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Is Parenting the Mediator of Change in Behavioral Parent Training for Externalizing Problems of Youth?

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Abstract

Change in parenting behavior is theorized to be the mediator accounting for change in child and adolescent externalizing problems in behavioral parent training (BPT). The purpose of this review is to examine this assumption in BPT prevention and intervention programs. Eight intervention and 17 prevention studies were identified as meeting all criteria or all but one criterion for testing mediation. Parenting behaviors were classified as positive, negative, discipline, monitoring/supervision, or a composite measure. Forty-five percent of the tests performed across studies to test mediation supported parenting as a mediator. A composite measure of parenting and discipline received the most support, whereas monitoring/supervision was rarely examined. More support for the mediating role of parenting emerged for prevention than intervention studies and when meeting all criteria for testing mediation was not required. Although the findings do not call BPT into question as an efficacious treatment, they do suggest more attention should be focused on examining parenting as a putative mediator in BPT.

Keywords

Parenting; mediator; behavioral parent training

> "It is as important to know how intervention works as it is to document that it works"
>
> (Snyder et al., 2006, p. 43).

> "…after decades of psychotherapy research, we cannot provide an evidence-based explanation for how or why even our most well studied interventions produce change"
>
> (Kazdin, 2007; p. 23).

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[5]The Gonzales et al. (2012) study is not included in this summary and the Overall Summary.

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Intervening through parents to treat children's and adolescents' externalizing problem behaviors—specifically, disruptive behaviors [Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD)] and Attention Deficit/Hyperactivity Disorder (ADHD)—has a long history (see Forehand, Jones, & Parent, 2013; Pelham & Fabiano, 2008). Behavioral parent training (BPT) has been identified repeatedly as an evidence-based treatment for the prevention and treatment of both disruptive behaviors and ADHD (for reviews, see Charach, Carlson, Fox, Ali, Beckett, & Lim, 2013; Chorpita, Daleiden, Ebesutani, Yong, Becker, & Starce, 2011; Comer, Chow, Chan, Cooper-Vince, & Wilson, 2013; Dretzke et al., 2009; Eyberg, Nelson, & Boggs, 2008; Fabiano, Pelham, Coles, Gnany, Chronis-Tuscano, & O'Connor, 2009; Lundahl, Risser, & Lovejoy, 2006; Maughan, Christiansen, Jenson, Olympia, & Clark, 2005; McMahon, Wells, & Kotler, 2006; Michelson, Davenport, Dretzke, Barlow, & Day, 2013; Pelham & Fabiano, 2008; Sandler, Schoenfelder, Wolchik, & MacKinnon, 2011; Serketish & Dumas, 1996; Weersing & Weisz, 2002; Weisz & Gray, 2008). Of particular note, Chorpita et al. (2011) recently concluded that, for the treatment and prevention of childhood attention and hyperactivity problems, "Parent Management Training (alone) showed the largest number of successful studies" (p. 159) and, for disruptive behaviors, "the vast majority of positive findings continue to support Parent Management Training" (pp. 161 & 163) as the treatment of choice.

From a theoretical perspective, BPT is grounded in the social interactional model, which was proposed by Patterson and his colleagues to explain how parents can inadvertently shape externalizing problems of their children and adolescents (e.g., Patterson, 1982; Patterson & Fisher, 2002; Patterson, Reid, & Dishion, 1992). In this model, certain parenting behaviors, including positive parenting (e.g., attention, praise), discipline, and structure (e.g., rules, instructions, &, particularly for adolescents, monitoring), exert influence over their offspring's behavior through the control of reinforcing contingencies (see Forehand et al., 2013; McKee, Jones, Forehand & Cuellar, 2013, for recent reviews of the intervention and non-intervention literature on parenting & youth externalizing problems). A critical component of the social interactional model is coercion, where "parents and children mutually 'train' each other to behave in ways that increase the probability that children will develop aggressive behavior problems and that parents' control over these aversive behaviors will decrease" (p. 101) (Granic & Patterson, 2006). Coercive interactions involve parents providing structure (e.g., an instruction), a child refusing to comply to that structure and escalating her or his negative behavior (e.g., yelling, hitting), the parent escalating his or her negative parenting behavior (e.g., criticisms, threats) but then eventually capitulating to the child (Granic & Patterson; McMahon & Forehand, 2003). These interchanges are viewed as "the fundamental behavioral mechanisms" (p. 101) that account for the emergence and stability of child externalizing problems (Granic & Patterson). The goal of BPT is to decrease coercive interchanges and, as a consequence, youth externalizing problems by teaching parents how to use their attention and other positive contingencies they control, provide structure, and, when inappropriate child behavior is emitted, apply effective discipline.

As just noted, the putative mechanism for change in youth behavior in BPT is change in parent behavior. Most studies, but certainly not all (particularly early ones; e.g., Kazdin, Siegel, & Bass, 1992; Patterson, Chamberlain, & Reid, 1982), report change in parenting

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behaviors with intervention (e.g., Nixon, Sweeney, Erickson, & Touwz, 2003; Sanders, Markie-Dadd, Tully, & Bor, 2002). However, the extent to which parenting behaviors serve as a mediator of change in youth externalizing problem behaviors with the implementation of BPT is open to question. Interestingly, with three exceptions, the reviews noted in the preceding paragraph have not directly addressed the role of parenting behaviors in accounting for change in child disruptive and attention/hyperactivity problems.[1]

In the first exception, after reviewing BPT studies for disruptive behaviors, Weersing and Weisz (2002) concluded that "we were surprised that none of the EST (empirically supported treatment) clinical trials directly tested whether changes in parenting practices mediated the effects of treatment on youth behavior" (p. 16). And, more recently, Eyberg et al. (2008) concluded that most treatment studies of children's and adolescents' disruptive behaviors have assessed mediating variables such as parenting skills but "few studies have examined these variables in formal statistical tests" (p. 232). Eyberg and colleagues note that a study conducted by Eddy and Chamberlain in 2000 was "among the first to conduct such tests" (p. 232); however, it is important to point out that even this study did not examine parenting skills alone (i.e., a construct consisting of parenting plus peer associations was examined). In the final exception, Sandler et al. (2011) reviewed parenting prevention programs with follow-up data and found that only 22% (10 of 46 studies) reported findings on mediation. Of note, the child outcome in the Sandler et al. study was not limited to externalizing problems. And, similar to Eyberg et al.'s conclusion with treatment studies, all of the studies identified by Sandler et al. were conducted since 2002. In sum, although the first published BPT study for youth disruptive behaviors was over 50 years ago (see Forehand et al., 2013), it has only been in the last 14 years that the role of parenting as a mediator has begun to be examined.

As Kazdin (2007) has cogently pointed out, understanding why treatment works can help us select which interventions to implement, clarify links between treatments and diverse outcomes, and optimize clinical change. Of particular importance, as both Kazdin and Eyberg and her colleagues (2008) have noted, in order to translate evidence-based therapies into widespread use in the mental health field, it is critical to understand why and how interventions produce their change. For an intervention with a 50-year history (Forehand et al., 2013), *now* is the time to examine if parenting skills are a mediator of change in youth externalizing problems when treated by BPT.

In a recent narrative account of the history of BPT with disruptive behaviors and anxiety, Forehand et al. (2013) pointed to the importance of examining mediation. They noted several BPT studies that have begun to examine parenting as a mediator when children were clinic-referred for disruptive behaviors. These authors also called for a systematic assessment of mediation from a broader range of BPT studies (e.g., inclusion of prevention studies) and use of rigorous criteria for reaching conclusions about mediation (i.e., assessment of change in the mediator before assessment of change in child outcome).

[1]One other review (Pelham & Fabiano 2008) noted the importance of treatment adherence (i.e., parents and teachers implementing treatment as intended) as a potentially important mediating variable. This could include, but is not limited to, specific parenting skills.

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The purpose of the current review was to respond to our call for a broader range of BPT studies to be reviewed and to utilize rigorous criteria for inclusion of studies. We review not only BPT studies where the child or adolescent referral problem was disruptive behavior but also ADHD, and we review prevention, as well as intervention, studies. Although a cogent argument can be made for considering disruptive behaviors (i.e., ODD & CD) and ADHD separately (see Forehand et al., 2013), our intent in this review is not to collapse across these types of problems of youth but to contrast parenting as a mediator for disruptive behaviors versus ADHD. Furthermore, with the utilization of BPT with children and adolescents at risk for externalizing problems because of a familial or extrafamilial stressor (e.g., poverty, divorce, bereavement, parental depression), the opportunity for examining parenting as a mediator is extended to prevention studies (i.e., youth who are not clinic-referred and may have less severe externalizing problems). This approach allows us to examine if similar or different parenting behaviors serve as mediators across two types of externalizing problem behaviors (disruptive and ADHD) and from potentially less (i.e., at-risk) to more (i.e., diagnosed or clinic-referred) severe externalizing problems.

We also imposed rigorous criteria in the current review for concluding that mediation occurred. For example, a criterion for mediation according to Kramer, Kiernan, Essex, and Kupfer (2008) is that change in the mediator (parenting) is demonstrated prior to change in the outcome (child behavior). However, we recognize that few studies may meet all criteria in a field where research has only begun to emerge in the past 14 years. Therefore, in secondary analyses, we examine studies not meeting all the criteria for mediation, such as the assessment of the mediator (parenting) and outcome (youth externalizing problems) at the same point in time after intervention. This allowed us to compare more and less rigorously conducted studies.

In addition, we delineate how each study examines mediation. Since Judd and Kenney (1981) and Baron and Kenny (1986) presented the causal steps approach for testing mediation, modifications to their procedures as well as other frameworks for testing mediation have been proposed (e.g., Kramer et al., 2008; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; Shrout & Bolger, 2002; see Hayes, 2009, 2013, Preacher & Hayes, 2008, for reviews). Several authors have noted that the causal steps approach is too conservative and may lead to the under-identification of mediators (e.g., Hayes, 2009). Accordingly, we delineate the method for testing mediation in each study and examine trends in the findings to determine if the method utilized to test for mediation is related to the conclusion that parenting is a mediator of BPT.

Finally, we believe it is important to not only identify when support for a parenting behavior as a mediator is found but when support is *not* found. In this way a more accurate conclusion about the importance of each parenting behavior as a mediator can be reached. To this end, we calculated a percentage of mediation tests that resulted in support of a parenting behavior as a mediator.

Before proceeding to the review, it is important to note that the purpose of the current review is *not* to question the efficacy of BPT for children's externalizing problems. However, we contend that the role of parenting in BPT is a largely unexplored hypothesis at

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this time as a comprehensive review has not been undertaken. This paper is designed to fill that void.

Method

Literature Search

PsycINFO and PubMed were used to search for articles published in peer-reviewed journals (i.e., unpublished dissertations were not included) or online through the end of 2013. A range of search terms was utilized, individually and in combination, including terms reflective of parenting (e.g., caregiver, mother, childrearing), externalizing problems (e.g., ODD, behavioral disorders, disruptive behavior, attention, hyperactive, ADHD), intervention (e.g., parenting, parent training), and mediation. The review articles mentioned earlier and articles by authors of well-established BPT programs (e.g., Barkley, Eyberg, Kazdin, Lochman, McMahon, Patterson, Sanders, Sandler, Webster-Stratton) were also examined for references to mediation. Finally, additional articles were identified through the examination of the reference lists of those articles found in the initial search and contacting researchers through listservs (e.g., ABCT's ADHD Special Interest Group listserv).

Criteria for Inclusion

The following criteria were utilized for inclusion:

1. Published in a peer-reviewed journal. Similar to Lovejoy, Graczyk, O'Hare, and Newman (2000), we believe that "peer-reviewed published studies provide some degree of quality control in the selection of studies" (p. 568).
2. Children and adolescents in the 2- to 18-year age range.
3. Youth who were (a) clinic-referred for an externalizing problem behavior, diagnosed with ODD, CD, or ADHD, or met another criterion for an externalizing problem behavior (e.g., above a clinical cut-off on a behavior problem inventory or adjudicated for a delinquent act) or (b) exposed to an environmental stressor (e.g., divorce, death of a parent, foster care, poverty, parent depression) with an externalizing problems measure as an outcome. Studies were classified as intervention (e.g., a clinic sample) or prevention (an at-risk sample; e.g., children from a divorced family). Universal prevention programs were not included.[2]
4. Random assignment of participants to a BPT intervention and a comparison condition (Kraemer et al., 2002), and BPT was implemented to reduce externalizing problem behaviors. A study was defined as BPT if it involved teaching parenting skills based on social learning theory, including (a) increasing attending to and reinforcing appropriate behavior, (b) reducing criticisms and other forms of harsh parenting, (c) using discipline techniques such as time-out and work chores, and (d) increasing supervision in the home (e.g., rules, effective instructions) and/or monitoring behavior outside the home. If authors of a study

[2]The Brody, Kagan, Chen, and Murry study (2008) was a universal prevention program but the authors only examined mediation in a high-risk group of youth (those with deviance-prone peers); therefore, this study was included.

stated using one or more of these skills or if they claimed to use BPT (or some variant of this term), then the study was considered for inclusion. Externalizing problem behaviors were broadly defined to include those characteristic of ODD (e.g., noncompliance, loses temper), ADHD (i.e., attention problems, hyperactive behaviors), and CD (e.g., initiates fights, steals, destroys property), including delinquent outcomes (e.g., arrests).[3] It is important to note that many of the studies we reviewed had youth outcomes (e.g., internalizing problems, social skills, prosocial behavior) we do not examine. Finally, we did not include child or adolescent outcomes assessed in schools. Although there are multiple exceptions (e.g., Webster-Stratton, 1998), there is a history of almost 40 years of child behavior change in the home resulting from BPT not necessarily generalizing to the school setting unless specific programming occurs (Breiner & Forehand, 1981; Forehand et al., 1979; Johnson, Bolstad, & Lobitz, 1976). BPT studies have varied substantially in the extent to which such programming (e.g., home-based reinforcement for school behavior, monitoring homework completion) does occur. As a consequence, it is difficult across studies to determine the extent to which change in school behavior change (when it does occur) results from generalization of BPT from home to school or results from a component of BPT addressing a school-related behavior. Because of this ambiguity, which could affect the conclusions, outcomes in the school were not included.

5. Parenting behavior and a child or adolescent externalizing problem behavior were reported as outcome variables of an intervention and neither of these was collapsed with other variables (e.g., deviant peer associations and parenting behavior combined and reported as one construct). The parenting and youth behavior constructs could be constituted by a single parenting (e.g., praise) or youth (e.g., noncompliance) behavior or by a multi-item measure of parenting or youth (e.g., summary score on the Eyberg Child Behavior Inventory) behavior.

6. At a minimum, pathways between treatment (intervention group vs. comparison group) and the mediator (parenting) and between the mediator and the outcome (youth behavior) were examined to assess for mediation “effects” (see next section for tests of mediation). In addition, other variables (e.g., effortful control by child, parent sense of competence) were not examined in the mediational model so that the links between treatment → parenting → youth outcome could be directly examined.

7. Demonstration that changes in the mediator (parenting) occurred with treatment prior to change in the outcome (youth behavior) (Kraemer et al., 2008). As Kazdin (2007) has pointed out, this has been “the Achilles' heel of treatment studies” (p. 5).

When multiple studies examining mediation were reported from the same dataset, we only included one study. We selected the study for inclusion based on two criteria: (1) the study

[3]A number of studies examined parenting as a mediator of substance use and/or engagement in risky sexual behavior (e.g., Brody et al., 2006; Dishion, Nelson, & Kavanagh,2003). These outcomes were not included as they are not symptoms of ODD, CD, or ADHD in DSM-IV or DSM-5. However, if a study (e.g., Henggeler et al., 2009) included a measure with items such as “pushes others into having sex,” this outcome was included as this is a symptom of CD.

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with the longest follow-up period used for testing mediation; and (2) the study most directly examining child or adolescent externalizing problems.

Tests of Mediation

We examined the literature on ways to test for mediation (e.g., Baron & Kenny, 1986; Hayes, 2009, 2013; Holmbeck, 1997; Kazdin, 2007; Kraemer et al., 2002, 2008; MacKinnon et al., 2002, 2007; Preacher & Hayes, 2008) and identified four overarching approaches that have been used to examine parenting as a mediator in the treatment of child externalizing problems (see MacKinnon et al., 2002).

1. Baron and Kenny's (1986) causal steps approach: The independent variable (i.e., intervention) is related to the dependent (i.e., youth outcome) variable; the independent variable is related to the mediator (parenting); the mediator is related to the dependent variable; and the relationship between the independent variable and the dependent variable decreases when the mediator is taken into account.
2. Joint Significance approach: The independent variable (i.e., the intervention) is related to the mediator (i.e., parenting) and, in turn, the mediator is related to the dependent variable (i.e., youth outcome) (Hayes, 2009, 2013; MacKinnon et al., 2000; Shrout & Bolger, 2002).
3. In a variant of the Joint Significance approach when examining mediators in randomized clinical trials, Kraemer and colleagues (Kraemer et al., 2008; Kraemer et al., 2002) have proposed the MacArthur approach. With this approach, the independent variable (i.e., the intervention) is related to the mediator (parenting) and either the mediator *or* the intervention by mediator (at post-treatment) interaction is related to the outcome.
4. MacKinnon, Lockwood, Hoffman, West, and Sheets (2002) have advocated for not only the Joint Significance approach but testing Indirect Effects ($\alpha\beta$, with α representing the path from treatment to mediator and β representing the path from mediator to outcome) with reporting of confidence intervals to determine the significance of the indirect effect. We classified mediation tests as one of the following: (a) Baron and Kenny; (b) Joint Significance approach; (c) MacArthur; and (d) Indirect Effects.

Statistical approaches used to analyze data leading to tests of mediation included linear regression analyses, path analysis/structural equation modeling (SEM), and growth curve modeling (GCM). With GCM, it is important to point out that the assessment of the mediator and the child outcome can occur simultaneously (a violation of criterion 7); however, Cheong, MacKinnon, and Khoo (2003) have made a strong argument that “because multiple measurements are used to estimate true long-term change, a causal statement” can be made about the mediator and outcome *if* there is “strong theory” to support such a conclusion (p. 259). We would argue that, although there is some evidence for child effects on parenting, there is strong theory (e.g., social interactional model, coercion theory) and research evidence to indicate parenting influences children's behavior.

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Primary and Secondary Studies

Primary studies were ones that met *all* of the seven criteria delineated above and conducted one or more of the four tests of mediation delineated earlier. Secondary studies were those that met criteria for all requirements except one—specifically either criterion 5 or 7—and conducted one or more of the tests of mediation. We included secondary studies in this review in order to enlarge the sample of studies and to examine if the less rigorous secondary studies provided more evidence for mediation than the more rigorous primary studies.[4]

Results

Four parenting behaviors were identified: Positive parenting (e.g., praise, encouragement, effective communication); negative parenting (e.g., verbal criticisms, harshness); discipline (e.g., appropriate/inappropriate, consistent/inconsistent or lax); and monitoring/supervision (e.g., awareness of activity and location of youth). Furthermore, some studies reported a composite measure of parenting that combined across multiple types of parenting (e.g., positive parenting and discipline).

Primary Studies

Three intervention and 13 prevention studies met all criteria for inclusion. One study (Pantin et al., 2009) was considered but not included because there was not an intervention effect on externalizing problems. Of note, no studies with children with ADHD or with ADHD symptoms as an outcome were identified as meeting all criteria. Hinshaw et al. (2000) did meet all criteria but only had school outcome measures and, therefore, was not considered further.

Intervention Studies—The top part of Appendix A (available in online supplementary materials) presents a description of characteristics of the three intervention studies meeting criteria as primary studies. In order to facilitate examination of parenting behaviors serving as mediators, a summary for each study is presented in the top part of Table 1. Within this table, the number of mediational analyses conducted and the number of those demonstrating mediation for positive parenting, negative parenting, discipline, monitoring/supervision, and a composite measure of parenting is presented for each study. Also summarized in Table 1 is the parenting program implemented, the method of testing mediation, and comments about what constituted intervention (i.e., parenting only or parenting plus one or more other interventions).

As can be seen, the number of analyses examining mediation varied substantially across the three studies (from 6 to 24). Although reaching conclusions based on three studies certainly has risks, the findings suggest some support only for discipline serving as a mediator (45% of analyses conducted supported mediation). Negative parenting received minimal support

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[4]Literature searches were conducted by the second and third authors, studies meeting criteria for inclusion were determined by the first and second authors, classification of studies by the type of test of mediation was done by the first and second authors with input from the fourth author; and classification of studies into type of parenting behavior examined, prevention versus intervention, and primary versus secondary was done by the first and second authors with input from the third author. Discrepancies were resolved by discussion and reaching a consensus. The first author takes responsibility for any inclusion and classification errors.

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(17%), positive parenting and monitoring/supervision received no support, and a composite measure of parenting was not examined. Three parenting programs have been examined, two types of mediation tests have been utilized, and one of the three studies examined only a parenting intervention.

Prevention Studies—The bottom part of Appendix A presents a description of characteristics of the 13 studies meeting the seven criteria for inclusion. A summary of the mediational tests for each parenting behavior is presented for each study in the bottom part of Table 1. With the exception of the Gonzales et al. (2012) study, the number of mediational analyses performed in a study ranged from one to four. Gonzales et al. conducted a total of 90 mediational analyses [3 reporters (mother, father, child) of child outcome for each of 5 mediators for mother *and* for father (30 mediation tests) in each of 3 samples]. As this study accounted for 82% of the 110 mediational analyses performed across the 13 studies, it was an outlier that skewed the aggregated data, overshadowing the findings from the remaining 12 studies. Therefore, we dropped the Gonzales et al. study from the aggregated totals we report; however, we do consider the findings throughout the remainder of the paper in the context of this study which found minimum support for mediation [3 of 90 analyses conducted (3%)].

Strong support for mediation emerged for monitoring/supervision (100%), positive parenting (83%), a composite measure of parenting (83%), and discipline (67%); moderate support emerged for negative parenting (33%). It is important to note that the percentages reported are based on fewer than five mediational analyses for *each* of the five parenting behaviors ($M = 4$); therefore, the percentages can be misleading. Another way to examine these data is to consider the number of analyses providing support for mediation. These ranged from a low of 1 (monitoring/supervision) to a high of 5 (positive parenting & composite measure of parenting) with an average of 3.0 per parenting behavior. Finally, if the Gonzales et al. (2012) study was included, the number of mediational analyses would increase substantially and the percentage of analyses finding support for mediation would decrease substantially.

Excluding Gonzales et al. (2012), 12 different parenting programs have been examined; however, six of these (50%) are adaptations of existing programs (e.g., Parent Management Training-Oregon, Helping the Noncompliant Child). All four types of mediational tests have been utilized with the Baron and Kenny and Indirect Effects tests employed most often. Only three studies (25%) examined a parenting intervention alone.

Summary Across Intervention and Prevention Studies—The findings indicate substantially more studies have examined mediation with prevention than intervention samples and, based on percentages, suggest more support for prevention than intervention for four parenting behaviors: Monitoring/supervision (100% vs 0%); positive parenting (83% vs. 0%); discipline (67% vs. 45%); and negative parenting (40% vs. 17%). A composite measure of parenting was not examined in intervention studies, making a comparison impossible. However, it is worth noting that prevention studies found support for a composite measure of parenting in most tests of mediation (83%). Summing across the

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five parenting behaviors and across intervention and prevention, 69 mediational analyses were conducted and 26 of these tests supported mediation (38%).

The Baron and Kenny, Joint Significance, MacArthur, and Indirect Effects approaches were used in 4, 3, 1, and 7 studies, respectively. The number of tests finding support for mediation, the number of mediational tests conducted, and the percentage of tests finding support for mediation were as follows: Baron and Kenny (4 of 4, 100%); Joint Significance (8 of 11, 73%); MacArthur (1 of 4, 25%); and Indirect Effects (13 of 50, 26%). The percentage of tests that found support for mediation varied widely across approaches and did not display an obvious pattern. It is important to note that two of the studies (Henggler et al., 2009; Jouriles et al., 2009) which used the Indirect Effects approach conducted 42 of the 69 mediational analyses.

Fifteen parenting programs were examined in the 15 studies. Although each was examined only once, adaptations of PMT-O were examined in four additional studies. Helping the Noncompliant Child (HNC) and Incredible Years (IY) had adaptations evaluated in four and two studies, respectively. Four studies examined only a parenting program and 11 examined a parenting program plus one or more additional treatment components.

Secondary Studies

In order to enlarge the number of studies examined, we relaxed the criterion for inclusion and examined studies that did not meet one of two criteria: (5) parenting behavior was not combined with other variables; or (7) demonstration that change in the mediator occurred prior to change in the outcome. One and eight studies failed to meet criteria 5 and 7, respectively. As with primary studies, no studies were identified in which children with ADHD were examined or ADHD symptoms were measured as an outcome. Therefore, children with ADHD or ADHD symptoms are not considered further.

Five intervention studies and four prevention studies met the criteria for inclusion (all but either criteria 5 or 7; see Appendix B for a description of characteristics of the studies and Table 2 for a summary of the mediational tests for each parenting behavior). Six studies were considered but not included. Two studies met criteria for inclusion as a secondary study but were not included because they did not examine a specific parenting behavior [parental engagement in therapy (Webster-Stratton, Reid, & Beauchaine, 2013) and parental effectiveness (Webster-Stratton & Herman, 2008)]. One study (Bagner & Eyberg, 2007) did not examine the path between the mediator and outcome. One study (Posthummus, Raajmakers, Maassen, & Van England, 2012) was excluded because it did not meet criterion 4 (random assignment) and "traditional mediational analyses" (p. 493) were not conducted. Two studies (Beauchaine, Webster-Stratton, & Reid, 2005; Huey, Henggeler, Brondino, & Pickrel, 2000) were excluded because they did not have a comparison group (criterion 4).

As delineated in Table 2, the findings for intervention studies suggest strong support for a composite measure of parenting (100%), discipline (100%), and positive parenting (75%); however, the composite measure was based on only one test of mediation. No support emerged for negative parenting (0%). Monitoring/supervision was not examined. For prevention studies, strong support emerged for a composite measure of parenting (100%),

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discipline (100%), and negative parenting (100%); however, the latter two behaviors were based on one test of mediation each. Moderate support emerged for positive parenting (50%). Support did not emerge for the single test conducted to examine mediation for monitoring/supervision.

Summary Across Intervention and Prevention Studies—In general, similar attention to and support for mediation has occurred in prevention and intervention studies. Across intervention and prevention studies, there was strong support for a composite measure of parenting (100%) and discipline (100%), moderate to strong support for positive parenting (67%) and negative parenting (50%), and absence of support for monitoring/supervision (0%). Summing across the five parenting behaviors and across intervention and prevention studies, a total of 17 mediational analyses have been conducted and 13 of these tests supported mediation (76%).

In agreement with Kazdin's (2007) assessment of treatment studies in general, the failure to assess the mediator before the outcome measure was the criterion not met in eight of the nine secondary studies. Four parenting programs have been evaluated and two have been evaluated three and four times each, respectively: Incredible Years and PMT-O (adapted version evaluated three times). The Baron and Kenny and Indirect Effects approaches were used to determine mediation in six and three studies, respectively. Six studies implemented a parenting program alone and three studies implemented a parenting program plus additional intervention components.

Overall Summary

When examined across primary and secondary studies and across intervention and prevention studies, a composite measure of parenting [9 of 10 tests supporting mediation (90%)] and discipline [15 of 27 (55%)] received the most support and monitoring/supervision [1 of 10 (10%)] received the least support. Positive parenting [9 of 20 (45%)] and negative parenting [5 of 19 (26%)] each received some support.

To compare intervention and prevention studies, we summed across parenting behaviors and across primary and secondary studies. A comparison of the percentage of analyses supporting mediation in intervention [18 of 57 (32%)] vs. prevention [21 of 29 (72%)] suggests more support for the latter type of study. To compare primary and secondary studies, we summed across parenting behaviors and across intervention and prevention studies. A comparison of the percentage of analyses supporting mediation in primary [26 of 69 (38%)] vs. secondary [13 of 17 (76%)] studies suggests more support for the latter type of study. To compare younger and older children, we divided the studies into ones with a sample of youth with a mean age below (33%) and above (67%) 10 years. We summed across parenting behaviors, across intervention and prevention studies, and across primary and secondary studies. A comparison of the percentage of analyses supporting mediation suggests more support in younger (61%) than older (29%) children.

A total of 86 mediational analyses have been conducted and support for mediation was found in 39 of these tests (45%). Again, note that the Gonzales et al. (2012) study was not included in these summary calculations.

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Multiple Linkage Studies

Although not isolating parenting as a mediator between intervention and child outcome, Sandler et al. (2011) have highlighted the importance of multiple linkage investigations (i.e., a chain of intervening variables between intervention and child outcome). This type of study is beginning to appear in the literature (e.g., Chronis-Tuscano et al., 2010; Forgatch & DeGarmo, 2002; McClain, Wolchick, Winslow, Tein, Sander, & Millsap, 2010; Shelleby et al., 2012). Although not directly addressing the questions posed in this study, we believe acknowledging this type of study is important: Parenting may be one of several variables that unfold in a sequenced order following treatment to lead to change in child externalizing problems. We will briefly present one study that illustrates this approach.

In an examination of multisystemic therapy (MST), Dekovic et al. (2012) found the following linkage: MST intervention → parenting sense of competence → parenting (discipline) → adolescent externalizing problems. This study suggests that how parents perceive their competence as a parent changes first, leading to changes in actual parenting practices, and then change in adolescent externalizing problems. Interestingly, when we inquired if there was a direct link between intervention and change in parenting, the senior author voluntarily initiated re-analysis of the data leaving out the parent's sense of competence and found that MST intervention led to changes in parenting (discipline) which, in turn, led to changes in adolescent externalizing problems, suggesting that sense of competence may not be a necessary linking variable in the mediational process. The initial analysis and the re-analysis point to how parenting can be examined in multiple linkage models and then how those models can be refined to examine the individual role of parenting as a mediator.

Discussion

We believe that it is important to begin our discussion of the findings by delineating what we were *not* attempting to accomplish in this review. First, we are not calling into question that behavioral parent training (BPT) is an extremely efficacious treatment for child and adolescent externalizing problems. At least 14 reviews have supported this conclusion (see Introduction). However, as we will discuss below, the role of parenting behaviors in BPT has been largely unexplored at the time. This is particularly noteworthy as BPT has a 50 year history (Forehand et al., 2013) but the earliest study in our review of parenting as a mediator was reported in 2000. Second, we are not being critical of the existing research on parenting as a mediator in BPT research but, instead, we are attempting to clarify the state of the field and point to future research. Of relevance, it is important to note that many of the studies we reviewed were not explicitly designed to test mediation but rather were designed to test treatment outcome with mediation being only one or a secondary component. Thus, attention has not focused on mediation as an important topic in and of itself (for examples of exceptions see Compas et al. 2010; Henggeler, Letournea, Chapman, Bourduin, & McCart, 2009).

With these considerations as a backdrop for our discussion, the first two, and most important, conclusions are (a) the dearth of tests of parenting as a mediator and (b) the lack of support in the majority (55%) of these tests. These findings echo the quote from Kazdin

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(2007): “After decades of psychotherapy research, we cannot provide an evidence-based explanation for how or why even our most well studied interventions produce change” (p. 23). This was particularly pronounced in the area of ADHD as no primary or secondary intervention and prevention studies were identified. Second, for at least some parenting behaviors (e.g., positive parenting), more support (based on percentage of tests demonstrating mediation) emerged for children who were at-risk (prevention studies) than clinic-referred (intervention studies). Third, more support for parenting as a mediator emerged when children were younger (under 10) than older (10 and above). One explanation for both of these findings (i.e., more pronounced effects for at-risk & younger children) is that parenting behaviors and child externalizing problems may be more malleable among younger children and those who have not reached clinic referral status (i.e., problem behaviors are less entrenched). Fourth, again at least for some parenting behaviors (e.g., discipline), more support emerged when the rigor of the criteria for mediation was relaxed. The last three points suggested that more support for mediation may exist when children's problems are less severe, children are younger, and, not surprisingly, when studies are conducted with less rigor. These conclusions indicate that we need to be cautious about reaching conclusions (a) about parenting interventions for clinic-referred youth based on findings with those who are at-risk, (b) about older children based on studies with younger children, and (c) when rigorous criteria have not been utilized in studies.

The identification of only three intervention studies that met all inclusion criteria was particularly surprising. Although the five secondary intervention studies lend some support for parenting as a mediator in samples that are clinic-referred and/or meet criteria for clinical diagnosis, clearly more research is needed. Two of the three programs meeting all criteria for classification as primary intervention studies deserve special note: PMT-O and MST. PMT-O received support in both primary and secondary intervention studies, as well as in primary and secondary prevention studies using a version of this program adapted for special samples (e.g., divorced families, stepfamilies). Similar to Eyberg et al.'s (2008) conclusion that PMT-O is the only intervention for child disruptive behaviors that is well established, our findings suggest that this program has the most support for parenting as a mediator that accounts for change in child externalizing problems. PMT-O was the first systematically investigated parenting program, has had a team of clinical researchers focused on examining the program and its derivatives for four decades, and has been based on a clearly delineated theoretical model (see Forgatch & Patterson, 2010; Patterson, 1982; Patterson & Fisher, 2002). All of these factors likely contribute to our identification of PMT-O as the program with the most support for parenting as a mediator. Across the studies using a version of PMT-O, discipline, positive parenting, and a composite parenting measure have all received support as mediators.

MST was also identified as a primary intervention study. If the re-analysis of the Dekovic et al. (2012) (see Multiple Linkage section of Results) study was included, this investigation also would be classified as a primary intervention study. Together, the Henggeler et al. (2009) and Dekovic et al. studies provide support for discipline as a mediator in MST. The developers of this program require substantial commitment and training of agency personnel implementing the program, therapists with low caseloads (4-6 clients), and intensive intervention with each family (60 hours or more direct contact; see Henggeler & Schaeffer,

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2010), all of which likely contribute to the program's success and the identification of a parenting mediator.

The examination of and support for mediation differed across the five parenting behaviors examined. Discipline, negative parenting, and positive parenting were examined most often. A composite measure of parenting and discipline received the most support. These findings are not surprising. A construct consisting of multiple parenting behaviors taught in BPT (e.g., use of positive reinforcement for appropriate behavior and discipline for inappropriate behavior) intuitively would be more effective than individual parenting behaviors: More components of effective parenting should add up to greater increases in child behavior change and additional change may occur through synergistic effects. Regarding discipline, responding in a consistent and firm manner to a child's or adolescent's externalizing problems is a critical aspect of parenting, especially for youth at-risk for or identified as displaying high levels of these problem behaviors (see McMahon & Forehand, 2003). All BPT programs include a component on discipline and our findings suggest support for this behavior serving as a mediator of change in externalizing problems of youth.

A particular concern is evident for one parenting behavior: Monitoring/supervision. This has long been recognized as an important parenting skill to treat and prevent externalizing problems of adolescents (e.g., Dishion & McMahon, 1998). However, monitoring/ supervision has only been examined as an individual parenting behavior in three studies and, when examined, has received support as a mediator in only one study. One explanation for the lack of attention to monitoring/supervision is that this construct is primarily relevant for adolescents; only 33% of the studies we reviewed began with youth with a mean age of 10 or older, and only two of these enrolled youth with a mean age above 12 (Eddy & Chamberlain, 2000; Henggeler et al., 2009; see Appendices A & B online). Clearly, more attention needs to focus on this parenting behavior.

The relative lack of support for positive parenting behavior as a mediator in primary and secondary intervention studies (45% of tests supported mediation) should be considered in the context of the support found for the composite measure of parenting. Positive parenting was included in all of the composite measures examined, suggesting that, in combination with other parenting skills (e.g., discipline), it may be important (also see McKee, Jones, Forehand, & Cuellar, 2013). Furthermore, congruent with how many BPT programs are constructed (i.e., developing positive parenting skills first; e.g., McMahon & Forehand, 2003; Zisser & Eyberg, 2010), recent evidence suggests that this parenting skill may be the foundational parenting behavior on which other parenting skills are built. Reed and colleagues (2013) examined how parenting skills unfolded over a two-year follow-up in a sample of divorced parents treated with PMT-O (Forgatch, Patterson, DeGarmo, & Beldavs, 2009). They found that positive parenting changed first and was associated with subsequent change in monitoring which, in turn, was associated with subsequent change in effective discipline. Although they did not directly examine parenting as a mediator between treatment and child externalizing problems, this study suggests that positive parenting may serve as the underpinning for the other parenting skills learned in BPT programs (see Eisenstadt, Eyberg, McNeil, Newcomb, & Funderbunk, 1993; Roberts, Hatzenbuehler, & Bean, 1981, for exceptions to this conclusion).

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It is important to note the limitations of our review of parenting as the mediator accounting for change in child externalizing problems in behavioral parent training studies. First, some studies collapsed across interventions (parent only and parent plus child components) to test mediation. Second, 73% of the primary and 33% of the secondary studies included more than a parenting intervention component. Although perhaps effective for maximizing change of externalizing problem behaviors, these dual interventions are not ideal for examining parenting as a mediator. Theoretically, changes in child or adolescent behavior through the youth intervention could lead to change in parenting (see Silverman, Kurtines, Jaccard, & Pina, 2009) which could, in turn, lead to change in child or adolescent externalizing problems. This is a particularly salient limitation in the secondary studies where parenting and youth outcome were examined at the same point in time. Several programs included additional components [e.g., academic tutoring (CPPRG, 2002)] that could pose similar issues in identifying parenting as a mediator. Third, the method for testing mediation and the particular parenting program examined varied widely across studies (see Tables 1 & 2). Combined with the small number of mediation tests conducted and the small number of studies examining any one parenting program except PMT-O, drawing conclusions is difficult. In addition, the criterion for entry into the study, age of child, individual versus group treatment, the role the parent played in intervention, the reporter of parenting (e.g., parent, child, observation) and child externalizing problems (e.g., parent, child, observation, arrest record), the rigor of the assessment of parenting and child behavior (e.g., questionnaire measures varying from single items to well-validated scales), the type of comparison group included in the study (e.g., treatment as usual, written information), and the timing of assessments varied substantially across studies (see Appendices A & B online and Tables 1 & 2). If consistent results had emerged across studies, this would be a positive outcome; however, with findings varying across the small sample of studies, it is difficult to separate out the support for mediation from these variations across studies.

Fourth, our conclusions are restricted to settings, primarily the home, in which parents are directly involved with their children. Specifically, child or adolescent behavior change in school with implementation of BPT was not examined. Future research could include school behavior as an outcome, quantify the extent to which programming within BPT occurs for school behavior (e.g., monitoring homework completion) versus generalization without programming occurs, and examine parenting as a mediator of school behavior change. In fact, some research (e.g., Forgatch et al., 2005, 2009), which specifically teaches parenting methods to monitor and support schoolwork, has found parenting is a mediator of change in teacher ratings of children's school behavior. Fifth, because the state of the literature does not allow for a quantitative analysis (i.e., meta-analysis), our review relies on the counting of analyses supporting and not supporting parenting as a mediator. Such an approach limits conclusions that can be reached. Finally, it is important to note again that the Gonzales et al. (2012) study was excluded because it was an outlier based on the large number of mediational tests conducted. Inclusion of this study would have substantially reduced the support for mediation as only three of 90 analyses supported mediation and would have overshadowed the findings from other studies.

Our review also was limited to studies where parenting was the only mediator between intervention and child externalizing problems. As we have noted, Sandler et al. (2011) have

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pointed out the importance of conducting multiple linkage investigations. Parenting interventions can lead to changes in individuals (e.g., parent depressive symptoms) and in family processes (e.g., co-parenting relationship) (see McMahon & Forehand, 2003), suggesting that parenting may be only one component of change in families with the implementation of BPT. Therefore, multiple linkage studies are important in that they demonstrate that parenting skills may not work in isolation as mediators of change between intervention/prevention and child outcome. It is important for future research to examine where and how parenting fits into these multiple linkage models.

Furthermore, it is important to consider that parenting may be a mediator of child or adolescent externalizing problems for only certain parents or children, a concept that Tein, Sandler, MacKinnon, and Wolchick (2004) have labeled as mediation in the context of moderation (i.e., moderated mediation). For example, Zhou et al. (2008) found parenting served as a mediator only for high risk young adolescents. Both multiple linkage studies and mediation in the context of moderation indicate the complexity of the task ahead of us as we explore the role of parenting in BPT. However, we would argue that the first order of business is to lay the foundation by examining individual parenting behaviors as mediators, followed by the testing of multiple parenting behaviors simultaneously and then the construction and testing of parenting composites as well as sequences of parenting behaviors as mediators. When feasible (e.g., adequate measurement and sample size), how other mediators interface with parenting and operate in the context of moderation also should be examined.

Identification of parenting behaviors that mediate change in youth externalizing problems is important for not only increasing our understanding of why BPT programs are effective but for dissemination. As Comer and Barlow (2014) recently noted, a major impediment to evidence-based therapies being adopted in clinical settings is the complexity of the programs. By first identifying which parenting behaviors lead to child or adolescent behavior change and then eliminating other non-essential parenting behaviors, BPT programs can become less complex and more efficient, increasing their utilization in community mental health agencies. Nevertheless, our findings suggest that it is constructs consisting of multiple parenting behaviors (i.e., composites) that receive the most support as mediators. Therefore, parenting behaviors will need to be considered in combination with each other as conclusions about essential parenting behaviors for BPT are reached.

We used seven criteria for inclusion in the current review. Nevertheless, there are additional criteria which could be considered for evaluating studies. First, measurement of parenting and youth outcome could be evaluated based on the extent to which measures form latent constructs, resulting in more precise, and fewer, tests of mediation within a study. Second, the use of intent-to-treat analyses can be considered as a measure of rigor. Third, the use of multiple reporters (e.g., parent, child) and methods (e.g., questionnaires, behavioral observations) rather than a single reporter or method could serve as a criterion for evaluating studies.

Finally, in order to increase comparability across BPT studies in the future, we recommend using the following procedures to test mediation. Although our findings did not suggest

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clear differential patterns by method of mediation, we concur with MacKinnon and colleagues (2002) that mediation tests based on the product of the two coefficients—the Indirect Effects approach—are generally preferable, in that they examine most directly what is of key interest (the magnitude of the mediated effect). In addition, we find compelling Hayes's (2009, Hayes's (2013) recommendation to use bootstrapping methods to determine the confidence interval of indirect effects. Finally, we would also urge researchers to consider adopting the effect size measure of mediation recommended by the extensive discussion of Preacher and Kelley (2011): the proportion of the maximum possible indirect effect, taking into account scaling of the variables involved. We also recommend that authors in this area routinely report all numeric information necessary for quantitative combining of study effects, including the scale ranges and descriptive statistics of the mediator and outcome variables, the indirect effect magnitude (unstandardized and standardized) and confidence intervals, and where feasible the proportion of maximum possible indirect effect. This will help future reviews accurately ascertain the magnitude of parenting constructs as intervening variables between BPT prevention and intervention programs and externalizing problems of youth.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Highlights

- Examines parenting as a mediator in behavioral parent training (BPT).
- Eight intervention and 17 prevention studies are examined.
- Support found in 45% of mediation tests examined.
- A composite measure of parenting and discipline received the most support as mediators.

BPT is an effective intervention; however, more attention to the role of parenting as a mediator is needed.

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Table 1

Summary of Parenting Behavior Serving as a Mediator in Primary Studies[1]

	Positive Parenting		Negative Parenting		Discipline		Monitoring/ Supervision		Composite		Parenting Program	Mediation Test	Comments
	#M Tests[2]	#Support M[3]	#M Tests	#Support M	#M Tests	#Support M	#M Tests	#Support M	#M Tests	#Support M			
Intervention Studies													
Henggeler et al, (2009)[4]	8	0			8	3	8	0			MST	Indirect effects	Included components other than parenting (e.g. community activities)
Jouriles et al. (2009)			12	2	6	3					PS (adapted HNC)	Indirect effects	Parent intervention & instrumental/emotional support component for parents
Amlund Hagen et al (2011)[5]					6	3					PMT-O	Joint significance	Parent only intervention
Total	8	0 (0%)	12	2 (17%)	20	9 (45%)	8	0 (0%)					
Prevention													
Vitaro et al. (2001)							1	1			Adapted PMT-O	Baron & Kenny	Parent, child & teacher interventions
Lochman & Wells (2002)[6]					1	1					CP (adapted HNC & PMT-O)	Joint Significance	Parent & child interventions
CPPRG (2002)			1	0					1	1	Fast Track (adapted from HNC)	Indirect Effects	Parent & multiple child interventions
Tein et al. (2006)									2	1	FBP	Indirect Effects	Parent & child intervention
Bernat et al. (2007)[7]					1	1					ER	Baron & Kenny	Parent & multiple child interventions
Brody et al. (2008)									1	1	SAAF	Baron & Kenny	Parent & child interventions.
Dishion et al (2008)	1	1									FCU	Indirect Effects (CI not reported)	Parent only intervention
Zhou et al. (2008)	1	1			1	0					NB	Indirect Effects	Combined parent intervention & parent plus child intervention for analyses. (Mediation found only in high risk group).
Brotman et al. (2009)	2	2	1	1					1	1	Adapted IY	Joint Significance	Parent & child intervention
Forgatch et al. (2009)									1	1	Adapted PMT-O for divorced families	Baron & Kenny	Parent only intervention
Compas et al. (2010)	2	1	2	0							FGCB (Adapted from HNC)	MacArthur	Parent & child interventions
Gonzales et al. (2012)[8]	(36)	(0)	(18)	(1)	(18)	(0)	(18)	(2)			(B/P)	(Indirect Effects)	(Parent & child interventions)
Sovech & Elizur (2012)			1	1							H (adapted from IY, PMT-O, Triple P)	Indirect Effects	Parent only intervention
Total	6	5 (83%)	5	2 (40%)	3	2 (67%)	1	1 (100%)	6	5 (83%)			

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	Positive Parenting		Negative Parenting		Discipline		Monitoring/ Supervision		Composite		Parenting Program	Mediation Test	Comments
	#M Tests[2]	#Support M[3]	#M Tests	#Support M	#M Tests	#Support M	#M Tests	#Support M	#M Tests	#Support M			
Grand Total[9]	14	5 (36%)	17	4 (24%)	23	11 (48%)	9	1 (11%)	6	5 (83%)			

MST = Multisystemic Therapy; PMT-O = Parent Management Training-Oregon; CP = Coping Power; HNC = Helping the Noncompliant Child; FBP = Family Bereavement Program; ER = Early Risers; SAAF = Strong African American Families; FCU = Family Check-Up; NB = New Beginnings; IY = Incredible Years; PS = Project Support; FGCB = Family Group Cognitive Behavioral; B/P = Bridges/Puentes; H = Hitkashrut (English translation: Attachment).

[1] Studies are listed chronologically within intervention and prevention to provide a timeline when mediational studies were conducted.

[2] Number of mediation tests performed.

[3] Number of tests supporting mediation.

[4] Criticism and Harsh were both included under Negative Parenting.

[5] Reported testing indirect effects. Based on analyses reported, Discipline mediated three indicators of child externalizing problems using a Joint Significance test. Indirect effects test (without reporting CIs) indicated two of these were at a borderline level of significance (p = .06 & .08). We counted all three as support for mediation.

[6] Parenting was one of five variables examined simultaneously in a mediational model. Therefore, we could only examine the paths from the intervention to the mediator (parenting) and the mediator to child outcome using the Joint Significance test. Both paths were significant.

[7] Used Baron and Kenny approach to test mediation; therefore only examined outcome (ODD symptoms) for which there was a significant treatment effect. CD symptoms not examined in mediational analyses.

[8] Not included in total.

[9] Intervention plus prevention studies.

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Table 2

Summary of Parenting Behavior Serving as a Mediator in Secondary Studies[1]

	Positive Parenting		Negative Parenting		Discipline		Monitoring Supervision		Composite			Criterion Not Met[2]	Mediation Test	Comments
	#M Tests[3]	#Support M[4]	#M Tests	#Support M	#M Tests	#Support M	#M Tests	#Support M	#M Tests	#Support M	Parenting Program			
Intervention Studies														
Eddy & Chamberlain (2000)									1	1	MTFC (Expanded PMT-O)	5	Baron & Kenny	Parent only intervention
Gardner et al. (2006)	1	1									IY	7	Baron & Kenny	Parent only intervention
Fossum et al. (2009)	1	0			2	2					IY	7	Baron & Kenny	Combined parent & parent plus child interventions for analyses
Gardner et al. (2010)	1	1	1	0							IY	7	Baron & Kenny	Parent only intervention
Bjorknes et al. (2012)	1	1			1	1					PMT-O	7	Baron & Kenny	Parent only intervention
Total	4	3 (75%)	1	0 (0%)	3	3 (100%)			1	1 (100%)				
Prevention Studies														
Forgatch et al. (2005)									1	1	MAPS (Adapted from PMT-O)	7	Indirect Effects (CI not reported)	Parent only intervention
Chamberlain et al. (2008)[5]									1	1	KEEP (Adapted from MTFC & PTM-O)	7	Baron & Kenny	Parent only intervention
The Multisite Violence Prevention Program (2012)					1	1	1	0			GREAT Families	7	Indirect Effects	Parent and school interventions
Hanisch et al. (2014)	2	1	1	1					1	1	PEP	7	Indirect Effects	Parent & teacher interventions
Total	2	1 (50%)	1	1 (100%)	1	1 (100%)	1	0 (0%)	3	3 (100%)				
Grand Total[6]	6	4 (67%)	2	1 (50%)	4	4 (100%)	1	0 (0%)	4	4 (100%)				

MTFC= Multidimensional Treatment Foster Care; PMTO = Parent Management Training-Oregon; IY = Incredible Years; MAPS = Marriage and Parenting in Stepfamilies; KEEP = Keeping Foster Parents Trained and Supported; PEP = Prevention program for preschool children with Externalizing Problem Behavior.

[1] Studies are listed chronologically within intervention and prevention to provide a timeline of when mediational studies were conducted.

[2] Criterion not met: 5 = Both parenting behavior and child externalizing problem behavior were reported as outcome variables of an intervention and neither of these were collapsed with other variables; 7 = Demonstration that change in the mediator occurred with treatment prior to change in the outcome.

[3] Number of mediation tests performed.

[4] Number of tests supporting mediation.

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[5]Reported using Baron and Kenny. However, also used Indirect Effects test (with reporting CI). Results were same with both methods of testing mediation.

[6]Intervention plus prevention studies.