the strength of the relations was not significantly different between groups (t[33]=1.30, p=.21).

Contributions to Stress using the ABC

Hierarchical multiple regressions were used to examine the effects of several different variables on parental distress (PD scale of the PSI). In the first analysis, ABC raw total represented problem behaviors. ABC raw total was entered in Block 1, Daily Living Skills in Block 2, and diagnosis in Block 3. Problem behaviors accounted for 15.7% variance in stress, daily living skills explained 12.6% additional stress, a significant contribution, and diagnosis only explained .2% stress in addition to problem behaviors and adaptive skills. In the final model, ABC total and DL significantly affected stress; with a higher beta value for ABC total and a lower beta value for Daily Living score. Diagnosis did not uniquely significantly affect stress. See Table 4 for results of this analysis. No significant group-by-problem behavior interactions were found. Because the DD group had significantly higher intellectual functioning than the ASD group, and some of these variables showed significant correlations with the Early Learning Composite (ELC), this regression was re-run controlling for ELC score in Block 1. Cognitive

functioning only accounted for a small percentage of the variance in stress and did not significantly contribute to the model. See Table 6 for results of hierarchical regressions controlling for cognitive functioning.

Contributions to Stress using the CBCL

In the second set of hierarchical multiple regressions, raw CBCL total represented problem behaviors. CBCL raw total was entered in Block 1, Daily Living Skills in Block 2, and diagnosis in Block 3. Problem behaviors accounted for 32.1% of the variance in stress, daily living skills explained an additional 4.7%, and diagnosis only explained an additional .2% after accounting for problem behaviors and adaptive skills. Only the CBCL total had a unique significant contribution to stress; daily living skills and diagnosis did not uniquely affect stress. The CBCL was a better predictor than the ABC in the last model. See Table 5 for results of this analysis. No significant group-by-problem behavior interactions were found. This regression was also performed controlling for cognitive functioning in Block 1. Again, cognitive functioning (measured using the ELC) accounted for a minimal percentage of variance in stress and did not significantly affect the model. See Table 5 for regressions controlling for cognitive functioning.

<div align="center">

Discussion

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This study represents a replication and extension of research by Estes et al. (2009) using similar measures and analyses to predict parenting stress in parents of children with ASD and DD. Findings are also intended to build upon research by Eisenhower et al. (2005), who found that diagnosis contributed to stress above and beyond behavior problems (suggesting that some features of diagnosis influence stress). The purpose of

the current study was to examine group differences in child problem behavior, adaptive skills, and parental distress, examine relations between severity of autism symptoms and parental distress, and examine the variance in stress accounted for by problem behavior, adaptive skills, and diagnosis. No significant group differences in problem behavior, stress, or daily living skills were found, although the groups differed in cognitive functioning and in overall adaptive skills. While clinician-reported severity of autism symptoms did not predict parental distress, parent-reported symptoms of autism did significantly predict parental distress. Problem behaviors were found to account for most of the variance in parental distress, especially when a general measure of problem behaviors was used. It is important to note that the current analyses focused on the Parental Distress scale of the PSI in an attempt to view stress apart from child problem behaviors. Estes et al. used a summary score for stress as well as a measure of psychological distress in conceptualizing parental stress. Results using Total Stress on the PSI were very similar to results using the Parental Distress scale, but differences from Estes et al. could be explained to some extent by the different methods of assessing stress.

Group Differences in Daily Living Skills and Problem Behavior

Children in the ASD group showed significantly poorer overall adaptive skills than children in the DD group. When examining daily living skills in particular, children with ASD were reported to show significantly more disability than children with DD. Our finding replicates that of Estes et al. (2009) and supports literature (e.g., Weiss et al., 2003) suggesting that adaptive skills are a particular area of difficulty for children with ASDs. This was in line with our hypothesis. However, because the ASD groups showed

significantly lower cognitive functioning and adaptive behavior and intellectual functioning are suggested to be highly intertwined (i.e., Dykens & Hodapp, 1997), analyses were also run controlling for cognitive functioning. After controlling for cognitive functioning, differences in Daily Living skills disappeared and differences in adaptive composite, while trending, were no longer statistically significant. Group differences in problem behaviors on the ABC or CBCL were not seen, in contrast to Estes et al.'s findings that children with ASDs exhibited more problem behaviors. Differences from prior studies may be partly because all children in our sample were referred for an ASD evaluation and may have been exhibiting similar types of problem behaviors in order to warrant a referral.

Comparison of Parenting Stress between Groups

In the current study, parental distress and total stress did not differ between ASD and DD groups, which is inconsistent with prior literature (i.e., Estes et al., 2009; Rodrigue et al., 1990; Schieve et al., 2007; Silva & Schalock, 2012) finding significantly higher stress in mothers of children with ASDs. However, because all of the children in this study were evaluated due to concerns about an ASD, these results do not necessarily contradict the literature. It may be that parental stress when going through an ASD evaluation is relatively stable across the groups in our sample regardless of ADOS classification. Additionally, prior research and our findings suggest that problem behaviors and parenting stress are highly correlated. Because our groups had similar levels of problem behaviors, it would follow that differences in parental distress between groups would not be present.

Relations of Severity of Autism Symptomatology to Parenting Stress

      ADOS severity rating and parental distress. Higher levels of autism

symptomatology as measured by ADOS severity ratings were not significantly related to

more stress across the sample. Separating ASD and DD groups to examine relations

within each group still resulted in no significant relations (see Table 3). When groups

were examined for any indication of differences, it was noted that the strength of the

correlation between ADOS severity rating and stress appeared to be stronger in the ASD

group, with medium effect sizes for the correlation. The strength of these relations was

tested further through the exploration of the interaction between ADOS severity rating

and group, which indicated stronger relations in the ASD group. While the interaction

was not significant, the trend toward significance may suggest that a sort of "threshold

effect" exists. If a child does not have an autism spectrum disorder, severity and parental

distress are not highly correlated. However, when the child does meet criteria for an

ASD, severity does appear to affect parental distress.

      SRS and parental distress. Interestingly, while the clinician-determined severity

rating on the ADOS showed no significant relations to parenting stress, parent report of

autism-related symptoms on the SRS were significantly correlated with parent report of

stress in both the Parental Distress and Total Stress domains across the sample. Medium

effect sizes for correlations were observed in the DD group, and large effects were seen

in the ASD group, but SRS-by-group interaction analyses revealed no significant

differences in relations between groups. Given that the clinician's ADOS severity rating

did not predict stress, post hoc analyses were performed to examine correlations between

the two measures of autism symptom severity. Correlations did not reach the level of

significance, but the strength of the relations appeared to be stronger in the ASD group. Again, this suggests the existence of a threshold effect such that when a child exhibits the level of symptoms sufficient for a clinician diagnosis of ASD, the level of symptoms that the parent reports are more consistent with the clinician severity ratings. However, an investigation of the interaction between severity measures revealed that the strength of relations between the two measures was not significantly different between groups.

One explanation for the stronger relations between the parental report measures is that parents' perception of ASD symptomatology is related to their perception of their own stress: if they report more symptoms on the SRS, they also report higher distress on the PSI. All children were seen for an autism evaluation, presumably because parents or another caregiver noticed symptoms that were suspected signs of autism. Consequently, parents may have been highly attuned to any sign that their child was exhibiting symptoms related to autism around the time of the evaluation, and those symptoms would likely be reported. Additionally, simply knowing that the child was getting an evaluation for a possible autism diagnosis could very well increase parenting stress, regardless of whether the clinician saw fit to diagnose the child with an autism spectrum disorder and regardless of the severity score on the ADOS or ADOS-2. Because the literature suggests higher stress in parents of children with an ASD, it is possible that parents who suspect autism-related symptoms may in fact report higher levels of stress. Our results support this suggestion: in the lab setting, parents with high parental distress scores are not necessarily the parents of children with higher clinician-observed autism severity ratings. Rather, the parents with higher parental distress seem to be those who also report – from their own view - more autism-related symptoms.

Contributions to Stress using the ABC

Our fourth aim was to replicate prior research using the ABC to clarify the nature of parental stressors. In line with our hypothesis, findings revealed that diagnosis (ASD or DD) does not contribute above and beyond problem behaviors as measured by the ABC, a finding that supports Estes et al. (2009)'s results. However, we found that daily living skills did significantly contribute to stress beyond the effect of problem behaviors. Problem behaviors measured by this checklist appear to account for the most stress, with daily living skills accounting for some additional stress and diagnosis making no significant contribution. Notably, the ABC was not correlated with either of our measures of symptom severity (ADOS severity rating and SRS), such that the suggestion that the ABC may reflect autism-heavy behavior problems was not supported. In this study we did not analyze specific items or scales, which could have been of use when attempting to determine whether the scales that were more "autism" related (e.g., stereotype behaviors) were elevated in this group of children compared to other samples. Future research may more closely examine the problem behavior scales on this measure that are most endorsed by parents with higher stress.

Contributions to Stress using the CBCL

Our final aim was to examine the effects of behavior problems, adaptive skills, and diagnosis to parenting stress with the use of the more general measure of problem behaviors, the CBCL. We expected to see a larger role for diagnosis in the influence of parenting stress by using a very general measure of child problem behaviors. Contrary to our hypothesis, problem behaviors using this measure accounted for almost all of the variance in stress, while adaptive skills and child diagnosis influenced stress very little

above and beyond problem behaviors or on their own. In research on stress in parents of children with several kinds of disabilities, Eisenhower et al. (2005) found that diagnosis accounted for an additional 3.7% of the variance in stress, with significant beta values for problem behavior and ASD group. We found problem behavior to be a significant predictor but not diagnosis; the discrepancy with Eisenhower et al. is likely due to their sample's several distinct groups of diagnoses. Our sample consisted of families with undiagnosed children who were all referred for the same reason, whereas Eisenhower et al.'s sample consisted of children with standing diagnoses (e.g., Down syndrome and cerebral palsy).

No significant group-by-problem behavior interactions were found using the CBCL or the ABC, a finding which conflicts with Estes et al. (2009)'s results. Given that the current sample's groups did not differ in problem behaviors, this finding is not surprising. Compared to the ABC, the CBCL accounted for a larger percentage of the variance in stress than did the ABC when entered into Block 1 of our previous analysis. The CBCL may indeed provide a sense of problem behaviors that are more separate from ASD symptoms, but rather than proving a larger role for diagnosis in accounting for parental distress, the use of the CBCL actually appears to give a larger role to problem behaviors. Future studies may examine in depth the individual types of behaviors on this measure that seem to contribute more to stress and whether many are, in fact, related to autism.

Limitations

The small sample size was one limitation to this study. A major limitation was the discrepancy in cognitive ability between the ASD and DD groups. Due to the nature of

recruitment, the sample was restricted to families actively seeking an autism evaluation, and this subjected the researchers to a slower rate of data collection and little control over participants' characteristics beyond age. However, steps were taken to control for cognitive ability during group comparisons and hierarchical regressions; regression analyses showed no significant contribution for cognitive ability. Cross-sectional allows for a small glimpse of each child's abilities, so performance may be affected by extraneous circumstances (e.g., mood). We also acknowledge the method variance introduced by examining relations between two parental report measures in using the SRS, the CBCL, and the ABC to predict stress. Correlations between the SRS and stress may mean that the SRS is reflecting some amount of parenting stress. The same possibility holds true for the CBCL and ABC. Another limitation is that we used the SRS and ADOS clinician ratings to measure severity, but it is important to note that while both are measures of severity, they are not equivalent (the SRS picks up on severity of social responsiveness deficits typically associated with autism, while the ADOS focuses more heavily on deficits in social communication). Finally, all participants in this sample were undergoing a diagnostic assessment, and groups were not clearly defined at the time of this evaluation. This likely played a role in similarities seen between groups. Future research should include measures of problem behavior that are not parent-reported (e.g., teacher report).

Conclusion

While most literature evidences higher stress in parents of children with ASDs, we found no differences in parenting stress between ASD and DD groups. However, because all participants in our sample were referred because of a suspected ASD, similar

stress levels across the group may be due to distress over a possible diagnosis of ASD. We found no differences in problem behaviors between groups, but children with ASD showed significantly poorer daily living skills and overall adaptive skills than children with DD. Clinician ratings of severity were not significantly related to stress across the group, but correlations between the two were much stronger in the ASD group, suggesting a threshold effect such that when a child displays symptoms sufficient for clinician diagnosis of ASD, severity does affect stress. Notably, parental report of severity was significantly related to parental report of stress, raising the possibility that a key factor in perception of parental distress is perception of ASD symptoms, whether or not the child ultimately receives an ASD diagnosis. Correlations between clinician severity ratings and parent-reported level of ASD symptoms were not significant across the group but were much stronger in the ASD group, again suggesting a threshold effect. We found that problem behaviors account for most of the variance in parental stress, with daily living skills making a significant contribution when a more specific measure of problem behavior was used but not when a more general measure was used. Diagnosis did not significantly affect stress and accounted for very little stress above and beyond problem behaviors. From these results we may conclude that problem behaviors and stress are highly related regardless of diagnosis. However, what may be important in many cases is that if a parent perceives symptoms of an ASD, he or she may be at a high risk for parental distress regardless of whether the child receives a diagnosis of ASD. This knowledge may help clinicians in providing services and recommendations for parents.

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Table 1
Demographic Data

	Sample (N=40)	ASD Group (n=19)	DD Group (n=21)
Gender:			
Male	29	14	15
Female	11	5	6
Age (Mean, SD); range	3.53 (SD=.93) years; Range=2-5 years	3.3 (SD=.82) years; Range=2-5 years	3.71 (SD=1.01) years; Range=2-5 years
Mullen Early Learning Composite (Mean, SD)	70.80 (SD=22.52)	59.65 (SD=20.38)	80.62 (SD=20.05)
ADOS Severity Rating (Mean, SD, range)	3.88 (SD=2.69); Range=1-10	6.16 (SD=1.86); Range=3-10	1.81 (SD=1.25); Range=1-5
Other Dx*	n=22	n=2	n=20
DD	n=8		n=8
RELD	n=4	n=1	n=3
ADHD	n=2		n=2
RELD+ADHD	n=1		n=1
RLD+ID+ADHD	n=1	n=1	
ADHD+ODD	n=1		n=1
ELD	n=1		n=1
SA	n=1		n=1
PD	n=2		n=2
DBD-NOS	n=1		n=1

DD=Developmental Delay; RELD=Receptive/Expressive Language Disorder; ADHD= Attention-Deficit Hyperactivity Disorder; RLD=Receptive Language Disorder; ID= Intellectual Disability; ODD=Oppositional Defiant Disorder; ELD=Expressive Language Disorder; SA=Social Anxiety; PD=Phonological Disorder; DBD=Disruptive Behavior Disorder

Table 2
Descriptive Statistics and Group Differences

Measure/*Subscale*	n	ASD M(*SD*)	n	DD M(*SD*)	df	*t*	F(1,37)	*p*
Mullen ELC[a]	19	59.65 (20.38)	21	80.62 (20.05)	38	3.23		.003**
PSI[b]								
Parental Distress	19	30.37 (9.80)	21	28.57 (8.47)	38	-.62		.54
Total Stress	19	92.95 (24.03)	21	90.52 (25.25)	38	-.31		.76
VABS[c]								
Daily Living	19	73.16 (16.89)	21	85.10 (10.57)	38	-	1.41	.24
Adaptive Compos.	19	67.42 (13.70)	21	81.86 (11.07)	38	-	3.85	.06
ABC[d] Total	17	41.53 (21.23)	21	43.05 (22.83)	36	.21		.84
CBCL[e] Total	19	61.68 (24.63)	21	65.19 (26.29)	38	.43		.67
SRS[f] Total	14	80.21 (19.32)	20	76.80 (13.45)	32	-.61		.55

[a]ELC=Early Learning Composite; [b]PSI=Parenting Stress Index; [c]VABS=Vineland
Adaptive Behavior Scales; [d]ABC=Aberrant Behavior Checklist; [e]CBCL=Child Behavior Checklist; [f]SRS=Social
Responsiveness Scale
Significant group differences * p < .05; ** p < .01

Table 3
Spearman's Correlations

	ADOS Severity			SRS		
	Corr.	*p*	Effect Size	Corr.	*p*	Effect Size
Whole Sample						
PSI PD	.13	.43	Small	.45	.008**	Med.
PSI Total	.10	.54	Small	.40	.019**	Med.
SRS	.09	.60	Negligible			
ASD Group						
PSI PD	.36	.13	Medium	.53	.052	Large
PSI Total	.27	.26	Small	.46	.098	Med.
SRS	.33	.26	Medium			
DD Group						
PSI PD	-.04	.87	Negligible	.37	.11	Med.
PSI Total	.01	.96	Negligible	.31	.18	Med.
SRS	-.06	.81	Negligible			

** $p < .01$

Table 4

Regressions: Predicting Distress using Problem Behavior, Adaptive Skills, and Diagnosis

	Regression 1			Regression 2		
	Block 1 (ABC[a])	Block 2 (+DL[b])	Block 3 (+Dx)	Block 1 (CBCL[c])	Block 2 (+DL)	Block 3 (+Dx)
R squared[d]	15.7%	28.3%	28.6%	32.1%	36.8%	37.1%
F of model	6.70	6.92	4.53	18.00	10.78	7.06
df	(1,36)	(2,35)	(3,34)	(1,38)	(2,37)	(3,36)
Sig of model	.014*	.003**	.009**	<.001**	<.001**	<.001**
R squared change[e]	-	.126	.002	-	.047	.002
R squared %	-	12.6%	0.2%	-	4.7%	0.2%
F change	-	6.18	.103	-	2.74	.134
df	-	(1,35)	(1,34)	-	(1,37)	(1,36)
Sig F change	-	.018*	.750	-	.106	.716
beta	.404	.375	.050	.506	-.203	.054
Sig of unique contribution	.009**	.022*	.750	<.001**	.203	.716

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

[a]ABC=Aberrant Behavior Checklist; [b]DL=Daily Living Skills; [c]CBCL=Child Behavior Checklist

[d]R squared=% variance in Parental Distress explained by model; [e]R squared change = % additional stress explained by added variable

Table 5
Regressions Controlling for Cognitive Functioning

	Reg. 1				Reg. 2			
	Block 1 (ELC[a])	Block 2 (+ABC[b])	Block 3 (+DL[c])	Block 4 (+Dx)	Block 1 (IQ)	Block 2 (+CBCL[d])	Block 3 (+DL)	Block 4 (+Dx)
R squared[e]	3.8%	20.4%	28.4%	28.7%	4.6%	35.6%	37.4%	37.4%
F of model	1.43	4.49	4.50	3.32	1.83	10.2	7.16	5.24
df	(1,36)	(2,35)	(3,34)	(4,33)	(1,38)	(2,37)	(3,36)	(4,35)
Sig of model	.239	.018*	.009**	.021*	.184	<.001**	.001**	.002**
R squared change[f]	-	.166	.080	.003	-	.310	.018	.001
R squared %	-	16.6%	8.0%	.3%	-	31.0%	1.8%	.1%
F change	1.43	7.31	3.79	.15	1.83	17.78	1.03	.046
df	(1,36)	(1,35)	(1,34)	(1,33)	(1,38)	(1,37)	(1,36)	(1,35)
Sig F change	.239	.011*	.060	.701	.18	<.001**	.32	.83
beta	-.053	.406	-.351	-.064	-.079	.512	-.164	.034
Sig of unique contribution	.78	.009	.06	.70	.646	.001	.365	.832

* $p < .05$; ** $p < .01$
[a]ELC=Early Learning Composite; [b]ABC=Aberrant Behavior Checklist; [c]DL=Daily Living Skills; [d]CBCL=Child Behavior Checklist
[e]R squared=% variance in Parental Distress explained by model; [f]R squared change = % additional stress explained by added variable