Published in final edited form as:

Child Psychiatry Hum Dev. 2014 October ; 45(5): 628–645. doi:10.1007/s10578-013-0431-5.

Outcomes of Parenting Interventions for Child Conduct Problems: A Review of Differential Effectiveness

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Abstract

This review integrates findings from studies formally testing moderators of parenting interventions targeting child conduct problems from ages 1 through 10 with a focus on baseline child problem behavior, sociodemographic risks, and family process risks as moderators. The review examines whether differential effectiveness has been found for individuals at higher versus lower risk across the body of moderator studies of parenting interventions. We conclude that greater problematic child behavior at baseline may, in some cases, be associated with greater benefit from parenting interventions. None of these studies reviewed found reduced effects for those with higher baseline child problem behavior. With regard to sociodemographic and family process risks as moderators, findings are less consistent; however, on the whole, the collection of studies suggests equal effectiveness across levels of risk, with reduced effects for those at higher risk rarely demonstrated. Implications of these conclusions for future research and intervention efforts are discussed.

Keywords

Parenting Interventions; Child Conduct Problems; Moderators; Differential Effects

Introduction

A wealth of longitudinal research on the emergence of conduct problems has shown that young children who demonstrate elevated levels of disruptive behavior in early childhood are at risk for persisting in problematic behavior across development [1], including serious antisocial behavior [2] and abuse of substances [3]. The term conduct problems (CP) encompasses problematic behaviors such as oppositionality, disruptiveness, aggression, and rule-breaking behavior [4] and differs from the broader term of externalizing problems, which is also inclusive of inattention and hyperactivity [5]. Conduct problems are the most common reason for referring children for mental health treatment [6]. As research has suggested behavior is more malleable in early childhood than in later childhood or adolescence [7], investigating ways in which to intervene early has received much attention.

Among early risks implicated in the development of CP, parenting is a particularly salient factor because parents serve as the most important socializing agents for young children [8], and parenting has been posited to play a mediating role in the link between various other risk factors (e.g., socioeconomic status) and child behavior outcomes [9]. Therefore, it is not surprising that many widely implemented early interventions for CP target aspects of parenting [10, 11]. For the purpose of this review, the term “parenting intervention” refers to interventions that focus on preventing and/or reducing child CP by targeting problematic or negative parenting practices (e.g., coercion, harshness) and/or enhancing protective or positive parenting practices (e.g., contingency, warmth) associated with CP. Although promising effects have been demonstrated through parenting interventions for child CP, with meta-analyses reporting small to moderate effects [10, 12, 13, 14], they are not effective for all children and families [15, 16]. Indeed, there are several factors that may undermine the effectiveness of parenting interventions, such as sociodemographic risk factors (e.g., family income, educational attainment), parental psychopathology (e.g., heightened depressive symptoms), and other related stressors (e.g., family conflict). Several important questions remain regarding the conditions under which parenting interventions may be most or least successful. Therefore, the investigation into moderators of effectiveness is a critical issue for the field both to inform ways to refine interventions and to advance theory, as moderator analyses can identify subgroups and elucidate if developmental processes differ for different groups or those at different levels of risk [17, 18].

Several empirical studies [17, 19] and a limited number of reviews (e.g., [10]) have investigated whether factors across sociodemographic, child, and family domains are differentially associated with intervention effectiveness. Some studies have focused on understanding how individuals with high initial levels of child problem behavior respond to interventions, which is very important because these behaviors are directly targeted in parenting interventions. Further, basic research has shown that children with the most elevated rates of CP at young ages are at greater risk for long-term persistence and exacerbation of CP [1, 20]. As children with the highest levels of CP may be the most important targets for intervention to prevent long-term costs, it is of great importance to understand whether interventions are relatively more or less effective with this subgroup. Indeed, previous research has found that in some cases, children with higher initial levels of CP may benefit more from interventions than those at lower risk [19, 21]. Given that child CP are directly targeted in parenting interventions and that those at highest risk might be the most important targets for change, one central goal of the current manuscript is to systematically synthesize results across studies of baseline child behavior as a moderator of intervention effectiveness to examine whether greater benefits are demonstrated for those at higher risk in this domain. Rather than meta-analyze results across studies, we take the approach of synthesizing results across studies that have formally tested moderation within individual samples. Although meta-analyses have several strengths, such as greater heterogeneity in variables than is possible in individual studies [10], there are also limitations, such as the need to categorically code studies as falling within a specific category (e.g., low income versus high income sample). Such coding does not address heterogeneity on these variables of interest within each sample, a point discussed in further detail in later sections.

Just as child behavior is an important factor to consider in explaining differential effectiveness, so too is the family context in which an intervention is disseminated. Several sociodemographic (e.g., low SES, single parent families) and family process risks (e.g., maternal depression, family conflict) are also of critical importance in understanding intervention effectiveness. Because such contextual variables are not direct targets of interventions however, it is less clear how they might influence response. On the one hand, research has shown how such risks can compromise parenting [22, 23, 24, 25]. For example, low SES has been associated with greater levels of harsh, physical, and inconsistent discipline [26], less responsiveness [22], and less supportive and involved parenting [27]. In addition, greater family conflict [28] and greater levels of stress [29] have been associated with harsh discipline, hostility, less nurturant caregiving, and poorer limit setting. Parental psychopathology has also been found to compromise parenting, such as poor discipline and monitoring practices among antisocial parents [30], greater harshness among substance abusing parents [31], and depressed mothers demonstrating higher negativity, coercion, punitive discipline, inconsistency, and criticism and being less responsive and affectionate toward children than non-depressed mothers [23, 32]. In a similar way, such risks could compromise the effectiveness of interventions that target parenting. Indeed, some research has shown that interventions can be less successful for disadvantaged families and those facing stressors such as maternal depression [10, 33]. On the other hand, if the links between stressors and compromised parenting are interrupted by an intervention, families at higher risk in these areas could benefit comparably (or even more). Some studies have shown no differential response among those at high risk, such as low SES or single-parent families [34, 35] and while limited, some research even suggests greater benefit for high risk families, such as those with depressed mothers (e.g., [36]). Given the importance of clarifying if sociodemographic and family process risks compromise intervention effectiveness, it is important to systematically synthesize results across studies exploring these risks as moderators.

In summary, the purpose of this review is to integrate the extant literature on moderators of parenting interventions targeting child CP from toddlerhood through early elementary school age, and to synthesize the results across individual studies that have formally tested moderation to examine whether those at higher risk evidence greater or less benefit, with a specific focus on baseline child behavior, sociodemographic risks, and family process risks. Higher baseline child problem behavior is expected to be associated with greater intervention benefit, given that it is a direct target of parenting interventions. Risk factors that are not direct targets of interventions but have been associated with compromised parenting, including sociodemographic (e.g., low SES) and family process risks (e.g., maternal depression), might be linked with comparable (or greater) benefit for those at higher risk, given that families with such stressors may be in greater need of change and therefore may be highly engaged despite the stressors they face. Conversely, these risks have been linked to compromised parenting, and therefore may be associated with reduced effectiveness of interventions that target parenting. There are several other variables that have been explored as moderators that are beyond the scope of the current review. As the current focus is on variables that are direct targets of interventions (e.g., baseline CP) and the sociodemographic and family process risk that have clear theoretical and empirical links

to compromised parenting, other *child* risk factors associated with CP (e.g., age, race, gender) and other engagement/intervention process variables are excluded from this review.

Effectiveness Findings of Parenting Interventions that Seek to Reduce or Prevent CP

Some of the most prominent parenting interventions have their origins in behaviorism and are designed to shift social contingencies so that parents positively reinforce child prosocial behavior and ignore or punish aversive and disruptive behavior [37]. The interventions on which moderation analyses have been conducted that are included in this review share common core elements including interventionists working with parents to promote positive parenting practices and/or reduce negative parenting practices that are associated with child CP.

Several meta-analyses of parenting interventions have been conducted to examine effectiveness across multiple trials. Overall, results have demonstrated effects sizes in the small to moderate range (with some large effects) in reducing/preventing child CP and/or improving parenting. To highlight a few reviews, one meta-analysis of studies including children with a mean age of 6 reported a moderate mean effect size (ES) in parental adjustment ($ES = 0.44$) and large effect in child outcomes ($ES = 0.73$ to 0.85), with most studies including a follow-up for between 2 months to 1 year post-treatment [37]. Similarly, a meta-analysis of studies including children up to age 5 examining pre-post evaluation of effects found moderate effects for child CP ($ES = 0.35$) [12]. Another meta-analysis of studies of preschool to adolescent children found moderate initial effects (e.g., between 1–6 months) in child and parenting behavior ($ES = 0.42$ and 0.47 , respectively) but smaller effects at follow-up, (e.g., between 7–12 months; $ES = 0.21$ and 0.25 , respectively) [10]. Dretzke et al. [13] also reported effects favoring intervention to control in their review of randomized controlled trials of parenting programs for child conduct problems, with standardized mean differences of -0.67 for parent reported outcomes and -0.44 for observational measures of outcome. Similarly, in a Cochrane Collaboration systematic review of behavioral and cognitive behavioral parenting interventions for child CP, standardized mean differences were found to be -0.53 for parent reported outcomes and -0.44 for independently assessed outcomes, with outcomes typically measured short-term (e.g., immediately post-treatment to up to three months post-treatment) [14]. Another recent review examining whether parenting interventions effects differed based on family SES and level of baseline child behavior found that when lower SES samples had low levels of baseline severity, they demonstrated less benefit at post-test. However, at long-term follow-up approximately one year after posttest, samples with lower SES benefitted less from parenting intervention compared to higher SES samples regardless of baseline severity [38].

While these results are favorable overall, parenting interventions are not effective for all parents and children. Studies have found that a sizeable group (e.g., one-fifth to one-third of children) fail to show improvement [15, 16]. It is important to investigate whether there is variability in improvement based on baseline levels of problem behavior, sociodemographic, and family process characteristics and whether differential effects are found between subgroups [39, 40]. Investigating whether these factors moderate effectiveness of interventions can help interventionists refine programs or better target recruitment efforts.

Differential Effects: Exploring Moderators of Effectiveness

In statistical terms, moderation involves an interaction in which the moderating variable (e.g., SES) interacts with a predictor (e.g., intervention group status) and impacts the level of the outcome (e.g., child behavior) [41]. Moderation can also be explored in a structural equation modeling (SEM) framework through multi-group modeling, which involves testing whether the same model fits the data among different subgroups. The current review is restricted to studies that formally test moderation in these ways: by probing interactions or multi-group model equivalence. However, it is important to point out how these approaches differ from moderation tested in the context of meta-analysis to highlight the advantages of the current approach, which synthesizes patterns of findings across individual studies.

The meta-analytic approach to testing moderation involves assessing whether effect sizes are heterogeneous – differing across studies [42]. If they are, then moderators are explored to see if these differences are due to common (moderating) variables [43]. While meta-analyses have several strengths, such as greater heterogeneity in variables than would be possible in individual studies [10], there are also limitations to the existing meta-analyses that have been conducted on parenting interventions. Gardner et al. [44] highlight that meta-analyses that include a broad range of interventions cannot specify whether a *specific* intervention is more or less beneficial for individuals depending on their level of risk. Oxman and Guyatt [45] point out potential problems of drawing conclusions by comparing “between” rather than “within” studies, providing the example that it would be problematic to conclude that the magnitude of effect for treatment A is larger than for treatment B based on two studies, one comparing A with placebo and one comparing B with placebo. This “indirect comparison” may be misleading, and a clearer picture could be gathered by direct examination of A to B within the same study. A related issue is that existing meta-analyses on parenting interventions have also typically involved categorizing studies based on potential moderators. For instance, Lundahl et al. [10] coded each study categorically or dichotomously on several characteristics explored as moderators. As an example, each was coded as having either a “high” (> 33%) or “low” (< 33%) percentage of single parents to explore single parent status as a moderator. Such coding does not address heterogeneity on these variables within each sample, especially for a variable such as single parenthood, as not all parents in the “high” percentage studies were single (and vice versa). It is important to assess whether the *same* intervention is comparably effective for single versus partnered parents, and the strength of looking at individual studies that test moderation is an examination of differential effects within each specific intervention study.

It is also important to distinguish between moderators and predictors. In intervention research, moderators are variables that specify for whom or under what conditions interventions are more or less effective [39, 46]. Predictors, on the other hand, can be defined as variables associated with an outcome but not differentially associated with response based on group assignment. For example, suppose researchers were interested in the influence of maternal depression on parenting intervention response. Looking at this association in the intervention group *only* would elucidate if depression served as a predictor by influencing the level of improvement in parenting among those treated. However, without comparing to a control, it is unclear what would happen without intervention. If

maternal depression predicts poor outcomes in the intervention group, it may predict even poorer outcomes in the control group and thus the intervention could actually be protecting against a greater decline in parenting associated with depression. Testing whether there is an interaction between intervention status and depression and how this influences outcomes is therefore a more informative way to understand the influences of this risk. A significant interaction could indicate greater benefits for depressed intervention mothers compared to how they would fare in the control group and to the benefits gained by non-depressed intervention mothers. Alternatively, a significant interaction could indicate reduced effects for depressed compared to non-depressed mothers if they showed less benefit. One further point is that a nonsignificant interaction would indicate that effectiveness did not vary based on depression. In this case, depression may still be a predictor if there were main effects of depression regardless of group assignment (e.g., in both the intervention and control groups, those who were depressed had worse outcomes). Because moderation analysis is particularly informative in understanding differential effectiveness, the following review synthesizes results across individual studies that formally tested moderators.

Differential Effectiveness: Meta-analytic Results

Before reviewing studies formally testing moderation by probing interactions and multi-group model equivalence, what can we glean from studies utilizing other methodologies to explore differential effectiveness based on risks? Recent meta-analyses of parenting interventions explored variables associated with differential effectiveness. Utilizing the heterogeneity in effect size approach to assess moderation, Lundahl et al. [10] found greater effects for children with higher baseline CP but reduced effects for low SES and single parent families. Similarly, Reyno and McGrath [11] meta-analyzed predictors of effectiveness and found greater effects for children with higher baseline CP and reduced effects based on low income, low parental education, single parent status, large family size, negative life events, and maternal psychopathology. A recent meta-analysis that dichotomously categorized studies as being either high or low SES found that when lower SES samples had low levels of baseline severity, they demonstrated less benefit at post-test, whereas at long-term follow-up, all samples with lower SES benefitted less from parenting intervention compared to higher SES samples regardless of baseline severity [38]. Because these reviews synthesized results across multiple studies, these findings have been taken as a robust demonstration that while individuals with higher baseline CP may benefit at least as much if not more from parenting interventions, higher-risk, sociodemographically disadvantaged families do not benefit as much, which has major implications for how interventions may be targeted and further, how they may be modified to reach those who do not respond. Given methodological limitations to existing meta-analytic and predictor studies, it is important to explore studies that have formally assessed moderation.

Taking these findings together, it is important to assess whether specific interventions demonstrate differential effects based on various risks [17] by exploring studies that have formally tested moderation. In summary, the first aim of this review is to examine whether higher initial levels of problematic child behavior are associated with greater benefit from interventions, given that it is a direct target of interventions. The second aim is to examine if sociodemographic and family process risks are associated with reduced effectiveness, in line

with predictor and meta-analytic results or alternatively, if these risks may be linked to comparable or greater effects, such that compared to how individuals may fare without intervention, those at higher risk may evidence meaningful benefits.

Methods

Studies included

Literature searches were conducted for studies published in English that examined moderators of parenting intervention effectiveness in samples with a mean child age between 1 to 10 years at the start of the intervention. Studies were required to have reducing/preventing child CP as a primary aim and could include individual parent training, or group parent training. Multicomponent interventions (e.g., those including primary elements involving teachers, peers, children) were excluded, given that having components in addition to parenting would make the results difficult to interpret (i.e., unclear whether effects are driven by parenting component or school component). While our focus was on child CP rather than the broader construct of externalizing problems (which is also inclusive of inattention/hyperactivity), we included studies that utilized broad externalizing measures based on the prevalence of such measures in the literature and the high rates of comorbidity among externalizing domains. However, we excluded studies that primarily focused on interventions for inattention, hyperactivity, or ADHD because of the different intervention modalities frequently used in such interventions (e.g., medication) in addition to parent management. Relevant moderators included baseline levels of child problem behavior, a variable that is a direct target of intervention, and the sociodemographic and family process risk that have clear theoretical and empirical links to compromised parenting. Some variables that have been previously examined as moderators in the literature were not included in the current review either because they typically are not direct targets of interventions (e.g., genetic differences, cortisol response) or do not represent sociodemographic or family process risk factors that have clear theoretical and empirical links to compromised parenting (e.g., child age, race, gender). For example, although previous studies have examined other *child* risk factors such as gender as moderators of parenting intervention effects, a recent review [47] of CP gender differences suggested that interventions that target risk mechanisms for child CP can be expected to be equally beneficial for males and females, consistent with some empirical studies [17]. These other child risk factors therefore are not directly relevant to the questions of this review and are excluded. In addition, other engagement/intervention process variables (e.g., parental attitudes, parental commitment, and organizational factors, among others) are also excluded because they are outside of the scope of this review.

Search Strategy

With these constraints in mind, searches were conducted in Ovid psychINFO, Embase, Medline, and CENTRAL, and alerts were set up in the National Center for Biotechnology Information (NCBI) and Google Scholar using keywords “parent intervention,” “parent training,” and “moderator.” Initial searching was completed between September 2011 and December 2011 and databases were searched for updates in May 2012 and November 2013. Studies were vetted by both the first and second author to confirm eligibility for inclusions.

Reference lists from relevant studies and reviews were also searched for additional studies. The number of studies formally assessing moderators is relatively small [40, 48]. In an attempt to ensure that all relevant studies were included, 27 authors who are experts in the area of parenting interventions were contacted and asked for references (74% response rate). Based on the hypothesized mechanisms through which interventions improve parenting which in turn, reduces child CP, risks could moderate links between the intervention and either changes in parenting and/or changes in child CP. Thus, studies exploring both parenting and child outcomes are included. To assist in interpreting the meaning and practical significance of the results, information on the number of interactions tested, descriptive statistics, and power are provided in the tables, if available (see Table notes for more information).

With regard to inclusion criteria, both individual and group parent training interventions were included. This review considers risks that fall under the domains of sociodemographic and family process risks. The term sociodemographic risk includes demographic-level variables that have been associated with compromised parenting and elevated child CP in previous research, including family income, parental education, parental occupational status, composite measures of SES based on a combination of these variables, single parent status, and teen parent status. Family process risks relate to psychological and relational stressors within the family that have been associated with compromised parenting practices and elevated CP. Broadly, these include parental psychopathology such as depression, antisocial behavior, and substance use, family/marital conflict, relational quality, social support, life stress, and cumulative measures of these factors. Although arguably it may be important to investigate the influence of each type of risk independently, broad domains of risks are used in this review for two primary reasons. The principle of equifinality suggests that many different types of stressors can lead to the same outcome [49]. Diverse risks may be associated with similar maladaptive processes (compromised parenting) and poor outcomes (CP), and research has suggested that specificity of different risks may be less important than considering risk across broad domains [50]. A second rationale for using broad domains is the limited number of studies on moderators of effectiveness [40, 48], which precludes the possibility of a thorough review of each independently.

Results

Studies of Baseline Child Behavior as a Moderator

Parenting-focused interventions—On the whole, parenting-focused intervention studies that explored baseline child problem behavior as a moderator found either nonsignificant moderation effects or significant moderation such that there were greater benefits for those with higher baseline problems. Importantly, none of the studies provided evidence that higher baseline child problem behavior was associated with reduced effects. Notably, all of the studies found significant main effects favoring intervention over control groups in at least some outcome measures (with the exception of Lavigne et al. [40] which compared nurse-led groups, psychologist-led groups, and literature on parent training and found no differences between groups). Because the following synthesis does not combine effect sizes across studies, any differences in study populations, interventions, or outcomes

noted between studies that are highlighted are based on observations of patterns and therefore should be considered speculative.

The six studies assessing baseline child behavior as a moderator appear in Table 1. Four studies found greater benefits for those at higher baseline risk such that the interventions were more effective in reducing CP among those with higher baseline problem behavior. Two found nonsignificant effects such that intervention effectiveness was not moderated by baseline level of problem behavior. What could explain this discrepancy? Three of these studies involved the Incredible Years intervention administered to separate samples; one of these studies found significant moderation and the other two did not. Therefore, it does not appear that this specific intervention in comparison to the others is the primary variable driving the different results. Interestingly, studies in which baseline child behavior was a significant moderator involved samples with mean levels of child problem behavior that were only moderately elevated compared to normative levels. By contrast, studies finding nonsignificant moderation involved samples in which all children were clinically elevated. Therefore, it appears that the likelihood of finding significant moderation is tied to characteristics of the sample, namely the mean level of child problem behavior at baseline. For example, in one study that involved a Head Start sample, children with higher baseline problem behavior evidenced greater benefit from intervention, but only 28% of the sample had a *T* score of 53 or higher on the teacher-reported baseline measure of child CP, indicating that many children were not clinically elevated [19]. Similar samples were included in the other studies finding significant moderation based on baseline child behavior, with children required to be above the normative mean but not elevated in the Shaw et al. [36] study, 35% of children having a parent-reported *T* score above the clinical cut point in the Tein et al. [51] study, and a similar level of baseline child problem behavior in the Chamberlain et al. [52] study, with a mean sample score on a daily report measure of CP of 5.85 and a score > 6 indicating clinically elevated behavior.

In contrast, the 2 studies with nonsignificant moderation findings involved samples in which all children were clinically elevated on baseline child problem behavior, with all children in the Gardner et al. [44] study clinically elevated on parent-reported CP and all children in the Lavigne et al. [40] study diagnosed with oppositional defiant disorder (ODD) with a mean *T* score of 71 on parent-reported CP. What these results suggest is that when a sample is restricted to children in the clinical range for CP, the benefit gained does not systematically vary depending on how high CP was at baseline. None of the studies explored whether baseline child behavior moderated effectiveness of parenting outcomes; this is perhaps an important future direction for further analyses.

In summary, findings exploring baseline child problem behavior as a moderator demonstrated that in several cases, those at heightened risk benefitted more than those at lower risk, while in other studies, moderation findings were not significant. The findings suggest that in samples in which not all children are clinically elevated, the more problematic a child's behavior is at baseline, the greater these individuals benefit. However, beyond a certain threshold, there may be a critical point at which this association is no longer apparent, such as in samples in which all children are clinically elevated. In these samples, moderator results were not significant. Therefore, it appears that the likelihood of

finding significant moderation is tied to characteristics of the sample, namely the level of child problem behavior at baseline.

Sociodemographic and Family Process Risks as Moderators

Parenting-focused interventions—The studies that explored sociodemographic and family process risks as moderators in parenting-focused interventions appear in Table 2. To summarize very broadly, across all studies, 47 variables were tested as moderators for one or more outcomes and of these, four were associated with reduced effects (from two studies), ten with enhanced effects (from nine studies), and all others were not significant. All found main effects in at least some of the outcomes assessed (with the exception of [40]). Although some of these studies utilized the same intervention [e.g., four involved Incredible Years (IY), two involved Parent Management Training (PMT)], results did not differ based on the intervention utilized. The Stolk et al. and Van Zeijl et al. [53, 54] studies also involved the same sample, with some significant moderation effects and other nonsignificant moderation effects in each study.

One study found reduced effects in parenting outcomes for mothers at higher risk in three domains; mothers with higher depressive symptoms, higher anger, and a history of abuse did not improve as much in some measures of parenting [55]. This study also found greater effects for mothers with higher anger in harsh parenting specifically. These varied findings do not lend themselves to straightforward interpretation, but taken together they elucidate the importance of including multiple measures of parent and child outcomes to assess which family process risks might moderate intervention effects on specific outcomes. The only other reduced effect was found by Gardner et al. [17] in a study of a high-risk sample with poorer CP outcomes for children of single ($d = .04$) compared to partnered parents ($d = .53$). On the other hand, this study found *greater* decreases in CP for children of mothers with lower education (high education, $d = 0.15$ to 0.18 ; low education, $d = 0.68$ to 1.17). The authors suggest greater effects based on low education could be due to the fact that such mothers have more limited knowledge of child development and how to appropriately parent, leading to greater utility of the intervention for them. In contrast, single parents may have had more difficulty enacting aspects of the intervention without a co-parent to assist them. However, four other studies explored single parent status, all of which found nonsignificant moderation. [40, 44, 56, 57]. One apparent difference is that whereas the Gardner et al. [17] study involved an individualized intervention (Family Check-Up), the four studies finding nonsignificant moderation results involved group parenting interventions (Incredible Years, Triple-P, group PMT). One hypothesis is that the group format could be beneficial for single parents who may be able to talk to other group members about how to successfully enact aspects of the intervention that might be difficult without a co-parent, something that an individualized intervention would not provide. This is only a speculative difference, and therefore studies that directly compare individualized to group interventions for single and partnered parents would be beneficial to test this hypothesis.

Another study investigating parental psychological functioning reported a significant three-way interaction between maternal mental distress, baseline CP, and intervention condition

such that higher baseline CP in combination with lower maternal distress was associated with lower post-test CP for the intervention group [58]. While this finding suggests that better pre-existing maternal mental health may enhance intervention benefit (and therefore poorer mental health may reduce benefit), it must be qualified by the significant effect that baseline CP exerts within this three-way interaction. The outcome of this study stresses the importance of considering how risk variables may interact with one another and with treatment status in predicting outcomes.

Four other studies explored measures of parental education, none of which found meaningful differences [40, 53, 56, 57]. While percentages indicate some variability in educational attainment among these samples, not all of these studies indicate percentages in *each* educational category, making it difficult to compare level of education along a similar metric. However, results seem to suggest that intervention effectiveness does not systematically vary based on parental educational levels.

With regard to other enhanced effects, two studies involving samples with a mean level of depressive symptoms in the mild to moderate range found significant moderation by baseline level of maternal depression, such that there were greater effects in CP for children of mothers with higher baseline depressive symptoms [36, 44]. It is interesting that the study demonstrating reduced effects based on maternal depression [55] explored parenting outcomes and the two studies finding enhanced effects explored child behavior outcomes. These results demonstrate the importance of exploring moderators across different outcome variables. Three other studies exploring depression as a moderator found nonsignificant effects. One appears to have a mean level of depression in the mild to moderate range (e.g., 42% in clinical range; [17]) similar to studies in which there were greater effects in CP for children of mothers with higher depressive symptoms [36, 44]. Unfortunately descriptive information for mean levels was not available in the other two studies [40, 56].

Results from a study exploring another measure of psychopathology, antisocial behavior, found greater benefits for antisocial parents in coercive parenting but not positive parenting [59]. Five other studies that explored measures of parent psychopathology/well-being found nonsignificant moderation [17, 40, 53, 54, 56]. The other greater benefits were found for children whose mothers reported lower mother-child relationship quality [51], for children whose mothers reported low social support (partial $\eta^2 = .02$ to $.03$) [53], and from the same sample, for children of mothers who reported greater marital discord and daily hassles (partial $\eta^2 = .03$ for both) [54]. In contrast, the other study assessing mother-child relationship quality found a nonsignificant effect [40], the other study assessing caregiver relationship quality found a nonsignificant effect, three studies exploring hassles/life stress found nonsignificant effects, and none of the studies investigating parental age, income/SES, or cumulative risk found significant moderation by these risks [17, 40, 44, 56, 57, 60].

To summarize, the majority of these studies found non-significant moderation such that individuals facing various sociodemographic and family process stressors benefitted as much from parenting interventions as those at lower risk. Only two studies found reduced effects based on higher levels of risk (mothers with higher depressive symptoms, higher anger, and a history of abuse did not improve as much in some measures of parenting [55]

and there were poorer CP outcomes for children of single compared to partnered parents [17]) and interestingly, these same two studies also found greater effects for mothers with higher anger in harsh parenting [55] and greater decreases in CP for children of mothers with lower education [17]. Such differential effects found in opposing directions within individual studies highlight the importance of including multiple measures of risk and multiple outcomes to fully understand the conditions under which risk variables moderate intervention effectiveness, while being careful to adjust for multiple tests and attention to power.

In summary, although the results of studies exploring sociodemographic and family process risks are somewhat varied, on the whole, the vast majority found nonsignificant moderation by risk variables. In addition, several studies found significant moderating effects in which greater benefits were demonstrated for those at higher risk, and only two studies found reduced effects in 4 domains of risk. Regarding the possibility that significant effects were found by chance or that the nonsignificant effects were due to low power, most studies appeared to test a reasonable number of interactions. However, findings from Stolk et al. [53] of greater benefits for children whose parents reported low social support should be interpreted cautiously. Although not directly reported, based on the number of variables explored as moderators and the number of outcomes investigated, it appears that more than 100 interactions were tested, only 7 of which were significant. These authors did not provide any information on correcting for multiple tests.

Discussion

The aim of this review was to examine the conditions under and domains in which higher risk status is associated with better versus worse response to parenting interventions, with a particular focus on two types of risk. The first primary focus was on the potential for baseline level of child problem behavior, a risk factor that is a direct target of parenting interventions, to be associated with greater intervention benefit. The second primary focus was on sociodemographic and family process risks that are not direct targets of interventions but are associated with compromised parenting and elevated CP. The goal was to assess whether such risks might similarly lead to greater benefits or conversely could reduce effectiveness.

With regard to the first aim, overall the results support the hypothesis that greater levels of problematic child behavior at baseline may be associated with greater benefit from intervention. Importantly, none of these studies found reduced effects for those with higher baseline levels of child problem behavior. Several of the studies finding nonsignificant moderation results involved samples in which all children were clinically-elevated in CP. The fact that there were small to moderate main effects in most of the studies with nonsignificant moderation findings shows that those at highest risk (which in these cases is the whole sample) may still be benefitting significantly.

One issue that must be raised involves technical measurement – individuals who are farther away from the mean intrinsically have the capacity to change more than those who are close to the mean. While this is true for those at higher risk in baseline CP, it is important to

clarify that because the studies reviewed were truly moderator studies (i.e., not predictor studies), the pattern of results does not simply reflect a regression to the mean. If regression to the mean were evident, then those high in baseline problems in the control groups would also be expected to demonstrate similar declines in behavior. While individuals with higher scores have greater room for improvement, the significant moderation effects shown for baseline levels demonstrate that it is the interventions that are associated with greater improvement. It could still be true that those at higher baseline risk are changing more because they have greater room for change, but importantly, the interventions appear to be a crucial component in facilitating that change.

With regard to the second aim examining sociodemographic and family process risks as moderators, the findings are less consistent, but on the whole, reduced effects for those at higher risk were rarely demonstrated. Importantly, this is in contrast to what has been reported in some predictor studies without control groups [33,61] and meta-analyses [10, 11] finding less benefit for higher risk families. However, a recent review found that the effect sizes from parent training did not differ based on differing levels of SES [14], and Leijten et al. [38] found that effect sizes did not differ based on SES at short-term follow-up but did at long-term follow. This discrepancy may reflect that predictor studies do not adequately address what would occur without intervention, as individuals not receiving intervention may demonstrate a greater decline in functioning. Therefore while perhaps lower SES families might not demonstrate the same reductions in problems as higher SES families within an intervention group, lower SES families could still be evidencing meaningful benefit compared to how they would fare without intervention. Similarly, meta-analyses may find different patterns because they do not address whether *specific* interventions are more or less effective based on risk. To reiterate how this review differs from the moderator approach utilized in meta-analyses that explore moderation, whereas the current review is restricted to individual empirical studies that formally tested moderation within each sample, the meta-analytic approach to test moderation involves assessing whether effect sizes are heterogeneous – differing across studies. If they are, then moderators are explored to see if these differences are due to common (moderating) variables. As articulated previously, this often involves categorizing studies, which may be problematic for interpretation. This review adds to the literature by demonstrating the importance of looking at patterns across individual studies to see whether moderation by a specific risk is consistently demonstrated.

Limitations

The current review has several limitations that require mention. Whereas the intention was to provide a synthesis of moderator literature that serves a complementary yet distinct function from a formal meta-analysis, there are strengths to meta-analyses that the current review lacks, including a failure to combine effects sizes across studies, less heterogeneity in variables than is possible in a meta-analysis, performance of sensitivity analyses and other formal tests of weighting and bias [62]. It bears repeating that because data were not meta-analyzed, any differences in study populations, interventions, or outcomes noted between studies that are highlighted are based on observations of patterns and are therefore speculative. We did however include a risk of bias summary (see table 3), as recommended for reviews [62].

Another issue that deserves attention is the possibility that studies including samples of clinically elevated children had less variability in the baseline measures they assessed as moderators. Therefore, significant effects may have been less likely to be detected in such samples. Unfortunately, it is not possible to easily compare variability across studies as different measures were utilized and some do not report on variability of baseline measures. However, even though some samples were restricted at the higher range of the CP spectrum, they could show similar variability as those with less elevated scores, if scores in the less elevated samples were clustered around mean levels. Interestingly, the results of Kjobli et al. [58] suggest that investigating three-way interactions may further elucidate conditions under which better or worse intervention outcomes are demonstrated, particularly when examining baseline CP.

Regarding other limits to interpretation of results described herein, two notable limitations of moderation analyses include the potential failure to correct for multiple tests, which increases the likelihood of finding a significant effect by chance, and the problem of limited power to detect meaningful moderation effects, especially if they are relatively small [63]. Whereas there are guidelines in the meta-analytic framework for when to look for moderators based on significant heterogeneity in effect sizes across studies, the rationale for testing moderation within individual empirical studies is typically based on exploration or theoretical rationale. Exploratory analyses can help to generate hypotheses, but there are dangers to “fishing expeditions” and over-interpreting findings that result from exploratory methods, particularly if extreme numbers of interactions are tested. To address these issues, future studies should be transparent in the number of tests conducted and power calculations should be performed to determine the size of moderating effects able to be detected.

Another limitation of this review was that broad categories of risks were utilized. More studies examining specific types of sociodemographic and family process risk are needed to be able to draw conclusions about the impact of each individual risk factor. Although there are arguments that stressors are “non-specific” in terms of links to maladaptive outcomes [50], there is still reason to believe that certain factors, such as single parenthood, may be associated with uptake and success of parenting interventions in different ways than other factors would be, such as teen parenting, antisocial behavior, or depression. The hope is for more research to be theoretically grounded, considering how each risk may influence intervention effectiveness, to allow for a more refined examination of how each moderator operates.

A qualification of the current review is that the influence of child behavior on parenting was not directly examined. Because children demonstrating CP are a heterogeneous group, it may be important to examine different subgroups of children, such as early versus late starters, those with comorbid disorders (e.g., ADHD, anxiety, depression), or children who demonstrate callous/unemotional traits. Certain child traits (e.g., high sensation seeking, fearlessness, feeling little guilt after misbehaving, inattentiveness) could impede the typical parenting intervention targets and processes. Hawes and Dadds [64] found that youth with callous-unemotional traits did not respond as well to specific features of a parent training intervention (e.g., discipline and time-out) but importantly, this was a predictor study that did not involve a control group. Hyde et al. [65] explored a similar construct of deceitful-

callous behavior as a moderator of parenting intervention effectiveness for young children ages 2–4 and found that it did not moderate effectiveness. It would be important for further studies to assess these and other child traits as moderators to examine their influence on effectiveness and replicate findings.

Future Directions

New Lines of Research

This review highlighted the need for several new directions in research in this area to advance the field and lead to interventions that best serve the needs of at-risk youth. With regard to specific theories to explore, one theoretical rationale to explain the pattern of findings that higher baseline CP may be associated with greater benefit from intervention is the theory of behavioral change, which postulates that the degree of motivation for change (i.e., as indicated by parent's difficulty in managing child behavior) is positively related to the level of change likely to occur [66]. Researchers have theorized that one of the central components of motivation in parenting interventions for child CP is the parent's desire for child behavioral change [67]. Parents of children with highly problematic behavior and who may themselves experience higher levels of frustration managing their children's behavior might have higher motivation, which could lead to greater benefits through intervention for such families. The hypothesis would be that motivation could explain why those with higher baseline CP evidence greater gains, based on higher motivation for parents of such children to seek behavioral change in their children. It would be helpful to have a greater number of studies with measures of motivation to test the theory of behavioral change. Accordingly, the use of such measures could test whether the degree of motivation for change (i.e., as indicated by parent's difficulty in managing child behavior) would be positively related to the level of change in child CP [66].

While the findings from this review suggest that initial level of CP may be an important indicator of the amount of change likely to occur from a parenting intervention, levels or frequencies of problem behaviors should not be the only index of severity assessed; researchers should also be concerned with the extent to which the parent views their own or their child's behavior as problematic or interfering with functioning. Other researchers [21, 68] have noted that showing that individuals with the most elevated problem behavior benefit from interventions provides evidence against the notion that early-starting children are "superpredators" destined to engage in persistent and escalating antisocial behavior and potentially unreachable through early interventions (e.g., [69]). This review suggests that children with elevated CP may in fact benefit more from intervention compared to children with lower baseline CP, but additional research on movement into the normative range would also be important to better assess the overall level of benefit. Greater benefit is not synonymous with normalization, and it is unlikely that children with the highest initial CP made reductions significant enough to match the lower levels of behavior problems for those with lower baseline CP [40]. More attention should be paid to utilizing normed measures for easier comparison.

Because changes in parenting are hypothesized to mediate changes in CP in various parenting interventions, one helpful methodology would be to test moderated mediation to

assess whether the mechanisms involved in interventions are differentially influenced by risk variables. Moderated mediation could elucidate if a mediated effect is larger or only apparent within a subgroup or if the size of the mediated effect changes as the level of the moderator changes. Two of the studies in this review took this approach, and both found significant moderation such that that mediation effects were stronger for those at higher baseline risk [51, 52]. Greater work should be dedicated to testing moderators in multiple pathways (e.g., between intervention and CP, between intervention and parenting, and between parenting and CP). The moderated mediation approach could elucidate if mediational pathways are contingent on moderators and which paths specifically are moderated in models including multiple pathways.

In addition, although nonsignificant moderation suggests that individuals at heightened risk in these domains do not demonstrate poorer response to parenting-focused interventions, particularly with regard to sociodemographic and family process risks, researchers should further consider what it might mean that a sizeable subgroup of participants in parenting interventions fail to achieve meaningful change. Although it is encouraging that interventions were not less effective based on risks such as SES, null moderator findings do not provide information about how to improve interventions for those who do not respond. Further research is necessary to better understand the reasons why many participants do not respond well to intervention (e.g., lack of initial or maintenance of engagement in intervention, bad match with interventionist).

Implications for Social Policy

One implication of the current review is that researchers and policy makers should be wary of results of predictor studies in determining who benefits from interventions. Predictor studies alone do not adequately compare outcomes to what would occur without intervention. Researchers, funders, and policy makers should be invested in questions of moderation from the inception of an intervention study to better understand who benefits and how intervention processes may differ for different subgroups. Funding agencies should also encourage utilizing normed measures as a requirement to allow comparison across studies.

In conclusion, findings from this review suggest that it is important to consider how different risk factors may compromise or enhance intervention effectiveness to better understand for whom and under what conditions interventions are most or least successful. In domains of risk that are direct targets of intervention (e.g., baseline child problem behavior), the findings from this review support the notion that meaningful and sometimes greater benefit can be demonstrated for those at high baseline risk. In domains of risk that are not direct targets of intervention, it appears that greater benefit is less likely but importantly, the majority of studies included in this review found nonsignificant moderation. In summary, the current review highlights the importance of examining moderation within individual studies to explore differential effects for individuals with varying risks who take part in the same intervention. Further, results from this collection of studies suggest that considering how different risks might be associated with effectiveness is important, as not all are associated in the same way.

Summary

The current review sought to approach the important issue of specifying for whom or under what conditions parenting interventions may be more or less effective in reducing child CP by synthesizing results across individual empirical studies that formally assessed moderation. The results demonstrated that greater problematic child behavior at baseline was associated with greater benefit from parenting interventions when not all children within a sample demonstrated baseline CP within the clinical range. None of these studies reviewed found reduced effects for those with higher baseline child CP. With regard to sociodemographic and family process risks, findings were less consistent; however, on the whole, the collection of studies suggests equal effectiveness across levels of risk, with reduced effects for those at higher risk rarely demonstrated. While nonsignificant moderation suggests that individuals at heightened risk in specific domains do not demonstrate poorer response, it is important to continue investigating why a sizeable subgroup of participants in parenting interventions fail to achieve meaningful change in order to better refine intervention programs for children and families.

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Table 1

Baseline child behavior as a moderator in parenting-focused interventions

Authors	Sample	Intervention	Moderators tested (sample level of CP)	Outcomes	Main effects and follow-up length	Number of tests, correction info	Moderation results
Studies that compare one parenting intervention to control condition							
Chamberlain et al. [52]	<ul style="list-style-type: none">$N = 700$ ($I = 359$, $C = 341$)M age = 8.8 yrs52% female22% E, 21% A, 33% H, 1% As, 1% N, 22% BChildren in foster care	<ul style="list-style-type: none">KEEP groupControl	<ul style="list-style-type: none">PR PDR child beh problems ($M = 5.85$ (4.10), within normal range)	<ul style="list-style-type: none">PR PDR child beh problems	<ul style="list-style-type: none">Sig CP: $d = .26$5 mos after	<ul style="list-style-type: none">UnknownNo info on correcting	<ul style="list-style-type: none">Baseline CP: greater effects through positive reinforcement
Gardner et al. [44]	<ul style="list-style-type: none">$N = 153$ ($I = 104$, $C = 49$)Age range = 3–4.9 yrs60% male56% income < £200/wkClinical range on ECBI	<ul style="list-style-type: none">IY groupWL control	<ul style="list-style-type: none">OBS child deviant beh (M of PR ECBI = 16, in clinical range)	<ul style="list-style-type: none">PR ECBI problem	<ul style="list-style-type: none">Sig CP: $d = .63$6 mos after	<ul style="list-style-type: none">7 tests (3 sig)Results hold if correct for multiple tests	<ul style="list-style-type: none">Baseline CP: NS
Reid et al. [19]	<ul style="list-style-type: none">$N = 882$ ($I = 607$, $C = 275$)86% age < 5 yrs53% male51% E, 19% A, 10% H, 8% As84% income < \$20,000/yr	<ul style="list-style-type: none">IY groupControl	<ul style="list-style-type: none">TR TRF problem beh (30% had a T score of 53 or higher)	<ul style="list-style-type: none">Composite of PR ECBI intensity & OBS of CP	<ul style="list-style-type: none">Sig CP7 mos after	<ul style="list-style-type: none">UnknownNo info on correcting	<ul style="list-style-type: none">Baseline CP: greater effects
Shaw et al. [36]	<ul style="list-style-type: none">$N = 120$ ($I = 60$, $C = 60$)M age = 2 yrs100% male48.3% A, 40% E, 11.7% BM income = \$15,374/yr	<ul style="list-style-type: none">FCU individualControl	<ul style="list-style-type: none">OBS child inhibition (M of PR CBCL agg & dest ~ 1 SD above normal)	<ul style="list-style-type: none">PR CBCL dest, overall agg, physical agg	<ul style="list-style-type: none">Sig dest: $d = .64$ SD after 1 yr; Trend dest: $d = .45$ SD 2 yrs	<ul style="list-style-type: none">9 tests (2 sig)No info on correcting	<ul style="list-style-type: none">Baseline inhibition: greater effects in dest; $\beta = .47$, $p < .05$
Tein et al. [51]	<ul style="list-style-type: none">$N = 157$ ($I = 81$, $C = 76$)M age = 10.4 yrs51% male	<ul style="list-style-type: none">NBP mother programLiterature Control	<ul style="list-style-type: none">Composite of PR CBCL EXT, CR DAS hostility (PR CBCL $M = 54$)	<ul style="list-style-type: none">Composite of PR CBCL EXT, CR DAS hostilityTR TCRS acting-out	<ul style="list-style-type: none">Sig CP: $d = .57$ after 13 sessions	<ul style="list-style-type: none">UnknownNo info on correcting	<ul style="list-style-type: none">Baseline CP: greater effects in CP through parental discipline; $\beta = -.11$, $p < .05$ post,

Authors	Sample	Intervention	Moderators tested (sample level of CP)	Outcomes	Main effects and follow-up length	Number of tests, correction info	Moderation results
	<ul style="list-style-type: none">88% E, 8% H, 2% A, 1% As, 1% O\$20,001 to \$25,000/yr medianDivorced mothers (recruited)		(9.16), 35% above clinical cut point)		<ul style="list-style-type: none">Sig for CP: $d = .38$ at 6 mos post		$\beta = -.14, p < .05$ follow-up
Studies that compare different types of parenting interventions to control condition							
Lavigne et al. [40]	<ul style="list-style-type: none">$N = 117$ (I = 49 nurse group, I = 37 psych group, C = 31)Age range = 3–6 yrs53% male75% EMostly middle classChildren with ODD	<ul style="list-style-type: none">IY group nurse ledIY group psych ledLiterature Control	<ul style="list-style-type: none">Clinical impairment psychologist rating of child beh [M of PR CBCL EXT = 70.6 (6.0)]	<ul style="list-style-type: none">PR ECBI intensityPR CBCL EXT	<ul style="list-style-type: none">NS CPAfter 12 sessions & 12 mos later	<ul style="list-style-type: none">40 tests (2 sig)Corrected by using $p < .01$, if cell sizes too small not interpreted	<ul style="list-style-type: none">Baseline child impairment: NS

Table 2

Sociodemographic and family process risks as moderators in parenting-focused interventions

Authors	Sample	Intervention	Moderators tested	Outcomes	Main effects and follow-up length	Number of tests, correction info	Moderation results
Studies that compare one parenting intervention to a control condition							
Baydar et al. [55]	<ul style="list-style-type: none">• $N = 882$ ($I = 607$, $C = 275$)• 86% age < 5 yrs• 53% male• 51% E, 19% A, 10% H, 8% As• 84% income < \$20,000/yr	<ul style="list-style-type: none">• IY group parent• Control	<ul style="list-style-type: none">• Mat depression (38.3% I, 45.0% C in clinical range)• Mat anger (25.2% I, 30.6% C in clinical range)• Mat history of abuse as child (>40th percentile: 34.3% I, 34.1% C)	Parenting: <ul style="list-style-type: none">• PR & OBS harsh/negative• PR & OBS supportive/positive• PR & OBS inconsistent/ineffective	<ul style="list-style-type: none">• Sig parenting PR & OBS harsh, OBS supportive, inconsistent• 7 mos after	<ul style="list-style-type: none">• Unclear• No info on correcting	<ul style="list-style-type: none">• Depression: weaker effects OBS harsh (48.0% vs. 34% SD), OBS supportive (63% vs. 38% SD), & OBS inconsistent (83% vs. 44% SD)• Anger: weaker effects OBS inconsistent (33% SD vs. 119% SD); greater effects in overall harsh (90% vs. 46% SD)• History of abuse: weaker effects overall harsh (44% vs. 66% SD)
Gardner et al. [17]	<ul style="list-style-type: none">• $N = 731$ ($I = 367$, $C = 364$)• Age 2–4• 51% male• 50% E, 28% A, 13% B, 9% O• 2/3 income < \$20,000/yr• 44% clinical on ECBI	<ul style="list-style-type: none">• FCU individual• Control	<ul style="list-style-type: none">• Low mat edu (22% I, 23% C)• Single parent (38% I, 42% C)• Caregiver rel. quality• Parenting hassles• Mat depression (42% clinical)• Mat substance (14% I, 12% C)• Teen parent (22% I, 23% C)• Cumulative risk	Child beh <ul style="list-style-type: none">• PR ECBI problem & CBCL EXT	<ul style="list-style-type: none">• Sig CP: $d = 0.23$ for ECBI & CBCL• 2 yrs after	<ul style="list-style-type: none">• 16 (3 sig)• No info on correcting	<ul style="list-style-type: none">• Low mat edu: greater effects in CP (ES high, $d = .04$ ECBI; .15 CBCL; ES low, $d = .53$ ECBI; 1.17 CBCL)• Single parent: reduced effects in CP (ES $d = .018$ single, $d = .68$ partnered ECBI)
Gardner et al. [44]	<ul style="list-style-type: none">• $N = 153$ ($I = 104$, $C = 49$)• Age range = 3–4.9 yrs• 60% male• 56% < £200/wk	<ul style="list-style-type: none">• IY group• WL control	<ul style="list-style-type: none">• Mat depression ($M = 16.9$ (10.3) I; $M = 16.6$ (11.2) C; Clinical cutoff > 10)• Single parent (45% I; 34% C)• Teen parent (47% I; 60% C)	Child beh <ul style="list-style-type: none">• PR ECBI problem	<ul style="list-style-type: none">• Sig CP: $d = .63$• 6 mos after	<ul style="list-style-type: none">• 7 (3 sig)• Results hold if correct for multiple tests	<ul style="list-style-type: none">• Mat depression: greater effects in CP; ES: $R^2 = .05$, $p = .004$

Authors	Sample	Intervention	Moderators tested	Outcomes	Main effects and follow-up length	Number of tests, correction info	Moderation results
	<ul style="list-style-type: none">From high poverty areasClinical range ECBI		<ul style="list-style-type: none">Income (<\$200: 57% I; 66% C)				
Kjølseth et al. [58]	<ul style="list-style-type: none">$N = 216$ (I = 108, C = 108)M age = 7.28 yrs68% male94% Norwegian; 6% otherM income = \$88,815	<ul style="list-style-type: none">BPTRegular Services control	<ul style="list-style-type: none">Mat distress	<ul style="list-style-type: none">PR ECBI intensity scale, HCSBS CP, & CBCL EXTTR HCSBS CP	<ul style="list-style-type: none">Sig CP PR; NS CP TR	<ul style="list-style-type: none">6 (5 sig)No info on correcting	<ul style="list-style-type: none">Three way interaction: child baseline CP by marital distress by group sig; greater effects for low mat distress and high CP ($p < .01$)
Lavigne et al. [40]	<ul style="list-style-type: none">$N = 117$ (I = 49 nurse group, I = 37 psych group, 31 CON)Age range = 3-6 yrs53% male75% EMostly middle classChildren with ODD	<ul style="list-style-type: none">IY group nurse ledIY group psych ledLiterature control	<ul style="list-style-type: none">Mat eduPat eduMarital statusSESMat life stressMat depressionParent-child dysfunction	Child beh <ul style="list-style-type: none">PR ECBI problemPR CBCL EXT	<ul style="list-style-type: none">NS CPAfter 12 sessions & 12 mos later	<ul style="list-style-type: none">40 (2 sig)Corrected by using $p < .01$, not interpreted if cell sizes too small	<ul style="list-style-type: none">All NS(statistically significant interaction for mat edu but cell sizes too small so results not interpreted)
McGilloway et al. [60]	<ul style="list-style-type: none">$N = 149$ (I = 103, C = 46)M age = 4.8 yrs, range 2.8 to 7.3 yrs63% male64% \$279/weekFrom IrelandClinical range on ECBI	<ul style="list-style-type: none">IY groupControl	<ul style="list-style-type: none">Risk of poverty (68% I, 63% C)Socioeconomic disadvantage (65% I, 68% C)Composite of single parent, teen parent, parental depression, family poverty, parent history of substance use or criminality (60% with a score 2 out of 5)	Child beh <ul style="list-style-type: none">PR ECBI intensity & problem & SDQOBS CP	<ul style="list-style-type: none">Sig PR intensity: $d = .7$; problem: $d = .75$; SDQ: $d = .48$; OBS: $d = 1.07$6 mos	<ul style="list-style-type: none">10 (0 sig)No info on correcting	<ul style="list-style-type: none">All NS
McTaggart and Sanders [56]	<ul style="list-style-type: none">$N = 421$ (I = 177, C = 244)Age range = 5-6 yrs51% male34% <\$30,000/yr	<ul style="list-style-type: none">Triple P groupWL control	<ul style="list-style-type: none">Family income (34% < \$30,000/yr)Family type (20% single/step)Caregiver edu (35% < 12 yrs)Parental depression	Parenting <ul style="list-style-type: none">PR dysfunctional parenting	<ul style="list-style-type: none">Sig parenting: $\eta^2 = .114$4 weeks after	<ul style="list-style-type: none">9 (3 sig)No info on correcting, $\eta^2 < 5\%$ variance, not interpreted	<ul style="list-style-type: none">All NS(statistically significant interaction for income but not clinically meaningful (ES,

Authors	Sample	Intervention	Moderators tested	Outcomes	Main effects and follow-up length	Number of tests, correction info	Moderation results
	<ul style="list-style-type: none">From BrisbaneSelf-referred		<ul style="list-style-type: none">Parental anxietyParental stress				$\epsilon^2 = .041$ so not interpreted)
Shaw et al. [36]	<ul style="list-style-type: none">$N = 120$ ($I = 60$, $C = 60$)M age = 2 yrs100% male48.3% A, 40% E, 11.7% BM income = \$15,374/yr	<ul style="list-style-type: none">FCU individualControl	<ul style="list-style-type: none">Mat depression ($M = 12.21$ (10.59) I; $M = 11.73$ (7.84) C; clinical cutoff = 13, M of sample in mild/moderate range)	Child beh <ul style="list-style-type: none">PR CBCL dest.;, overall agg., phys. agg.	<ul style="list-style-type: none">Sig dest.; $d = .64$ SD after 1 yr; trend; $d = .45$ SD after 2 yrs	<ul style="list-style-type: none">9 tests (2 sig)No info on correcting	<ul style="list-style-type: none">Mat depression: greater effects in CP ($\beta = .46$, $p < .05$)
Stolk et al. [53] ^a	<ul style="list-style-type: none">$N = 237$ ($I = 120$, $C = 117$)Age range = 1–3 yrs100% DutchHigh SES sampleChildren > 75th percentile in EXT on CBCL	<ul style="list-style-type: none">VIPP-SD individualControl	<ul style="list-style-type: none">Social supportMat edu (64% college)Mat psychopathologyCumulative risk sum of scores from all risk variables	Child beh: <ul style="list-style-type: none">PR CBCL overactive, opp., agg Parenting <ul style="list-style-type: none">PR & OBS sensitivityPR & OBS discipline	<ul style="list-style-type: none">NS CP1 yr afterSig PR sensitive partial $\eta^2 = .07$; sig PR & OBS discipline: partial $\eta^2 = .02$ & .03; 1 yr after	<ul style="list-style-type: none">> 100 tests (6 sig)No info on correcting	Child beh outcome <ul style="list-style-type: none">Low social support: greater effects for overactive (ES partial $\eta^2 = .02$); opp. (ES partial $\eta^2 = .03$) Parenting outcome <ul style="list-style-type: none">All NS
Tein et al. [51]	<ul style="list-style-type: none">$N = 157$ ($I = 81$, $C = 76$)M age = 10.4 yrs51% male88% E, 8% H, 2% A, 1% As, 1% O\$20,001 – \$25,000/yr median	<ul style="list-style-type: none">NBP mother programLiterature control	<ul style="list-style-type: none">Baseline mother-child relationship quality	Child beh: <ul style="list-style-type: none">Composite of PR CBCL EXT, CR DAS EXTTR TCRS acting-out	<ul style="list-style-type: none">Sig CP: $d = .57$ after 13 sessions; $d = .38$ six mos	<ul style="list-style-type: none">UnknownNo info on correcting	<ul style="list-style-type: none">Relationship quality: greater effects in CP through parental discipline ($\beta = -.12$, $p < .05$ post, $\beta = -.15$, $p < .05$ follow-up, ES not given)

Authors	Sample	Intervention	Moderators tested	Outcomes	Main effects and follow-up length	Number of tests, correction info	Moderation results
Van Zeijl et al. [54] ^a	<ul style="list-style-type: none"><i>N</i> = 237 (<i>I</i>=120, <i>C</i>=117)Age range = 1–3 yrs100% DutchHigh SES sampleChildren > 75th percentile CBCL EXTAll 2-parent families	<ul style="list-style-type: none">VIPP-SD individualControl	<ul style="list-style-type: none">Marital discordDaily hasslesMat well-being	<ul style="list-style-type: none">See above (Stolk et al., 2008)	<ul style="list-style-type: none">See above (Stolk et al., 2008)	<ul style="list-style-type: none">56 (2 sig)No info on correcting	Child beh outcome <ul style="list-style-type: none">Marital discord: greater effects overactive (ES: partial $\eta^2 = .03$)Daily hassles: greater effects in overactive (ES: partial $\eta^2 = .03$)
							Parenting outcome <ul style="list-style-type: none">All NS
Wachlarowicz et al. [59]	<ul style="list-style-type: none"><i>N</i> = 110 (<i>I</i> = 67, <i>C</i> = 43)Age 5–10, <i>M</i> age = 7.570% male90% E<i>M</i> income = \$39,432/yr25% below poverty lineStep families recruited	<ul style="list-style-type: none">PMTControl	<ul style="list-style-type: none">Parent antisocial beh	Parenting <ul style="list-style-type: none">OBS positiveOBS coercive	<ul style="list-style-type: none">Sig parenting: pos (β= .32, p<.05), coercive (β= -.24, p<.05)2 yrs after	<ul style="list-style-type: none">6 tests (3 sig)No info on correcting	Parenting outcome <ul style="list-style-type: none">Parent antisocial beh: greater effects in coercive (β= -.44, ES not given)
Studies that compare different types of parenting interventions to control condition							
Kling et al. [57]	<ul style="list-style-type: none"><i>N</i> = 159 (<i>I</i> = 49 nurse group, <i>I</i> = 37 self, <i>C</i> = 31)<i>M</i> age = 660% maleSwedish sample, 22% immigrants37% edu > 3 yrs post HSChildren with CP at a clinical level	<ul style="list-style-type: none">PMT nurse groupPMT self ledWL control	<ul style="list-style-type: none">Mat age (nurse <i>M</i>= 37 (5.2); self <i>M</i> = 38 (5.2); WL <i>M</i> = 38 (6.2))Pat age (nurse <i>M</i> = 39 (6.9); self <i>M</i> = 39 (6.9); WL <i>M</i> = 41 (5.9))Single parent (24% nurse; 25% self; 38% WL)Mat edu > 3 yrs post HS (35% nurse; 41% self; 43% WL)Pat edu > 3 yrs post HS (29% nurse; 38% self; 40% WL)	Child beh: <ul style="list-style-type: none">PR ECBI problem & intensity & PDR	<ul style="list-style-type: none">Sig nurse vs. WL: <i>d</i> = .76 – .91 post; self vs. WL: <i>d</i> = .45– .48 post; nurse vs. self: <i>d</i> = .30 – .46 post, <i>d</i> = .38 – .62 follow-up)	<ul style="list-style-type: none">27 tests (2 sig)No info on correcting but expected number of significant findings by chance (=2)	Child beh outcome <ul style="list-style-type: none">All NS
				Parenting: <ul style="list-style-type: none">PR parenting practices	<ul style="list-style-type: none">Sig nurse vs. WL: <i>d</i> = 1.07 post; self vs. WL: <i>d</i> = .55 post; nurse vs. self: <i>d</i> = .30 – .52 post)	<ul style="list-style-type: none">Power to detect med effects = .80	Parenting outcome <ul style="list-style-type: none">All NS (Maternal age: significant interaction but not meaningful)

Note: Information on the number of interactions tested and whether adjustments were made to correct for multiple tests is presented if available. If not reported, an effort was made to determine the number of moderation analyses conducted by considering the number of moderating variables and outcomes explored in analyses examining intervention effects. Numbers of moderators tested and significant effects will not necessarily reflect those listed in the table, as several studies assessed moderators outside of the scope of this review (e.g., child age, gender, etc.). When available, measures of effect size are presented for significant moderators. Descriptive statistics are reported for moderating variables when available and meaningful (e.g., normed scales of CP or percentages of clinically depressed mothers). Information about power is presented when available. Studies with the same superscript utilized the same sample or subsample.

Abbreviations: **I:** intervention; **C:** control; **WL:** wait list; **yr(s):** year(s); **wk:** week; **E:** white/European American; **A:** black/African American; **As:** Asian; **H:** Hispanic/Latino; **N:** Native American; **B:** biracial; **SES:** socioeconomic status; **UPK:** universal pre-K; **PR:** parent report; **CR:** child report, **TR:** teacher report; **OBS:** observed; **NS:** not significant; **Sig:** significant; **SD:** standard deviation; **ES:** effect size; **neg:** negative; **pos:** positive; **mat:** maternal; **pat:** paternal; **edu:** education; **beh:** behavior; **agg:** aggression; **opp:** oppositional; **des:** destructive; **EXT:** externalizing; **CP:** conduct problems; **ODD:** oppositional defiant disorder; **CD:** conduct disorder; **ADHD:** attention deficit hyperactivity disorder; **PT:** Parent Training; **CT:** Child Training; **TT:** Teacher Training; **CBCL:** Child Behavior Checklist [70]; **ECBI:** Eyberg Child Behavior Inventory [71]; **DAS:** Divorce Adjustment Scale (Program for Prevention Research, unpublished manual); **PDR:** Parent Daily Report [72]; **TRF:** Teacher Report Form[73]; **TCRS:** Teacher–Child Rating Scale [74]; **SDQ:** Strengths and Difficulties Questionnaire [75]; **HCSBS:** Home and Community Social Behavior Scales [76]; **IY:** Incredible Years; **KEEP:** Keeping Foster Parents Trained and Supported; **FCU:** Family Check-Up; **NBP:** New Beginnings Program; **BPT:** Brief Parent Training; **Triple P:** Triple-P Positive Parenting Program; **PMT:** Parent Management Training; **VIPP-SD:** Video-feedback Intervention to promote Positive Parenting – Sensitive Discipline

Table 3

Risk of bias summary for included studies

	Selection Bias	Performance Bias	Detection Bias		Attrition Bias	Reporting Bias
	Random Sequence	Allocation concealment	Blinding of participants and personnel	Blinding of outcome assessment	Incomplete outcome data	Selective reporting
Chamberlain et al. [52]	+	+	?	?	+	+
Gardner et al. [44]	+	+	?	+	+	+
Reid et al. [19]	+	?	+	+	?	+
Shaw et al. [36]	+	+	+	?	+	+
Tein et al. [51]	+	?	?	+	+	+
Lavigne et al. [40]	+	?	?	+	+	+
Baydar et al. [55]	+	+	+	+	+	+
Gardner et al. [17]	+	+	+	?	+	+
Kjøbli et al. [58]	+	+	?	+	+	+
McGilloway et al. [60]	+	+	+	+	+	+
McTaggart & Sanders [56]	?	-	?	?	?	+
Stolk et al. [53]	+	+	+	+	+	+
Van Zieijl et al. [54]	+	+	+	+	+	+
Wachlarowicz et al. [59]	+	?	?	+	+	+
Kling et al. [57]	+	+	+	?	+	+

+: low risk

?: unclear risk

-: high risk