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Parenting Stress through the Lens of Different Clinical Groups: a Systematic Review & Meta-Analysis

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Abstract

Research has demonstrated an association between parenting stress and child behavior problems, and suggested levels of parenting stress are higher among parents of children at risk for behavior problems, such as those with autism and developmental delay (ASD/DD). The goal of the present study was to conduct a systematic review of parenting stress and child behavior problems among different clinical groups (i.e., ASD/DD, chronic illness, with or at-risk for behavioral and/or mood disorders). We also examined demographic and methodological variables as moderators and differences in overall levels of parenting stress between the clinical groups. This systematic review documents a link between parenting stress and child behavior problems with an emphasis on externalizing behavior. One-hundred thirty-three studies were included for quantitative analysis. Parenting stress was more strongly related to child externalizing (weighted ES $r = 0.57$, $d = 1.39$) than internalizing (weighted ES $r = 0.37$, $d = 0.79$) problems. Moderation analyses indicated that the association between parenting stress and behavior problems was stronger among studies which had mostly male and clinic-recruited samples. Overall, parenting stress levels were higher for parents of children with ASD/DD compared to parents of children from other clinical groups. Findings document the association between parenting stress and child behavior problems and highlight the importance of assessing parenting stress as part of routine care and throughout behavioral intervention programs, especially for groups of children at high risk for behavior problems, such as children with ASD/DD, in order to identify support for both the parent(s) and child.

Keywords

Parenting stress; Behavior problems; Autism; Developmental delay; Chronic illness

Researchers have conceptualized parenting stress as a negative psychological response to the obligations of being a parent (Bornstein 2002). Everyday events, such as feeding, bathing, and transporting their child can create situations where parents feel tired, frustrated, and

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Compliance with Ethical Standards

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confused, even when parenting children who are calm and even-tempered (Crnic and Greenberg 1990). However, these daily tasks can be even more stressful when the child exhibits challenging behaviors, such as defiance and avoidance, and research studies have documented a significant association between parenting stress and child behavior problems (Benzies et al. 2004; Eyberg et al. 1993). Additionally, levels of parenting stress are reportedly higher among parents of children at risk for behavior problems, including those with autism and developmental delay (ASD/DD; Hayes and Watson 2013), chronic illnesses (Cousino and Hazen 2013; Golfenshtein et al. 2015), and with or at-risk for behavioral and/or mood disorders problems (Theule et al. 2013). However, limited studies have examined factors that may impact parenting stress and child behavior problems, as well as differences in parenting stress and child behavior problems among clinical groups. Therefore, the goal of the current study was to integrate the literature by conducting a systematic review and meta-analysis that examines the impact of child gender, age, race and ethnicity on parenting stress and child behavior in different clinical groups.

The Impact of Parenting Stress on Child Behavior

Deater-Deckard (1998) outlined a theory explaining the effect parenting stress has on child behavior. In a sample of typically developing preschool children, parenting stress was directly related to increased child behavior problems (Crnic et al. 2005). Additionally, Anthony et al. (2005) documented a direct relation between parenting stress and child behavior problems at school in a sample of children in Head Start programs. Specifically, parenting stress has been associated with attention problems (Barry et al. 2005), regulatory problems (Davis and Carter 2008), and withdrawn problem behaviors (Tharner et al. 2012) in children.

Overall, research suggests that parenting stress is associated with both child externalizing (Dubois-Comtois et al. 2013) and internalizing behavior problems (Rodriguez 2011). However, it is unknown whether parenting stress is differentially associated with externalizing or internalizing behavior problems. Information on the relation between parenting stress and child externalizing vs. internalizing behavior problems may have implications for clinical research and practice. For example, data supporting that parenting stress is more likely to be associated with externalizing problems than with internalizing problems may suggest the need to assess the extent to which interventions for child externalizing problems also lead to improvements in parenting stress. In the event interventions for child externalizing problems do not lead to improvements in parenting stress, it may be important to provide additional services for parenting distress. Overall, it is difficult to determine directionality as most studies are cross-sectional in nature, although a few studies suggest that the relation between parenting stress and child behavior problems is bi-directional (Neece et al. 2012; Williford et al. 2007; Woodman et al. 2015). These associations seem to be even more prominent among parents of children with mental health and physical health problems within clinical groups. Although parenting stress impacts all families, there may be other factors that impact the relation between parenting stress and child behavior problems, such as demographic factors including child gender, age, and race.

Parenting Stress across Clinical Groups

Although parenting stress can affect all parents, research has shown that parenting stress can be more severe for parents of children who display difficult and challenging behaviors from different clinical groups. The relation between parenting stress and child externalizing and internalizing behavior problems may differ between specific clinical groups of children, including children with ASD/DD, chronic illnesses (e.g., cancer, diabetes), and those with or at-risk (e.g., low-income, adopted/foster, subclinical behavior problems) for behavioral and/or mood disorders. Given the variability in treatment for these groups and the numerous other factors that may influence parenting stress within these groups, it is important to examine how the relation between parenting stress and child behavior problems differs among these groups in order to most effectively develop targets for treatment.

Parenting Stress and Child Behavioral and Mood Disorders

Research has demonstrated an association between parenting stress and negative child behavioral outcomes including behavioral and mood disorders. Specifically, parenting stress has been associated with behavioral disorders such as attention-deficit/hyperactivity disorder (ADHD; Fischer 1990), conduct disorder (Ross et al. 1998), oppositional behavior (Beernink et al. 2012), and disruptive behaviors (Dubois-Comtois et al. 2013). Cross-sectional findings have demonstrated strong associations between parenting stress and behavioral disorders in early childhood (Anthony et al. 2005) and adolescence (Anderson 2008), and longitudinal work has shown child behavioral disorders predict higher subsequent levels of parenting stress over time (Williford et al. 2007). In addition to child behavioral disorders, levels of parenting stress have also been shown to be related to child mood disorders, such as depression and anxiety (Rodriguez 2011). However, there are considerably fewer studies examining the relation between parenting stress and child mood disorders, than child behavioral disorders (Östberg and Hagekull 2013).

Parenting Stress and Child Chronic Illness

Studies have reported higher levels of parenting stress in parents of children with chronic illnesses compared to parents of typically developing or healthy children (Farrace et al. 2013; Nereo et al. 2003). One study examining parenting stress in parents of children with Joubert syndrome found that almost 60% of mothers and 50% of fathers in their sample reported borderline clinically significant levels of parenting stress (Farmer et al. 2006). Similarly, Farrace et al. (2013) found that parents of children with epilepsy reported significantly higher levels of parenting stress than parents of healthy children. Research has also shown parenting stress to be positively associated with behavioral and mood disorders among children with chronic illnesses (Farmer et al. 2006; Hilliard et al. 2011; Wolfe-Christensen et al. 2010).

Parenting Stress and Child ASD/DD

Rates of parenting stress among parents of children with ASD/DD are also higher when compared to parents of typically developing children (Baker et al. 2002; Hayes and Watson

2013). With high rates of behavior problems in children with ASD/DD, research has examined parenting stress among children with behavior problems, with and without developmental delay. On the one hand, research has demonstrated higher levels of child behavior problems have a larger effect on parenting stress than other factors such as developmental delay (Baker et al. 2003). On the other hand, research has shown that the combination of behavioral and cognitive deficits in the child had the greatest impact on parenting stress (Spratt et al. 2007). Given the mixed findings, we must take into account that children with ASD/DD range in symptoms and presentations that may differentially impact parenting stress. Further examination of differences in parenting stress among parents of children with ASD/DD is necessary to fully understand the aspects of this group that are associated with higher levels of parenting stress. It may also be that demographic factors such as child gender, age, race, and ethnicity impact the relation between parenting stress and child behavior problems.

Demographic Factors Linked to Parenting Stress

Child Gender

Gender has been linked to parenting stress and associated factors. Specifically, previous work has shown that mothers of boys report higher levels of parenting stress than mothers of girls (Vierhaus et al. 2013). This finding may be due to the higher rates of externalizing behavior problems among boys compared to girls (Williford et al. 2007). It may be that the elevated rates seen in boys versus girls capture parents' perceptions that girls are easier to parent and perhaps have a better bond with them. On the other hand, boys may elicit more parental stress due to their higher levels of hyperactivity and differences in interactions with mothers. However, to our knowledge, the role of gender on the relation between parenting stress and child behavior has not been thoroughly examined in previous research.

Child Age

Similarly, there is some research support for the association between child age and parenting stress (Williford et al. 2007). Specifically, previous work has shown that parenting stress may decrease over time as the child becomes older (Neece et al. 2012; Williford et al. 2007). However, other work has found that parenting stress is not associated with child age (McStay et al. 2014). Previous studies have hypothesized a decrease in parenting stress was due to a similar decrease in child behavior problems over time (Neece et al. 2012). It may be that parents are better able to manage their parenting stress over time in combination with a decrease in more overt child behavior problems, such as hyperactivity and aggression. However, the mixed findings suggest that further research is needed to examine how child age may impact parenting stress.

Child Race/Ethnicity

Another demographic factor that has been linked to parenting stress is child race and ethnicity. Specifically, on the one hand, higher rates of parenting stress have been found among parents from racial and ethnic minority backgrounds (Franco et al. 2010). For example, one study found that Korean mothers reported higher levels of parenting stress than US mothers (Chung et al. 2013). On the other hand, some studies with low-income samples

have found that there are no significant differences in parenting stress among mothers from different racial and ethnic minority backgrounds (Anderson 2008). Specifically, it may be that families from racial and ethnic minority backgrounds have so many other stressors, including financial hardships that lowers their tolerance for child misbehavior, and ultimately increases their levels of parenting stress. Given the inconsistent findings, further research is needed to examine the link between child race/ethnicity and parenting stress.

Summary of the Literature

In summary, while research has documented an association between parenting stress and child behavior problems, it remains unclear the extent to which parenting stress is differentially associated with externalizing and internalizing behavior problems. Moreover, it is important to understand whether the relation between parenting stress and child behavior problems, as well as the overall levels of parenting stress, differs between parents of children with chronic illness, ASD/DD, or those with or at-risk for behavioral and/or mood disorders. While previous reviews have examined parenting stress among parents of children with ADHD (Theule et al. 2013), chronic illnesses (Cousino and Hazen 2013; Golfenshtein et al. 2015), and autism (Hayes and Watson 2013), we are not aware of any systematic review that has specifically examined the relation between parenting stress and child behavior problems across these different clinical groups.

Therefore, the goal of the current study was to address the gaps in the literature by conducting a systematic review to examine: (a) the associations between parenting stress and child externalizing and internalizing behavior problems; (b) the extent to which demographic factors (i.e., gender, age, race/ethnicity) and clinical group (i.e., chronic illness, ASD/DD, or with or at-risk for behavioral and/or mood disorders) impact the association between parenting stress and externalizing and internalizing behavior problems; and (c) differences in the level of parenting stress among the three different clinical groups. Parenting stress is defined as a negative psychological response to the obligations of being a parent (Bornstein 2002) and is often characterized by parent report of stress due to the responsibilities of caring for a child. Previous research suggests that parents are less accurate at identifying internalizing symptoms in their children compared to externalizing symptoms, and therefore may be less stressed by their child's level of internalizing behavior problems relative to their child's level of externalizing behavior problems (Mesman and Koot 2000; Wren et al. 2004). Additionally, consequences for children engaging in externalizing behavior are much worse in terms of school issues and children being at risk for failing school (Silver et al. 2005). Thus parents may experience higher levels of stress due to those external factors reminding them of the severity of the issue. On the other hand, not only are parents less accurate at identifying internalizing symptoms, the relative impairment of such symptoms are not as readily seen in terms of impacting school and daily living tasks (e.g., homework which is associated more with externalizing than internalizing behavior problems). As such, we expected the association between parenting stress and externalizing behavior problems to be stronger than the association between parenting stress and internalizing behavior problems. Previous research suggests higher rates of behavior problems in boys and parenting stress in parents of boys compared to girls (Vierhaus et al. 2013), lower rates of parenting stress as children get older (Neece et al. 2012), and higher rates of behavior problems and parenting

stress among families from ethnic and racial minority backgrounds (Franco et al. 2010). Therefore, we expected stronger effect sizes between parenting stress and externalizing and internalizing problems in studies with more males than females, younger children, and higher percentages of racial/ethnic minority participants. Lastly, given the reportedly high rates of parenting stress in families of children with ASD/DD (Estes et al. 2009; Lecavalier et al. 2006), we expected the strongest effect between parenting stress and externalizing and internalizing behavior problems and the highest levels of parenting stress among parents of children with ASD/DD compared to parents of children with or at-risk for behavioral and/or mood disorders or children with chronic illnesses.

Method

Literature Review

We conducted a comprehensive search for peer-reviewed empirical articles examining the relation between parenting stress and behavior problems in children (defined as 0- to 18-year-olds) over the last 17 years. To ensure a comprehensive search, we used the following databases in the search of articles: Science Citation Index Expanded (1998–2015), Social Sciences Citation Index (1998–2015), Arts and Humanities Citation Index (1998–2015), MEDLINE (1998–2015), ProQuest (1998–2015), PsychINFO (1998–2015), and Google Scholar (1998–2015). The terms utilized in this search were *parenting stress*, *parental stress*, *maternal stress*, *parent-related stress*, *parenting hassles*, *caregiver stress*, and *caregiver strain*. These terms were crossed with terms relating to behavior problems, such as *child behavior problems*, *behavior problems*, *externalizing behavior problems*, *aggression*, *disruptive behavior*, *ADHD*, *internalizing behavior problems*, *depression*, and *anxiety* and terms relating to the clinical groups, such as *autism*, *intellectually disability*, *developmental delay*, *chronic illness*, *diabetes*, and *cancer*. In addition to searching through the above databases, references used in the identified studies were examined to detect other potentially relevant studies. The database search resulted in 2601 studies and therefore unpublished data were not examined in the present analyses.

Inclusion and Exclusion Criteria

The primary goal of this systematic review and meta-analysis was to examine the association between parenting stress and child behavior problems among different clinical groups. Thus, studies were required to either compare parenting stress between samples of children with a psychological or physical health problem and a control group or examine associations between parenting stress and child behavior problems. In order to establish a more current understanding of the literature, we included articles published between 1998 and 2015 (after Deater-Deckard's (1998) theoretical review). Given the focus on examining parenting stress among parents of children, studies reporting a mean child age of 18 years or higher were excluded ($n = 2$). Articles written in languages other than English were also excluded ($n = 2$). In order to reduce the risk of other sources of parenting stress unrelated to the child's behavior, articles that had an inclusion criterion requiring the parent to have a mental health diagnosis or a physical disability (e.g., depression, HIV) were excluded ($n = 4$). Additionally, articles examining the effect of parenting factors on the relation between parenting stress and child behavior problems (e.g., exposure to intimate partner violence,

child maltreatment, child abuse, sexual abuse, neglect, drug abuse, substance abuse, prenatal drug exposure) were excluded ($n = 26$). Furthermore, we excluded articles on children born preterm ($n = 6$) given the heterogeneous nature of this group, thereby making it difficult to classify this group within another identified clinical group yet insufficient in sample size to form its own group.

A total of 146 articles met the inclusion criteria and were not excluded for the reasons described above. However, 22 of these 146 articles lacked sufficient statistical data to allow for the calculation of effect sizes for externalizing and/or internalizing behavior problems. We contacted the corresponding authors and received the necessary data from a portion of the articles, resulting in a total of 133 articles with sufficient data. Of the 133 articles, one article (Slack and Yoo 2005) reported separate findings for each group studied (3 groups) resulting in a total of 135 effect sizes (see Fig. 1 for PRISMA flow diagram).

Coding of Moderators

Studies were independently coded for several characteristics by two raters (first and second authors). Interrater reliability was evaluated using intraclass correlation coefficients (ICC) for continuous codes and kappas (κ) for categorical codes. In order to address discrepancies, both raters independently reviewed discrepant cases and reevaluated each code. The remaining discrepancies were discussed between raters. Interrater reliability was excellent (all ICC values > 0.89 and average $\kappa = 0.97$).

Demographic Factors

We coded studies for child gender (% male), child age (average), and child race/ethnicity (% White, % Black, % Hispanic). In approximately 50% of the studies coded, 55% or more of the participants were male. In approximately 50% of the studies coded, the average child age was 7.25 years ($SD = 3.60$, range = 0.92–15.40). Moreover, in approximately 90% of the studies coded, the child age was younger than 12 years. Additionally, only 5% of the studies coded had more than 30% Hispanics in their samples, and only 20% of the studies coded had more than 30% Blacks in their samples. Consequently, over 70% of the studies coded had a predominantly (i.e., over 50%) White sample. We also coded for caregiver who completed the parenting stress measure (mother, $n = 91$, father, $n = 1$, other, $n = 1$, both parent, $n = 21$, and unclear or missing, $n = 22$). A majority of the studies (67%) coded included mothers as the reporter of parenting stress. Additionally, we coded for type of sample (community, $n = 83$, clinic, $n = 40$, and mixed sample of clinic and community, $n = 12$).

We also coded for group based on the child's mental or physical health. Each group was defined as approximately 80% or more of the sample falling into one of the primary groups described below. Children with autism and developmental delay were combined in most studies and have been described as having similar behavioral difficulties (Levy et al. 2010). Therefore, autism and developmental delay were coded as one group. Furthermore, the majority of the sample had to consist of one type of group (i.e., ASD/DD, $n = 32$, with or at-risk for behavioral and/or mood disorders, $n = 75$, or chronic illness, $n = 28$).

Methodological Factors

In addition to the moderators describe above, we coded three methodological factors (i.e., study design, measure of parenting stress, measure of child behavior). We categorized the articles either as cross-sectional ($n = 113$) or longitudinal ($n = 23$), with longitudinal studies including more than one time point with the appropriate statistical information. We acknowledge that the relation between parenting stress and child externalizing or internalizing behavior problems may be transactional, but given that there were few studies examining this relation, we did not include this transactional relation in the current study.

In addition, we coded studies based on the questionnaire used to measure parenting stress. Historically, researchers have primarily used self-report as the main method of assessing parenting stress, such as the Parenting Stress Index (PSI; Abidin 2012), which assesses parenting stress within the family context. The PSI includes scales corresponding to three domains: parent domain, child domain, and parent-child interaction domain. The PSI and modified versions (e.g., PSI-Short Form, translations of the PSI) were used in 75% of the articles ($n = 102$). Table 3 includes the number of studies that examined each domain. Other measures of parenting stress used were the Family Impact Questionnaire (Donenberg and Baker 1993; $n = 6$, 4.4%), the Caregiver Strain Questionnaire (Brannan et al. 1997; $n = 6$; 4.4%), and the Parental Stress Scale (Berry and Jones 1995; $n = 8$; 5.9%). The remainder of the studies ($n = 14$; 10.3%) used a different measure than those listed above, but these measures were used in less than three studies each and represented less than 15% of the studies and thus were coded as “Other.” The total score of each parenting stress measure was used in the analyses. For studies in which the total score was not reported, subscales of the parenting measures were averaged. Studies used several different measures to assess externalizing and internalizing behavior problems, with the Child Behavior Checklist (CBCL; Achenbach and Rescorla 2000) as the most common measure used. However, the high variability (i.e., over 30 measures) did not allow for us to code for measures used to assess child behavior problems. We were also unable to code for how behavior were assessed as most of the studies (over 80%) relied exclusively on parent report.

Consistent with recommendations by Valentine (2009), we developed a study quality variable that took into account demographic (i.e., mean age, gender, race, ethnicity) and design characteristics (i.e., within or between subjects, cross-sectional or longitudinal, number of reporters of child behavior). For the demographic characteristics, studies were given a 1 for each demographic data point reported and a 0 if the data point was not reported (for a possible total of 4 points for demographic characteristics). For the design characteristics, studies were given a score (i.e., 0–2) for each design characteristic, which included a 0 if data were not reported for the design characteristic, 1 for a more basic design characteristic (i.e., within subjects, cross-sectional, single reporter of child behavior), or 2 for a more complex design characteristic (i.e., between subjects, longitudinal and more than one reporter of child behavior), for a possible total of 6 points for design characteristics. When combining the demographic characteristics (4 possible points) and study design characteristics (6 possible points), a total of 10 points were possible as the index of study quality. On average, studies received a score of 7.5 ($SD = 1.12$), with 60% of the studies

receiving a score between 8 and 10. Twenty-percent of the studies were randomly selected and coded a second time for fidelity and yielded an inter-rater reliability estimate of 92%.

Computation of Effect Sizes

For the Effect Size (*ES*) metric, Pearson's *r* was used because of the correlational nature of most of the relevant studies (86%). *ES* estimates were computed primarily from correlations between parenting stress and externalizing and/or internalizing behavior problems. When correlations were not provided, Pearson's *r* was calculated from other available data sources, including group comparisons (*t*-tests), analyses of variance (ANOVAs), or means and standard deviations for groups assigned according to a criterion (e.g., comparing children from one of the three groups versus a control group). All effect size estimates and transformations from other data sources to Pearson's *r* were calculated according to the formulas provided in Lipsey and Wilson (2001). Positive *ES*s in the present meta-analysis indicated positive associations between parenting stress and externalizing and/or internalizing behavior problems.

A total of 133 studies with adequate statistical information were identified, yielding *ES*s for externalizing (134 *ES*, total $n = 30,695$) and internalizing (83 *ES*, total $n = 17,727$) behavior problems. In studies in which two or more pertinent dependent variables were used, such as two different measures of externalizing or internalizing behavior problems or two different reporters of child behavior problems, an average correlation was computed. Additionally, multiple subscales within one measure of both externalizing (e.g., hyperactivity and aggression) and internalizing (e.g., withdrawal and depression) behavior problems were also averaged unless the total score was provided. All study references are listed in the Appendix.

Data Analysis

Primary analyses were conducted using a random effects model approach (Hedges and Vevea 1998) to reflect the likelihood that individual studies would produce *ES*s different from other studies in the analyses. All *ES*s were transformed to *z*-scores using Fisher's *r* to *z* transformation. After aggregation, *ES*s were transformed again to *r*s for comparison. To estimate the size of the effects, we adopted Cohen's criteria: small = 0.10, medium = 0.30, large = 0.50. Given the large number of studies included, we used a minimum alpha level of 0.01 (two-tailed tests) to reduce type 1 error caused by the weighted sample sizes. In addition to the primary analyses, file drawer analyses were conducted following Rosenberg and Goodnight's (2005) weighted approach to determine the number of studies with null findings that would need to exist to bring the significant *ES*s of relations to $p > 0.01$. Additional tests for publication bias were conducted with comprehensive software including the rank correlation test (Begg and Mazumdar 1994) for publication bias as well as the Trim and Fill procedures (Duval and Tweedie 2000).

Heterogeneity analyses were also conducted to determine whether *ES*s were more heterogeneous than would be expected due to sampling error alone. The measure I^2 is a modification of Cochran's *Q* test (Cochran 1954), which measures whether the ratio of variation exceeds chance, thereby accounting for the number of studies utilized in the current systematic review with more accuracy (Higgins and Thompson 2002). Values for I^2

range from 0 to 1; an I^2 of 0% indicates no heterogeneity, whereas I^2 s of 25%, 50%, and 75% represent low, moderate, and high heterogeneity, respectively (Higgins et al. 2003). For variables with moderate to high heterogeneity, potential moderators to the ES were identified using weighted least squares regression procedures for continuous variables and ANOVA for categorical variables (Hedges 1994). Additionally, among studies reporting parenting stress percentiles, weighted means were calculated within each of the three clinical groups.

Statistical Approach

The I^2 values for parenting stress and child behavior problems indicated high heterogeneity for child externalizing (98%) and internalizing (97%) behavior problems (see Table 1). Moderators examined included child gender, average child age, and child race/ethnicity, caregiver who completed the parenting stress measure, as well as group, and type of sample. We were unable to examine study design and the type of measure of parenting stress as moderators due to the limited variability across studies (i.e., studies were primarily cross-sectional and used the PSI as a measure of parenting stress). Moderation analyses were examined for quality of studies and findings were non-significant for both the relation between parenting stress and externalizing ($p = 0.08$) and internalizing ($p = 0.77$) behavior problems.

Results

The Associations between Parenting Stress and Child Externalizing and Internalizing Behavior Problems

Identification of study information and ES s representing the relation between parenting stress and child externalizing and internalizing behavior problems are presented in Table 1. The relation between parenting stress and child externalizing behavior problems had a weighted ES of $r = 0.57$ (95% $CI = 0.56$ to 0.58 , $p < 0.001$), indicating a large effect. A smaller but moderate effect was found for the association between parenting stress and child internalizing behavior problems, with a weighted ES of $r = 0.37$ (95% $CI = 0.36$ to 0.39 , $p < 0.001$). The magnitude of the association between parenting stress and child externalizing behavior problems was significantly greater compared to the association between parenting stress and child internalizing behavior problems ($z = 27.17$, $p < 0.001$).

To account for the potential bias toward publishing or submitting only statistically significant findings, we conducted a file drawer analysis for the primary analyses (see Table 1). In the case of parenting stress and externalizing behavior problems, the file drawer analysis indicated over 1340 studies necessary to overturn significant findings. Over 424 studies were indicated as necessary to overturn significant findings in the link between parenting stress and internalizing behavior problems.

In addition to the file drawer analysis, we conducted the rank correlation test and the Trim and Fill procedures. The rank correlation test was significant for effects on externalizing behavior, Kendall's tau $b = 0.15$, $p = 0.01$, and internalizing behavior, Kendall's tau $b = 0.18$, $p = 0.02$. However, given that most studies included both outcomes and the low

number of studies with null findings, the guidelines for the Trim and Fill procedure collectively pointed toward a lack of publication bias.

The Effect of Demographic Factors on the Association between Parenting Stress and Externalizing and Internalizing Behavior Problems

Weighted regression analyses indicated that percent males within the sample was significantly associated with the average strength of the relation between parenting stress and externalizing ($\beta = 0.32, p < 0.001$) and internalizing ($\beta = 0.32, p = 0.005$) behavior problems, such that the relation was stronger among studies that had a sample containing a higher percentage of males. Additionally, percent Hispanic within the sample was significantly associated with the average strength of the relation between parenting stress and externalizing ($\beta = -0.004, p = 0.003$) and internalizing ($\beta = -0.003, p = 0.01$) behavior problems, such that the relation was stronger among studies that had a sample containing a higher percentage of non-Hispanics.

Univariate ANOVA using weighted least squares (accounting for sample size) resulted in statistically significant differences across samples on the relation between parenting stress and externalizing, $F(2, 132) = 4.24, p = 0.02$, and internalizing, $F(2, 81) = 7.37, p = 0.001$, behavior problems. A Bonferroni post-hoc test on the relation between parenting stress and externalizing behavior problems revealed that the clinical-only group ($M = 0.504, SD = 3.31$) was statistically significantly higher ($p = 0.02$) than the community-only group ($M = 0.329, SD = 4.22$). There were no statistically significant differences between the mixed community/clinical groups and the clinical-only group ($p = 1.00$) or the community-only group ($p = 0.62$). Similar results were found on the relation between parenting stress and internalizing behavior problems. No other significant moderators (i.e., age, % White, % Black, caregiver who completed the parenting stress measure) were identified.

The Effect of Clinical Group on the Association between Parenting Stress and Externalizing and Internalizing Behavior Problems

Group was not a significant moderator. It is important to note that studies that included a predominantly ASD/DD sample ($n = 32$), a sample predominantly of with or at-risk for behavioral and/or mood disorders ($n = 75$) and a predominantly chronic illness sample ($n = 28$) reported similar associations between parenting stress and externalizing (M range = 0.34–0.44) and internalizing (M range = 0.29–0.38) behavior problems (see Table 2).

Differences in the Level of Parenting Stress among Three Clinical Groups

To ensure measurement equivalency across clinical groups, only studies that used the PSI and reported raw score or percentile means were examined, and raw scores were converted to percentile scores (Total Scale $n = 65$, Parental Domain $n = 32$, Child Domain $n = 29$). Overall, parenting stress levels were significantly higher in the ASD/DD group on the total scale, $F(2, 62) = 11.01, p < 0.001$, and the child domain, $F(2, 26) = 4.24, p = 0.03$, compared to the other groups. A Bonferroni post-hoc test on the total stress subscale revealed that levels of parenting stress among the ASD/DD group ($M = 85.94, SD = 114.45$) was statistically significantly higher ($p < 0.001$) than the other two groups. There were no statistically significant differences between the other two groups. Similar results were found

for the child domain, while no significant differences between groups were found for the parent domain (Table 3).

Discussion

Given the collection of several individual research studies linking parenting stress to child behavior problems (Anthony et al. 2005; Baker et al. 2002; Chung et al. 2013; Hastings et al. 2006), the goal of the current study was to systematically examine the extent to which parenting stress was associated with child externalizing and internalizing behavior problems and the overall levels of parenting stress across clinical groups. Our systematic review revealed that several studies have demonstrated a link between parenting stress and child behavior problems, with more studies examining child externalizing behavior than internalizing behavior. However, the literature on how demographic factors impacted the relation between parenting stress and child behavior problems was limited.

Our quantitative analyses revealed the magnitude of the relation between parenting stress and child behavior problems was larger for child externalizing behavior problems than internalizing behavior problems. It is important to note that the primary measure of parenting stress included across most (75%) studies was the PSI. The difficult child subscale of the PSI includes questions that overlap with questions on parent-report measures of externalizing behavior problems, but does not include questions that overlap with parent-report measures of internalizing behavior problems. This overlap may explain to some extent the larger effect size for externalizing behavior problems compared to internalizing behavior problems. Thus, future research should examine alternative methods of assessing parenting stress, as well as the potential overlap between measures of parenting stress and measures of child behavior problems. However, these findings highlight that although externalizing behavior problems may be more strongly related to parenting stress, parents report higher levels of stress when their child exhibits elevated levels of externalizing *or* internalizing behavior problems.

Moderation analyses indicated that the relations between parenting stress and child externalizing and internalizing behavior problems were higher in magnitude in samples with a higher percentage of boys. The larger effect size among studies with samples with a higher percentage of boys is not surprising given the current literature demonstrating higher levels of parenting stress for parents of boys (Vierhaus et al. 2013) and higher rates of externalizing behavior problems in boys (Williford et al. 2007). Conversely, it may be the case that girls provide greater expression of affection that may result in decreased experiences of stress in their parents. Nevertheless, this moderating effect suggests that there may be some unique characteristics about boys, such as exhibiting overt aggression rather than relational aggression (Smith et al. 2010), which may be more stressful for parents. On the other hand, research should examine protective factors that may help explain the lower rates of parenting stress among mothers of girls.

The higher levels of stress may also represent a reason why boys more typically present to mental health clinics than girls (Biederman et al. 2002), which is also consistent with our finding that the association between parenting stress and externalizing and internalizing

behavior problems was stronger with samples recruited from clinics compared to mixed or community samples. Parents who bring their children to clinics may experience more stress about their child's behavior problems, and their level of stress may provide motivation to seek treatment for their child. Thus, regular screenings in clinical settings, such as pediatric primary care and community care centers, would help identify parents who are experiencing high levels of parenting stress, which may influence parent-child interactions, and child behavior.

In addition to child gender and type of sample, moderation analyses indicated that the relation between parenting stress and child externalizing and internalizing behavior problems had a larger effect in samples with higher percentages of non-Hispanics. This finding may be due to cultural differences between Hispanics and non-Hispanics such that stigma of mental health problems and may lead to underreporting of psychosocial issues (Villatoro et al. 2014), including parenting stress or child behavior problems. Another possible explanation, may be that Hispanic mothers value cultural factors like *familismo* (i.e., family loyalty, reciprocity, and solidarity), which has been shown to be a protective factor (Gallo et al. 2009) against parenting stress. Furthermore, it is important to note that most studies did not include a large percentage of Hispanics. Therefore the moderating effect may reflect the limited studies with high rates of Hispanic families and highlight the need to pursue research examining parenting stress among diverse racial and ethnic groups.

No other demographic factors, including child age, child race, and caregiver who completed the parenting stress measure, were significant moderators. Although previous research suggests that both levels of parenting stress and behavior problems decrease as children get older (Neece et al. 2012), our findings demonstrate that the relation between these variables is stable throughout childhood despite documented heterotypic continuity across childhood (Rutter et al. 2006). With regard to race, previous research has suggested that higher rates of stress among parents are often due to factors associated with low socioeconomic status (SES), such as limited resources and access to services (Franco et al. 2010). Given that most studies reviewed (over 50%) did not report indices of SES, we were not able to include SES as a possible moderator. Caregiver report of parenting stress may not have resulted as a moderator due to the limited variability in caregiver report.

Moderation analyses of group were also non-significant, suggesting that the relation between parenting stress and child behavior problems did not differ across clinical groups. However, overall levels of parenting stress among parents of children with ASD/DD were higher. These findings suggest there may be certain characteristics of these groups that influence parenting stress. For example, previous research indicates the combination of behavioral and cognitive deficits in children with ASD/DD had the greatest impact on parenting stress (Spratt et al. 2007). Alternatively, other studies have found that conduct problems in combination with ASD/DD have the strongest association with parenting stress (Estes et al. 2013; Lecavalier et al. 2006). However, future research should aim to examine differences in potential contributors to parenting stress. Nonetheless, it is important to note that these samples were all from studies that examined behavior problems, and future research should examine levels of parenting stress among these high-risk groups across all studies and not just those measuring child behavior problems.

Limitations and Future Directions for Research

In terms of limitations, it is important to acknowledge that most of the studies reviewed were cross-sectional, thus precluding us from examining the directionality of the association between parenting stress and child behavior problems. On the one hand, if stress leads to later behavior problems, it may be the case that parents develop stress from other factors (e.g., child illness), which may in turn lead to subsequent behavior problems. On the other hand, if behavior problems lead to later stress, certain groups of children (e.g., ASD/DD) may be more likely to display higher levels of behavior problems, which would in turn lead to higher levels of stress in the parent. It is also a possibility that there is a transactional relationship, in which both parenting stress and child behavior problems impact one another over time (Neece et al. 2012). It will be important for future longitudinal studies to measure parenting stress and child behavior in early childhood and track the trajectory of both factors over time among these different clinical groups to inform treatment development. For example, if parenting stress is higher for parents of children with ASD/DD, then both the parent and child may benefit the most from a treatment targeting both the child and the parent(s). Additionally, findings from future longitudinal research may suggest whether there is an ideal age or time when it is best to provide services.

While there was a strong association between parenting stress and child behavior problems, it is important to note that almost all the studies relied exclusively on parent report of child behavior problems, and most relied on maternal report of parenting stress. Given the potential bias associated with parent report, future studies should examine the magnitude of the association between parenting stress and child behavior problems using other methods of assessment for child behavior, such as teacher report, self-report, and observations. In addition, recent findings suggest there are differences in self-reported levels of parenting stress between mothers and fathers (Wiener et al. 2016). However, the current study demonstrated that there are a limited number of studies that included fathers and other caregivers. Therefore, future research is needed to determine how caregivers experience parenting stress differently. Furthermore, we excluded studies in which the inclusion criteria required parents to have a mental health diagnosis or physical disability given the focus of this systematic review on parenting stress. We acknowledge that parents in some of the studies included in this systematic review may have had a mental health problem or physical disability. Given the body of research that has documented moderate correlations between parental mental health and parenting stress (Roddenberry and Renk 2008), future research should examine the pathways by which parent mental health and/or physical disability may affect the relation between parenting stress and child behavior problems.

Additionally, it is important to acknowledge that the groups defined in this systematic review were heterogeneous, and that categorizing the groups differently may have led to group differences in the relation between parenting stress and child externalizing and internalizing behavior problems. Moreover, although we examined externalizing and internalizing behavior problems as separate outcomes, it is important to acknowledge that there are moderately high rates of comorbidity between externalizing and internalizing behaviors (Lilienfeld 2003). Therefore, future studies should specify comorbidity rates in order to examine differences between children who display externalizing, internalizing, or both

externalizing and internalizing behavior problems. Overall, future research should focus on examining rates of comorbidity between parenting stress and child externalizing and internalizing behavior problems, as well as differences in characteristics between varying clinical groups and other factors such as parenting practices that may be impacted by parenting stress. The inclusion of typically developing children in future studies of parenting stress is also necessary, as parents may experience parenting stress with their typically developing child. A sample of typically developing children could also allow for stronger control groups and help inform potential interventions. Lastly, although our study included samples with children 18 years or younger, most of the studies (90%) included in this systematic review included a sample of children 12 years old or younger. This finding demonstrates that most research studies examining parenting stress and child behavior problems focused on younger children, and few studies have examined parenting stress among parents of adolescents. Given that some studies have demonstrated high rates of parenting stress in parents of adolescents (Anderson 2008; Evans et al. 2009), it is important for future research to further examine parenting stress in this population.

Implications for Practice—Despite these limitations, this study marks the first systematic review to examine the association between parenting stress and child externalizing and internalizing behavior problems among at-risk clinical groups. Given the strong association between parenting stress and behavior problems, it may be important to assess for improvements in parenting stress following evidence-based treatments for behavior problems (e.g., parent training) to determine the need to develop ancillary interventions targeting parenting stress. However, in some cases, simply reducing child behavior problems may lead to a reduction in parenting stress (Ray 2008).

For the ASD/DD group, there may be other factors influencing parenting stress (e.g., cognitive functioning), suggesting treatment for children with ASD/DD may need to include additional targets for treatment to improve parenting stress. Furthermore, our findings suggest that assessment of parenting stress may be an important component to routine screening in pediatric primary care. There is a current push toward implementing primary care screening for maternal postpartum depression because identification may encourage mothers to seek treatment to reduce levels of depressive symptoms (O'Connor et al. 2016). If similar procedures are used in pediatric primary care clinics or other child-serving specialty clinics to screen for parenting stress throughout childhood, we may encourage parents to seek treatment to reduce symptoms for both their child and themselves.

Summary—Our review addresses some of the gaps in the literature by documenting the impact of gender and type of sample on the relation between parenting stress and child behavior problems. We also filled in some of the gaps in the literature with the finding that parents of children with ASD/DD report higher levels of parenting stress. The current systematic review highlights directions for future research on parenting stress, including additional research needed on parents of adolescents, other caregivers, and longitudinal studies. We also described clinical implications of these findings, such as the importance for clinicians to assess and monitor parenting stress, especially for parents of children with ASD/DD, chronic illness, and with or at-risk for behavioral and/or mood disorders.

Furthermore, parenting stress should be assessed throughout treatment as it can possibly impact treatment progress and/or be impacted by treatment.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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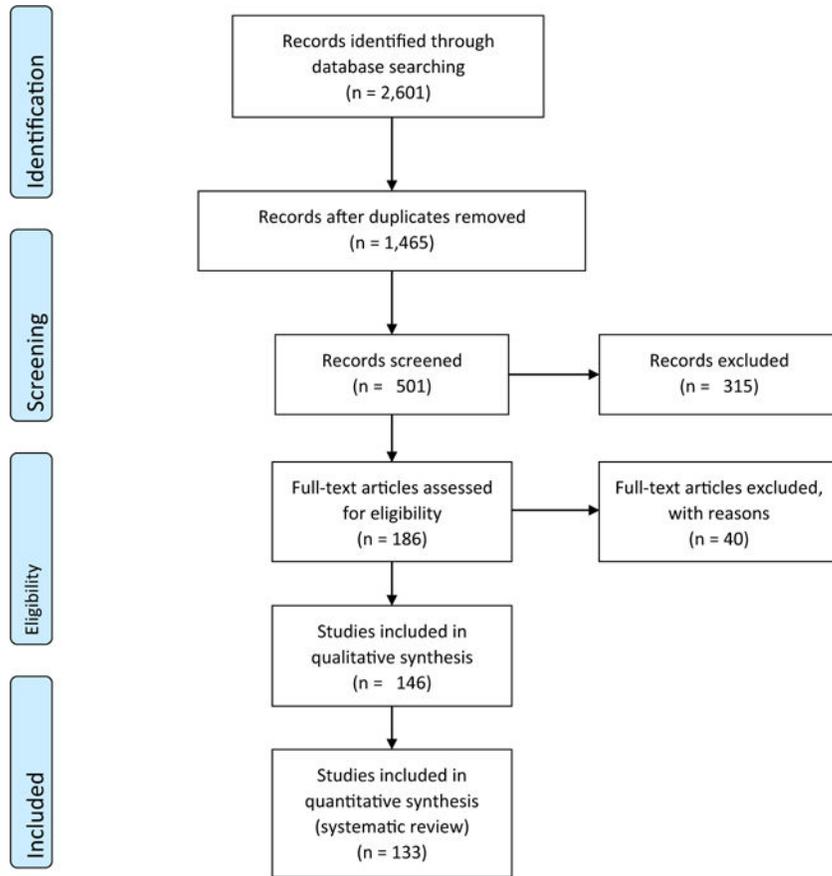


Fig. 1. PRISMA 2009 flow diagram

Table 1Effect sizes (r) across externalizing and internalizing behavior problems

	Externalizing	Internalizing
Weighted mean <i>ES</i>	0.57	0.37
Cohen's criteria	Large	Medium
95% <i>CI</i>	0.56 to 0.58	0.36 to 0.39
Number of effects sizes	134	84
Total <i>N</i> across studies	30,695	17,727
Range of effects sizes	-0.97 to 0.97	-0.97 to 0.96
<i>t</i>	100.44 ^{***}	49.97 ^{***}
File drawer analysis	1304	424
<i>f</i> ²	98%	97%

 $p < .001$

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Table 2Effect sizes (r) across externalizing and internalizing behavior problems by group

	Externalizing	Internalizing
ASD/DD		
Weighted mean <i>ES</i> (r)	0.43	0.35
95% <i>CI</i>	0.31 to 0.54	0.19 to 0.50
Number of effects sizes	32	18
With or at-risk for behavioral and/or mood disorders		
Weighted mean <i>ES</i> (r)	0.34	0.30
95% <i>CI</i>	0.29 to 0.39	0.24 to 0.36
Number of effects sizes	74	46
Chronic illness		
Weighted mean <i>ES</i> (r)	0.44	0.38
95% <i>CI</i>	0.27 to 0.61	0.20 to 0.56
Number of effects sizes	28	20

ASD Autism Spectrum Disorder, *DD* Developmental Delay, *ES* effect size

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Table 3

Differences in levels of parenting stress across groups

	ASD/DD		With or at-risk for behavioral and/or mood disorder		Chronic illness		<i>F</i>	<i>p</i>
	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>		
Total stress percentile	85.94 ^a (114.45)	12	63.31 ^b (230.55)	34	57.60 ^b (170.42)	19	11.005	< 0.001
Parental domain Percentile	67.92 (139.48)	10	58.21 (239.56)	12	49.93 (147.16)	10	2.969	0.067
Child domain percentile	85.33 ^a (81.60)	8	67.02 ^b (287.73)	11	59.61 ^b (210.39)	10	4.236	0.026

Means reported are weighted with externalizing sample size; *n* = number of studies. Estimated means in the same row that do not share superscript differ at **p* < 0.05
ASD Autism Spectrum Disorder, *DD* Developmental Delay