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LOMA LINDA UNIVERSITY
School of Behavioral Health
in conjunction with the
Department of Psychology

Stress and the Validity of Parent Report Measures

by

Katharine Fabro

A Project submitted in partial satisfaction of
the requirements for the degree
Doctor of Psychology

September 2022

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

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Cameron Neece, Professor of Psychology

David Vermeersch, Professor of Psychology

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ABBREVIATIONS

DD	Developmental Delays
MAPS	Mindful Awareness for Parent Stress
PSI-SF	Parenting Stress Inventory – Short Form
APQ-PR	Alabama Parenting Questionnaire – Preschool Revision
PCIRS	Parent Child Interaction Rating Scale
CBCL	Child Behavior Checklist

ABSTRACT OF THE DOCTORAL PROJECT

Stress and the Validity of Parent Report Measures

by

Katharine Fabro

Doctor of Psychology, Department of Psychology
Loma Linda University, September 2022
Dr. Cameron Neece, Chairperson

Data collected from self-report measures can be problematic as participants may misunderstand questions, misremember information, or misrepresent themselves when answering questions. Bias in self-report data is particularly concerning for parents of children with DD, as these measures are often used as part of diagnostic decisions and service allocations. Parents of children with DD typically experience higher levels of stress than parents of typically developing children. Stress has been shown to decrease cognitive functioning and bias parent perceptions, making it more likely that parents will inaccurately respond to self-report measures inquiring about their own parenting behaviors and their child's maladaptive behaviors.

Data from the MAPS project were used to determine if parents who report higher stress are less accurate reporters on their own parenting behaviors and their child's maladaptive behaviors. The parents and children in this project primarily identified as Hispanic (49.2% and 47.6%, respectively). Most of the children were male (69.4%) and 53.2% of our participants had a yearly household income of less than \$50,000. Parents completed measures of stress, parenting, and child behaviors, and then completed recorded interaction tasks which were coded for child and parent behaviors. Stress was used as a predictor of the discrepancy between the observational codes and parent

reports of these behaviors. It was hypothesized that parents high in stress will be less accurate reporters than parents low in stress.

Contrary to our predictions, stress did not significantly predict accuracy of parent reports of child behavior or parenting behavior ($p > .05$). Possible explanations include the sample's large variation in scores on the independent variable, poor reliability of parent report measures, and the large number of analyses run, which could have affected power. Another explanation could be that, as parents of children with DD must regularly report on their children's behavior, they have become more accurate, as research suggests that repeated reporting on the same measure increases reporter accuracy. Better understanding of reporter bias can allow providers to better utilize parent report data when making decisions around diagnoses and referrals, as well as potentially informing interventions or strategies to gather more accurate data from parents.

CHAPTER ONE

BACKGROUND

Reporting Biases

Reporting biases are inherent in self-report measures (Sessa, Avenevoli, Steinberg, & Morris, 2001) which can be particularly problematic in cases of parents of children with developmental delays (DD), as parent-report data on their own and their child's behaviors are often used to help make diagnostic decisions and special needs accommodations (Richards, Mossey, & Robins, 2016; Volkmar, Rogers, Paul, & Pelphrey, 2014). This can lead to misdiagnosis, lack of diagnosis, and improper allocation of services (Volkmar et al., 2014). Many of these measures rely on the parent to report the approximate frequency of maladaptive behaviors, but frequency data has been found to be difficult for parents of typically developing children to accurately report (Blair & Burton, 1987; Magnus, Kirkman, Dutta, Kaur, & Mannchen, 2019). A common finding was that parents who try to translate the many behaviors of either themselves or their child into numerical values, tend to underreport on all behaviors, both adaptive and maladaptive (Blair & Burton, 1987; Magnus et al., 2019). Parenting behavior, specifically, has been found to be difficult for parents to self-report on because the episodes in which parents perform these behaviors are so automatic that parents are often not aware of them (Gardner, 2000). Observational reports have been shown to be more accurate depictions of genuine parenting behavior, as they are better predictors of the outcomes associated with either positive or negative parenting strategies than self-report measures (Patterson & Forgatch, 1995).

Research has shown that self-report measures may be biased due to a combination of three factors: the reporter does not understand the question or the variable that the question is asking about; the reporter is not able to remember frequencies; or the reporter is actively trying to misrepresent themselves or the person they are reporting about, in this case, their child (Burton & Blair, 1991). Many researchers try to ameliorate the effects of reporters attempting to misrepresent themselves by informing them of validity checks and using motivational language, but the concern of genuine misunderstanding or misremembering important information is still problematic (Blair & Burton, 1987). In studies where researchers used this motivational language to dissuade parents from misrepresenting their own behaviors, parents, observers, and children reported equally favorable representations of the parent, but the parent still reported differently than the observers and children, who agreed more (Sessa et al., 2001).

Furthermore, parents of children with DD are at an increased risk for chronic and elevated stress levels and may misremember the information required to answer questions or misunderstand what measures are asking entirely due to the cognitive impairments caused by chronic stress (Woodman, Mawdsley, & Hauser-Cram, 2015). Mice models have shown that chronic stress physically alters brain structures, lowering one's capacity for memory (Chen et al., 2010). Stress has also been found to increase neurodegeneration, increasing problems with cognitive function and memory encoding (Carroll et al., 2011). A study examining adult caregivers found that caregivers reported much higher stress than non-caregivers as well as decreased speed of information processing and complex attentional skills (Caswell, Vitallano, & Cole, 2003). In nurse

practitioners, high stress was found to scatter practitioners' attention, meaning that their attention was spread among so many things that their selective attention was impaired (Braunstein-bercovitz, 2003). Additionally, women who experienced burnout, were found to have decreased non-verbal memory and visual and auditory attention (Sandstrom, Rhodin, Lundberg, Olsson, & Nyberg, 2005).

While little research on chronic stress and perceptual bias has been published, there is a plethora of information on the ways that depression, which is highly related to chronic stress, influences the way individuals perceive their surroundings (Slavich & Auerbach, 2018). Stress and depression have been shown to be deeply connected, so much so that the use of antidepressants often ameliorates the cognitive and perceptual effects of stress (Song, Che, Min-Wei, Murakami, & Matsumoto, 2006). Depression has also shown to alter the way that parents perceive their own actions and the actions of their child in such a way that they report inaccurately because they believe the inaccuracies (Parent et al., 2014). In mice studies, chronic stress was found to increase negative affect, and subsequently impair a mouse's ability to discriminate between ambiguous stimuli and clearly negative stimuli, in that the mouse perceived all stimuli as negative (Novak et al., 2016). A study by Webster-Stratton and Hammond found that depressed mothers reported more parenting incompetence than non-depressed mothers, despite teachers reporting no differences in parenting behavior (Webster-Stratton & Hammond, 1988). The same study found that depressed mothers rated their children as having more behavior problems than non-depressed mothers, despite the children being equally, if not better, adjusted in school and home per teacher and father report (Webster-Stratton & Hammond, 1988). This phenomenon was shown in the overall

reports on children by their depressed mothers and in specific domains such as depression/internalizing behaviors and defiance/externalizing behaviors (Webster-Stratton & Hammond, 1988). Overall, stress, both directly and through depression, may account for inaccurate reporting due to misunderstanding the question or misremembering the information required to provide an accurate answer.

Study Aims and Hypotheses

The goal of this study is to examine, in a sample of parents of children with DD, the influence that stress has on the way parents report on both their own and their child's behaviors.

Aim 1

To examine the relationship between parent distress and the discrepancy between self-report and observational measures of parenting behavior.

Hypothesis 1

We predict that as parent stress increases, discrepancy between self-reports of positive parenting and observational measures of positive parenting behavior will also increase.

Hypothesis 2

We predict that as parent stress increases, discrepancy between self-reports of negative parenting and observational measures of negative parenting behavior will also increase.

Aim 2

To examine the relationship between parent distress and the discrepancy between self-report and observational measures of child maladaptive behaviors.

Hypothesis 1

It is predicted that as parent stress increases, discrepancy between parent report of externalizing behavior and observational report of externalizing behavior will also increase.

Hypothesis 2

We predict that as parent stress increases, discrepancy between parent report of attention seeking behaviors and observational report of externalizing behaviors will also increase.

Hypothesis 3

It is predicted that as parent stress increases, discrepancy between parent report of aggressive behaviors and observational report of externalizing behaviors will also increase.

CHAPTER TWO

METHODS

Participants

The current study involved data from the Mindful Awareness for Parenting Stress (MAPS) Project, which includes parents of children, ages 2.5 to 5 years old, with DD. Subjects were primarily recruited through the Inland Empire Regional Center, with some recruitments through the local newspaper, local elementary schools, and the Inland Empire Autism Society. 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. An article was also placed in the local newspaper in order to increase the number of people reached. Additionally, information sessions were held at local elementary schools and parent groups. Finally, a notification of the study was included in the university's weekly newsletter.

Criteria for inclusion in the study were: (1) Having a child ages 2.5 to 5, (2) child was determined by Regional Center (or by an independent assessment) to have a developmental delay or disability, (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) 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.), and (5) parent agreed to participate in the intervention (this requirement was determined based on

whether the parent signs the consent form. For the first cohort (N = 52), the additional inclusion requirement of speaking and understanding English was included. For the second cohort (N=44), participants were required to speak and understand either English (N = 31) or Spanish (N = 13). Exclusion criteria included parents of children with debilitating physical disabilities or severe intellectual impairments that prevented the child from participating in the assessment tasks described in the protocol (e.g. child is not ambulatory).

Procedures

Interested parents either contacted the MAPS project by phone, returned a postcard requesting the primary investigator to contact them, or submitted their information on the MAPS website. The research team then conducted a phone screen assessing participants' eligibility once the families indicated their interest in participation. If the family met eligibility criteria for the study, an appointment for initial laboratory assessment was scheduled. Prior to the initial laboratory assessment, a packet of questionnaires was mailed to parents for them to complete before to coming into the lab. Only the parents participating in the study completed the packet. At the initial assessment, parents were given an informed consent form that the researchers reviewed with the parent. Demographic information was collected after the informed consent.

At the initial assessment, parents participated in a 15-minute play assessment in the lab, which was videotaped and later coded. The play assessment included 3 parts: (1) *Child-led play* (parent was instructed to allow the child to choose any activity and play along with the child); (2) *Parent-led play* (parent was instructed to select an activity and

to keep the child playing according to the parent's rules); and (3) *Clean-up* (parent was instructed to give the child a command to clean up).

Measures

Demographics

Demographic variables were collected during an interview with the parent during the baseline assessment.

Parenting Stress Index – Short Form (PSI-SF, Abidin, 1990)

The Parenting Stress Index – Short Form (PSI-SF) was used to assess parenting stress. The PSI-SF contains 36 items that are rated on a 5-point Likert scale ranging from “Strongly Agree” (1) to “Strongly Disagree” (5). The subscales for the measure are Parental Distress, Parent-Child Dysfunctional Interaction, and Difficult Child (Abidin, 1995). The Parental Distress subscale was used as the independent variable in the current study ($\alpha = .81$). Parents completed the PSI-SF prior to attending the first assessment.

Alabama Parenting Questionnaire – Preschool Revision (APQ-PR, (Clerkin, Marks, Policaro, & Halperin, 2007)

The APQ-PR is a measure of parenting practices. The scale is made up of three subscales (positive parenting, negative/inconsistent parenting, and punitive parenting) and 32 items which parents rate on a 5-point Likert scale which ranges from “Never” (1) to “Always” (5). The positive parenting ($\alpha = .76$), inconsistent parenting ($\alpha = .69$) and

punitive parenting ($\alpha = .44$) subscales were used as the parent measure of parenting behaviors referred to in research hypothesis one. Parents completed the APQ-PR prior to attending the first assessment.

Parent Child Interaction Rating Scale (PCIRS)

The PCIRS is an observational measurement of parents' interactions with their children. Parents are rated by trained coders on six elements: positive affect, negative affect, sensitivity, intrusive interaction, detached manner, and parent stimulation of cognitive environment. On each of these scales, coders rate parents from 1 to 5, where 5 is most indicative of the scale description. During the baseline assessment the parent-child interaction tasks were video recorded. Later, these videos were coded by a trained coding team based out of Loma Linda University.

Video recordings were randomized in order to ensure coder blindness and coded using paper-and-pencil in the laboratory. During the training phase, a senior graduate student who was an expert on the coding system served as the "master coder" for reliability monitoring and trained two graduate students using a consensus rating procedure. Ratings were discussed in a group format, until all coders' independent ratings agreed with the master coder's. To establish and maintain the reliability of the observational coding systems, a minimum reliability criterion of an intra-class correlation (ICC) = 0.80, which has been widely recommended as a minimum level of inter-rater reliability for ordinal level data, was used (Cicchetti, 1994). Once the specified training reliability was achieved, the two coders coded in pairs, first independently and then coming to a consensus. Twenty percent of the pair's consensus codes were compared

against the codes of a master coder to monitor inter-rater reliability.

The PCIRS Positivity Scale ($\alpha = .74$) was created by combining the positive affect, sensitivity, and parent stimulation of cognitive environment subscales and then subtracting the detachment subscale (Aber, 1999; Fenning, 2014). The PCIRS Negativity Scale ($\alpha = .77$) is made up of the negative affect and intrusive interaction subscales. Both of these scales were used as the observational measures of parenting behavior referred to in research hypothesis one.

Child Behavior Checklist for Ages 1 ½ - 5 (CBCL; Robinson, Eyberg, & Ross, 1980)

The CBCL 1 ½ to 5 was used to assess child behavior problems. The CBCL contains 100 items that generate seven syndrome scales, 99 items that are rated as “not true” (0), “somewhat or sometimes true” (1), or “very true or often true” (2), and one open ended question where parents are asked to write in any other behavior problems their child has. Parents completed the questionnaire prior to the initial assessment. Each item represents a problem behavior, such as “acts too young for age” and “cries a lot.” The mean reliability for all scales in the CBCL is .85 (Achenbach, 2000). The CBCL also shows strong convergent validity with both diagnoses based on DSM-IV-TR diagnostic criteria and similar scales measuring child behavior problems (Achenbach, 2000). The externalizing ($\alpha = .97$), attention ($\alpha = .61$), and aggression ($\alpha = .87$) subscales were used as the parent report measure of child behavior referred to in research hypothesis two.

Dysregulation Coding System

The purpose of this coding scheme is to capture and quantify the child’s ability to

self-regulate. This system takes into account the intensity, frequency, duration, lability, and recovery time of a child's dysregulation. There are two scales of regulatory skills, emotional dysregulation and behavioral dysregulation which are rated by trained coders from 0 to 4, where 0 indicates no dysregulation is present and 4 indicates a very high degree of dysregulation is present. During the baseline assessment, the parent-child interaction tasks were video recorded. Later, a trained coding team based out of Loma Linda University reviewed and coded the videos. Video recordings were randomized in order to ensure coder blindness and coded using paper-and-pencil in the laboratory. During the training phase, a senior graduate student who was an expert on the coding system served as the "master coder" for reliability monitoring and trained two graduate students using a consensus rating procedure. Ratings were discussed in a group format, until all coder's independent ratings agreed with the master coder's. To establish and maintain the reliability of the observational coding systems, a minimum reliability criterion of an intra- class correlation (ICC) = 0.80, which has been widely recommended as a minimum level of inter-rater reliability for ordinal level data, was used (Cicchetti, 1994). Once the specified training reliability was achieved, the two coders coded in pairs, first independently and then coming to a consensus. Twenty percent of the pair's consensus codes were compared against the codes of a master coder to monitor inter-rater reliability. The behavioral dysregulation scale of this system was used as the observational measure of child behaviors referred to in research hypothesis two.

Data Analytic Plan

Preliminary Analyses

We systematically assessed and controlled for any variables that could potentially confound the internal validity of the study, namely demographic variables (e.g., race/ethnicity, family language, family structure, SES, parent acculturation status), concurrent child services, and child characteristics such as language, IQ/Intellectual Disability status, and ASD-related symptoms. Internal consistency reliability (Cronbach's α) was calculated for all multi-item scales. The measures used for parent stress (PSI – Parent Distress Subscale), parent report of positive parenting techniques (APQ – Positive Parenting Subscale), parent report of child aggressive behaviors (CBCL – Aggression Subscale), parent report of child externalizing behaviors (CBCL – Externalizing Subscale), observer report of negative parenting techniques (PCIRS – Negative Parenting Composite), and observer report of positive parenting techniques (PCIRS – Positive Parenting Composite) met the criteria of $\alpha > .70$, the typically used cut off for reliability in research studies (Nunnally, 1978). However, the measures of parent report of negative parenting techniques (APQ – Inconsistent Parenting Subscale and APQ – Punitive Parenting Subscale) and our measure of parent report of child attention seeking behavior (CBCL – Attention Subscale) used, did not meet this reliability standard. An item analysis was conducted to examine whether removing one or more items from these scales would increase reliability, however, this analysis demonstrated no such effect. Cronbach's Alpha for measure used in this study to depict observer report of child externalizing behavior (Dysregulation Coding – Behavioral Dysregulation) could not be

determined as it was a single code, but the inter-rater reliability for this code was $> .80$, the standard requirement for inter-rater reliability in research studies (Cicchetti, 1994). Correlations between the parent report measures and observational measures of behavior were examined in order to examine the relationship between these variables independent of stress (Tables 1 and Table 2).

Table 1. Correlations between variables of interest (raw scores)

Variable	1	2	3	4	5	6	7	8
1. CBCL Attention Problems								
2. CBCL Aggression Problems	.399**							
3. CBCL Externalizing Problems	.600**	.973**						
4. Behavior Dysregulation	.361**	.187	.263*					
5. APQ Positive Parenting	-.075	.111	.076	.035				
6. APQ Inconsistent Parenting	.233*	.171	.208*	.274*	-.086			
7. APQ Punitive Parenting	.002	.182	.158	.137	.001	.190		
8. PCIRS Positive Parenting	.151	-.075	-.025	.145	.004	.027	.142	
9. PCIRS Negative Parenting	.217	.146	.187	.423**	-.002	.183	.199	-.066

* Correlation is significant at the .05 level; ** Correlation is significant at the .01 level

Table 2. Correlations between variables of interest (z-scores)

Variable	1	2	3	4	5	6	7	8
1. CBCL Attention Problems								
2. CBCL Aggression Problems	.399**							
3. CBCL Externalizing Problems	.600**	.973**						
4. Behavior Dysregulation	.361**	.187	.263*					
5. APQ Positive Parenting	-.075	.111	.076	.035				
6. APQ Inconsistent Parenting	.233*	.171	.208*	.274*	-.086			
7. APQ Punitive Parenting	.002	.182	.158	.137	.001	.190		
8. PCIRS Positive Parenting	.151	-.075	-.025	.145	.004	.027	.142	
9. PCIRS Negative Parenting	.217	.146	.187	.423**	-.002	.183	.199	-.066

* Correlation is significant at the .05 level; ** Correlation is significant at the .01 level

Data was examined for outliers and for violations of relevant assumptions prior to conducting analyses. Nine outliers were removed resulting in a final sample size of 79. After the removal of these outliers, no additional assumptions of simple linear regression were violated.

Aim 1

Hypothesis 1

Z-score change scores were created in order to examine the discrepancy between each participant's parent report of negative parenting (APQ – Inconsistent and Punitive Subscales) and observational report of negative parenting (PCIRS – Negative Parenting Composite). These scores were computed by first creating z-scores for each participant's scores on parent report measures and scores on observational measures, and then computing the difference by subtracting the PCIRS z-scores from the APQ subscale z-scores. Two individual simple linear regressions were run in order to test the effects of parent stress on these z-score changes (PCIRS Negative Parenting Composite minus APQ Inconsistent Parenting Subscale and PCIRS Negative Parenting Composite minus APQ Punitive Parenting Subscale). The parental distress subscale of the PSI-SF was included as the independent variable for both of these analyses. We determined if hypothesis 1 was supported by examining the significance of the parent stress regression coefficient with a significance cut off of $p < .05$.

Hypothesis 2

Z-score change scores were created to examine the discrepancy between each participant's parent report of positive parenting (APQ – Positive Parenting Subscale) and observational report of positive parenting (PCIRS – Positive Parenting Composite). These scores were computed by first creating standardized scores of each participant's scores on parent report measures and scores on observational measures, and then

computing the difference by subtracting the standardized observational scores from the standardized parent report scores. These z -score changes (PCIRS Positive Parenting Composite minus APQ Positive Parenting Subscale) were then entered as the dependent variable in a simple linear regression with the parental distress subscale of the PSI-SF was entered as the predictor variable for this analysis. We determined if hypothesis 2 was supported by examining the significance of the parent stress regression coefficient with a significance cut off of $p < .05$.

Aim 2

Hypothesis 1

Z -score change scores were used to examine the discrepancy between each participant's report of child externalizing behaviors (CBCL – Externalizing Subscale) with observer report of child externalizing behaviors (Dysregulation Coding System – Behavioral Dysregulation Scale). These scores were computed by first creating z -scores for all parent report measures and observational measures, and then computing the difference by subtracting the standardized observational scores from the standardized parent report scores. These z -score changes (Behavioral Dysregulation minus CBCL Externalizing Behaviors Subscale) were then entered as dependent variables in several simple linear regressions using the parental distress subscale of the PSI-SF was entered as the predictor variable for these analyses. We determined if hypothesis 1 was supported by examining the significance of the parent stress regression coefficient with a significance cut off of $p < .05$.

Hypothesis 2

Z-score change scores were used to examine the discrepancy between participants' parent report of attention seeking behaviors (CBCL – Attention Subscale) and observer report of child externalizing behaviors (Dysregulation Coding System – Behavioral Dysregulation Scale). These scores were computed by first creating standardized scores of participants' scores on parent report measures and scores on observational measures, and then computing the difference by subtracting the standardized observational scores from the standardized parent report scores. Z-score changes (Behavioral Dysregulation minus CBCL Attention Seeking Behavior Subscale) were then entered as the dependent variable in a simple linear regression with the parental distress subscale of the PSI-SF as the predictor variable for this analysis. We determined if hypothesis 2 was supported by examining the significance of the parent stress regression coefficient with a significance cut off of $p < .05$.

Hypothesis 3

Z-score change scores were used to examine the discrepancy between each participant's between parent report of aggressive behaviors (CBCL – Aggression Subscale) and observer report of child externalizing behaviors (Dysregulation Coding System – Behavioral Dysregulation Scale). These scores were computed by first creating standardized scores of participants' scores on parent report measures and scores on observational measures, and then computing the difference by subtracting the standardized observational scores from the standardized parent report scores. These z-score changes (Behavioral Dysregulation minus CBCL Aggressive Behavior Subscale)

were then entered as the dependent variable in a simple linear regression using the parental distress subscale of the PSI-SF as the predictor variable for this analysis. We determined if hypothesis 3 was supported by examining the significance of the parent stress regression coefficient with a significance cut off of $p < .05$.

Power

Power for the simple linear regression was calculated using G*Power. Results indicated that a sample size of 78 would give us an 80% chance of detecting a truly significant effect of $f^2 = 0.10$.

CHAPTER THREE

RESULTS

Demographics

The participants in the MAPS project ($N = 133$), from which this study was derived, were 50.4% Non-Latino and 49.6% Latino, with most of the children being male (69.4%). The average number of children living in the home was 2.27, with 53.2% of our participants making a household income of less than \$50,000 a year. On average parents in this project were 35.26 years old and children were 4.12 years old. The parents in our sample who answered the PSI-SF ($N = 102$) had, on average, a parent stress score of 37.15 ($SD = 7.89$), with 60.8% ($n = 62$) of our participants reaching or exceeding the clinical cut off for this subscale of 36. The lowest score on this subscale was 21 and the highest score obtained was a 55. More information regarding demographics of our participants can be found in Table 3. Table 4 displays the scores our sample obtained compared to normative samples on the CBCL (Pandolfi, Magyar, & Dill, 2009), the APQ (Clerkin et al., 2007), and the PSI-SF (Reitman, Currier, & Stickle, 2002).

Table 3. Characteristics of MAPS Sample (n = 133)

	<i>M(SD)</i>	<i>n(%)</i>
Parent Ethnicity		
% Hispanic	—	61(46.2)
% Caucasian	—	33(25.0)
% Asian	—	4(3.0)
% African American	—	2(1.5)
% Other	—	32(24.3)
Parent Assigned Sex		
% Mothers	—	116(87.2)
% Fathers	—	17(12.8)
Family Income (% ≤\$50,000)	—	72(54.1)
Parent Marital Status (% Married)	—	94(70.7)
Child Ethnicity		
% Hispanic	—	65(48.9)
% Caucasian	—	37(27.8)
% Asian	—	3(2.3)
% African American	—	3(2.3)
% Other	—	25(18.8)
Child Assigned Sex (% Male)	—	93(69.9)
Child Diagnosis		
% Autism	—	70(47.6)
% Other	—	77 (52.4)
Parent Age	37.06(7.70)	—
Child Age	4.14(1.00)	—

Note. MAPS = Mindful Awareness for Parenting Stress

Table 4. Means, Standard Deviations, and Other Characteristics of the Measured Variables (n = 102)

	<i>Normative M(SD)</i>	<i>M(SD)</i>	<i>n(%)</i>
PSI-SF Parental Distress Subscale	24.67(9.13)	37.15(7.89)	—
Scores Between 21 and 28	—	—	16(15.7)
Scores Between 29 and 35	—	—	24(23.5)
Scores between 36 and 42	—	—	39(38.3)
Scores between 43 and 50	—	—	17(16.6)
Scores at or above 51	—	—	6(5.9)
APQ Positive Parenting Subscale	51.43(5.5)	47.86(6.68)	—
APQ Inconsistent Parenting Subscale	15.96(3.3)	13.46(3.81)	—
APQ Punitive Parenting Subscale	9.36(2.7)	5.83(1.86)	—
PCIRS Negative Parenting Scale	—	3.97(1.19)	—
PCIRS Positive Parenting Scale	—	10.52(2.16)	—
CBCL Attention Subscale	5.15(2.40)	5.67(2.19)	—
CBCL Aggression Subscale	13.77(7.35)	18.15(7.57)	—
CBCL Externalizing Subscale	18.91(8.89)	23.81(8.68)	—
Dysregulation Codes	—	1.59(1.16)	—

Of the families who provided information regarding the services they received ($N = 124$) majority of the families in our study had their children enrolled in special education school services (87.9%), with 71.8% receiving services through the Inland Regional Center, 70.2% receiving speech or language therapy, 45.2% receiving occupational therapy, 44.4% receiving in-home behavioral services, and 16.1% receiving

clinic based behavioral services. Further information regarding the services received by the families in our study is listed in Table 5.

Table 5. Services Received by Participants in of MAPS Project (n = 124)

	<i>M(SD)</i>	<i>n(%)</i>
Special Education Services in School	—	109(87.9)
In a Special Education Classroom	—	98(79.0)
Learning Support outside of a Special Education Classroom	—	45(36.3)
Services from Inland Regional Center	—	89(71.8)
In-Home Behavioral Services	—	55(44.4)
Clinic Based Behavioral Services	—	20(16.1)
Speech or Language Therapy	—	87(70.2)
Occupational Therapy	—	56(45.2)
Physical Therapy	—	27(21.8)
Adaptive Physical Education	—	16(12.9)
Respite	—	41(33.1)
Other	—	8(6.5)

Note. MAPS = Mindful Awareness for Parenting Stress

Aim 1

Neither of the hypotheses under aim 1 were supported. A simple linear regression was used to test the hypothesis that parent stress would positively predict discrepancy between self-report and observational measures of positive parenting behavior and another was used to test the hypothesis that parent stress would positively predict discrepancy between self-report and observational measures of negative parenting behavior. Results indicated that parent stress did not explain a significant amount of variance in the discrepancy between self-report and observational measures of positive

parenting behavior ($r^2 < .01, p > .05$) or a significant amount of the variance in the discrepancy between self-report and observational measures of negative parenting behavior ($r^2_{(\text{inconsistent})} < .01, r^2_{(\text{punitive})} = .02, ps > .05$). Further information regarding the results of our analyses for this aim can be found in tables 6-8.

Table 6. Results of Simple Linear Regression Predicting Discrepancy between Parent Report of Positive Parenting and Observer Report of Positive Parenting from Parent Stress (n = 74)

	<i>b</i>	<i>SE</i>	β	<i>t</i>	<i>p</i>	95% CI	r^2
Parent Stress	.021	.021	.120	1.02	.310	[-.020, .063]	.014

Table 7. Results of Simple Linear Regression Predicting Discrepancy between Parent Report of Inconsistent Parenting and Observer Report of Negative Parenting from Parent Stress (n = 76)

	<i>b</i>	<i>SE</i>	β	<i>t</i>	<i>p</i>	95% CI	r^2
Parent Stress	.015	.019	.092	.793	.430	[-.023, .054]	.008

Table 8. Results of Simple Linear Regression Predicting Discrepancy between Parent Report of Punitive Parenting and Observer Report of Negative Parenting from Parent Stress (n = 76)

	<i>b</i>	<i>SE</i>	β	<i>t</i>	<i>p</i>	95% CI	r^2
Parent Stress	.031	.019	.185	1.620	.110	[-.007, .070]	.034

Additional post-hoc analyses were run to examine whether the parent's in the MAPS study who reported levels of stress below the clinical cut off (85th percentile) and

parents who reported levels of stress above the clinical cut off differed in the accuracy with which they reported on their own behaviors. Two independent sample *t*-tests were conducted to test 1) if there was a significant difference between the positive parenting discrepancy scores of the parents who reported stress scores lower than clinical cut off (stress scores < 85th percentile on the PSI-SF Parental Distress Subscale) and parents who reported stress scores at or higher than clinical cut off (stress scores ≥ 85th percentile on the PSI-SF Parental Distress Subscale), 2) if there was a significant difference between the inconsistent parenting discrepancy scores of the parents who reported stress scores lower than clinical cut off (stress scores < 85th percentile on the PSI-SF Parental Distress Subscale) and parents who reported stress scores at or higher than clinical cut off (stress scores ≥ 85th percentile on the PSI-SF Parental Distress Subscale), and 3) if there was a significant difference between the punitive parenting discrepancy scores of the parents who reported stress scores lower than clinical cut off (stress scores < 85th percentile on the PSI-SF Parental Distress Subscale) and parents who reported stress scores at or higher than clinical cut off (stress scores ≥ 85th percentile on the PSI-SF Parental Distress Subscale). Levene's test of variances was not significant for any of the analyses and, therefore, results were examined with equal variances assumed. None of the results of these *t*-tests were significant, $p > .05$, further details can be found in table 9.

Table 9. Results of t-tests Comparing Parents High and Low in Stress on Discrepancy between Parent and Observer Report of Parenting Behaviors

Z-Change between Observer and Parent Scores	Group						95% CI for Mean Difference	<i>t</i>	<i>df</i>
	Parents Below Clinical Cut Off for Stress			Parents at or Above Clinical Cut Off for Stress					
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>			
Positive and Positive Parenting	-.51	1.15	9	.16	1.34	65	[-0.27,1.60]	1.42	72
Negative and Inconsistent Parenting	-.23	1.03	10	-.05	1.31	66	[-0.72,1.01]	.33	74
Negative and Punitive Parenting	-.63	.77	10	-.05	1.33	66	[-0.28,1.44]	1.35	74

Aim 2

None of the hypotheses under aim 2 were supported. Simple linear regressions were used to test the hypothesis that parent stress would significantly predict discrepancy between self-report and observational measures of child externalizing behavior, the hypothesis that parent stress would positively predict discrepancy between self-report and observational measures of child attention-seeking behavior, and the hypothesis that parent stress would positively predict discrepancy between self-report and observational measures of child aggressive behavior. Results indicated that parent stress did not explain a significant amount of the variance in the discrepancy between self-report and observational measures of child externalizing behavior ($r^2 = .03, p > .05$), attention-seeking behavior ($r^2 > .01, p > .05$), or aggressive behavior ($r^2 = .02, p > .05$).

Further information regarding the results of our analyses for this aim can be found in tables 10-12.

Table 10. Results of Simple Linear Regression Predicting Discrepancy between Parent Report of Child Externalizing Behaviors and Observer Report of Child Externalizing Behaviors from Parent Stress (n = 79)

	<i>b</i>	<i>SE</i>	β	<i>t</i>	<i>p</i>	95% CI	<i>r</i> ²
Parent Stress	-.031	.018	-.194	-1.734	.087	[-.066, .005]	.038

Table 11. Results of Simple Linear Regression Predicting Discrepancy between Parent Report of Child Attention Seeking Behaviors and Observer Report of Child Externalizing Behaviors from Parent Stress (n = 79)

	<i>b</i>	<i>SE</i>	β	<i>t</i>	<i>p</i>	95% CI	<i>r</i> ²
Parent Stress	-.022	.017	-.146	-1.291	.200	[-.057, .012]	.021

Table 12. Results of Simple Linear Regression Predicting Discrepancy between Parent Report of Child Aggressive Behavior and Observer Report of Child Externalizing Behaviors from Parent Stress (n = 79)

	<i>b</i>	<i>SE</i>	β	<i>t</i>	<i>p</i>	95% CI	<i>r</i> ²
Parent Stress	-.029	.019	-.174	-1.550	.125	[-.066, .008]	.030

Additional post-hoc analyses were run to examine whether the parent's in the MAPS study who reported levels of stress below the clinical cut off (85th percentile) and parents who reported levels of stress above the clinical cut off differed in the accuracy with which they reported on their children's behaviors. Three independent sample *t*-tests were conducted to test 1) if there was a significant difference between the externalizing behavior discrepancy scores of the parents who reported stress scores lower than clinical

cut off (stress scores < 85th percentile on the PSI-SF Parental Distress Subscale) and parents who reported stress scores at or higher than clinical cut off (stress scores \geq 85th percentile on the PSI-SF Parental Distress Subscale), 2) if there was a significant difference between the attention seeking behavior discrepancy scores of the parents who reported stress scores lower than clinical cut off (stress scores < 85th percentile on the PSI-SF Parental Distress Subscale) and parents who reported stress scores at or higher than clinical cut off (stress scores \geq 85th percentile on the PSI-SF Parental Distress Subscale), and 3) if there was a significant difference between the aggressive behavior discrepancy scores of the parents who reported stress scores lower than clinical cut off (stress scores < 85th percentile on the PSI-SF Parental Distress Subscale) and parents who reported stress scores at or higher than clinical cut off (stress scores \geq 85th percentile on the PSI-SF Parental Distress Subscale). Levene's test of variances was not significant for any of the analyses and, therefore, results were examined with equal variances assumed. None of the results of these *t*-tests were significant, $p > .05$, further details can be found in table 13.

Table 13. Results of t-tests Comparing Parents High and Low in Stress on Discrepancy between Parent and Observer Report of Child Behaviors

Z-Change between Observer and Parent Scores	Group						95% CI for Mean Difference	<i>t</i>	<i>df</i>
	Parents Below Clinical Cut Off for Stress			Parents at or Above Clinical Cut Off for Stress					
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>			
Bx Dysreg - External	-.03	1.09	11	-.01	1.23	68	[-0.75,0.79]	.05	77
Bx Dysreg - Att	.09	.96	11	.02	1.20	68	[-0.82,0.69]	-.17	77
Bx Dysreg - Aggress	-.13	1.15	11	.00	1.29	66	[-0.70,0.95]	0.31	77

* denotes $p < .05$

Bx Dysreg - External = Behavioral Dysregulation and Externalizing Behaviors

Bx Dysreg - Att = Behavioral Dysregulation and Attention Seeking Behaviors

Bx Dysreg - Aggress = Behavioral Dysregulation and Aggressive Behaviors

CHAPTER FOUR

DISCUSSION

Research on parents with elevated levels of stress and depression has shown that these parents tend to interpret their children's behavior, and their own parenting behavior, more negatively than parents with lower levels of stress and depression (Webster-Stratton & Hammond, 1988) In the current study, we sought to examine the impact of stress on the accuracy of parent report data in a population of parents of children with DD using validated coding methods as our observational measure of parent and child behavior. However, contrary to our predictions, parent stress did not significantly predict the accuracy of parent and observer reports of child behavior or parenting behavior. Our first aim, to examine the extent to which, as parent stress increases, concordance between self-report and observational measures of parenting behavior decreases, had two hypotheses, neither of which were supported ($ps > .05$). Our second aim, to examine the extent to which, as parent stress increases, concordance between parent report and observational measures of child maladaptive behaviors will decrease, had three hypotheses, none of which were supported ($ps > .05$).

Potential Explanation of Findings

Other than potential limitations, which will be discussed later, an explanation for our findings could be that parents of children with DD are well trained and well-practiced in their reporting of behavior. The correlation matrix shown in table 1 shows large and significant correlations between parent and observer report measures, especially in regards to child behavior. This indicates that our overall sample, regardless

of stress, reported their child behaviors fairly accurately. A large majority of our parents reported that their children were receiving some sort of developmental service, whether that be behavior therapy, speech and language therapy, special education through the school system or some other service targeted at children with developmental delays. These services not only require parents to frequently report on their children's behavior, but often also include teachers or therapists telling the parents about the behaviors they see in the child and coaching parents to see their children's behaviors more accurately and objectively. Research has shown that parent training for parents of children with DD can increase parents' understanding of their children's behavior, which may explain why our sample reported more accurately than was expected (Graybill et al., 2014; McIntyre, 2008). Additionally, it has been shown that repeatedly using measures to report on behaviors can increase reporter accuracy on those measures (Koziol Jr & Burns, 1986). Many of our measures are commonly used in medical and behavioral therapy settings, therefore, the fact that so many of our participants are utilizing multiple services may mean that they have been exposed to these measures multiple times and thus, more accurately reporting on these measures. It is possible that the reason our hypotheses were not supported is that parents of children with DD, due to the frequency they report on their children's behavior combined with the regular coaching and feedback received by specialists, are less susceptible to the effects of stress on reporting accuracy.

Study Limitations

Our study had three primary limitations which may have contributed to our findings. First, a power analyses determined that a sample size of 78 participants for

each analysis would adequately detect a medium effect size. While our initial sample was large enough to fulfill this power requirement, as participants were excluded due to missing data, three of our six analyses were underpowered at the time of analysis. Additionally, six separate simple linear regressions were run, thus increasing the likelihood of experiment-wise error. The second possible explanation for the lack of significance in our analyses could be that our sample did not have a large variation in scores of independent variable, parent stress. While the stress scores for our sample were normally distributed, the distribution does not encapsulate many low scoring parents ($M = 37.15$, $SD = 7.89$), as most of our participants either met or exceeded the clinical cut off for parent stress ($n = 62$, 60.8%). While the minimum score on the parental distress subscale is 12, the lowest score obtained by our sample of parents was 21. A greater degree of variability in the predictor allows us to more confidently observe a relationship between the predicting and dependent variable. The final limitation of our study was the poor reliability of our parent report measures. One of the assumptions of regression analyses is that the measures used in the analysis are perfectly reliable, that is, there is no error. While this is not realistic, the generally accepted guideline of $\alpha > .70$ (Nunnally, 1978) was not met by our measures of parent report of negative parenting techniques (APQ – Inconsistent Parenting Subscale and APQ – Punitive Parenting Subscale) or our measure of parent report of child attention seeking behavior (CBCL – Attention Subscale). Measures with poor reliability can lead to shrunken R^2 values and biased standard errors. More reliable measures may have yielded larger effect sizes and smaller standard errors, thus increasing the likelihood of finding significance in our second hypothesis of our first aim and our second hypothesis of our second aim, which utilized

these poorly reliable measures.

Future Directions

This study could be improved upon by decreasing the study-wise limitations such as lack of variability in parent stress, poor reliability of some parent report measures, and low power. Rectifying these limitations is important so that one can accurately examine whether this study's findings were due to error or genuinely more accurate reporting on the part of parents of children with DD. By using a stratified sampling method, future researchers would be able to randomly select participants with diverse levels of parent stress, thus increasing the variability of the predictor. Future researchers could also improve upon this study by ensuring parents fully understood the questions being asked of them on the parent report measures, thus increasing the reliability of these measures. Another way to improve this research would be to increase the sample size. A larger sample size would both increase the overall reliability coefficient of the parent report measures and increase the power of the analyses to find a truly significant relationship between parent stress and the accuracy with which parent report their parenting behaviors and the maladaptive behaviors of their child. By reducing the study-wise limitations, researchers would better be able to gauge whether the hypotheses of this study were not supported due to the practice effects parents of children with developmental delays receive in reporting on their own behaviors and their child's behaviors.

Future research should seek to further explore the effects of stress on reporting behavior as these findings could have implications for future interventionists and assessors. Parents of children with DD are at an increased risk of clinically elevated

levels of stress and parent report measures are often used to determine diagnoses and service allocations for children with DD (Volkmar et al., 2014; Woodman et al., 2015). Despite their widespread use, parent report measures have shown to be less accurate in predicting and capturing parenting strategies and child behaviors than observational (Blair & Burton, 1987; Magnus et al., 2019; Patterson & Forgatch, 1995). High levels of stress can increase these reporting inaccuracies as chronic stress can lead to cognitive impairments such as poor attention and memory and perceptual biases leading parents to view behaviors as more negative than they actually are (Braunstein-bercovitz, 2003; Carroll et al., 2011; Caswell et al., 2003; Sandstrom et al., 2005; Webster-Stratton & Hammond, 1988). However, our study, which is one of the first examining the effects of stress on reporting in a sample of parents of children with DD, did not support these findings, leading us to examine factors such as parent training and parent familiarity with measures which also impact parent reporting behaviors. Failure to determine if elevated stress effects the accuracy of parent report measures could lead to misdiagnosis of DD and behavior problems in children as well as affect incorrect allocation of services such as therapies, aids, and special education services in schools. Alternatively, if our findings are accurate and parents of children with DD are accurate reporters of behavior, future assessors could spend less resource confirming parent report measures and instead use those resources to examine behavior in contexts outside of the parent-child dynamic. Further research on this topic could inform parent interventions for increasing understanding and reporting accuracy as well as techniques for assessors, such as those in research labs, school districts, and medical facilities, to account for the error, or lack thereof, in parent report measures.

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