Development and Psychopathology **28** (2016), 583–593
© Cambridge University Press 2015
doi:10.1017/S0954579415000607

Toward a developmentally informed approach to parenting interventions: Seeking hidden effects

REBECCA L. BROCK AND GRAZYNA KOCHANSKA
University of Iowa

Abstract

Drawing from developmental psychology and psychopathology, we propose a new, developmentally informed approach to parenting interventions that focuses on elucidating changes in the unfolding *developmental process* between the parent and child. We present data from 186 low-income mothers of toddlers, randomly assigned to a child-oriented play group or a play-as-usual group. We examined the maladaptive cascade from child difficulty to mother adversarial, negative parenting to child maladjustment, well documented in the literature. The measures incorporated multiple observations and reports. As expected, the sequence from child difficulty (pretest) to mother adversarial, negative parenting (Posttest 1, after 3-month intervention) to child maladjustment (Posttest 2, 6 months later) was present in the play-as-usual group, but absent, or defused, in the child-oriented play group. The findings are consistent with a view of intervention presumably enhancing the mother–child relationship, which in turn served to moderate future mother–child dynamics, altering its otherwise anticipated negative trajectory. A closer examination of the cascade revealed that, at Posttest 1, mothers in the play-as-usual group engaged in more adversarial, negative parenting (controlling for pretest) than did mothers in the child-oriented play group when their children were of high difficulty. The intervention appears to exert its primary influence on the cascade by weakening the link between child difficulty and maternal adversarial, negative parenting.

Contemporary intervention science has shifted from a focus on whether an intervention is effective to an emphasis on explaining *how* interventions lead to improvements (Kazdin & Nock, 2003; Kraemer, Wilson, Fairburn, & Agras, 2002). By isolating the elements of an intervention that drive its effectiveness, treatments can be modified and enhanced by focusing on these active therapeutic components. Examinations of treatment mechanisms typically involve isolating a specific factor that is conceptualized as changing during treatment, and examining it as a mediator of the link between treatment and outcome.

Although informative, this approach is typically limited to processes unfolding during the active treatment phase, overlooking larger developmental pathways or cascades linking earlier vulnerabilities to later outcomes. This limitation is especially salient with regard to preventive interventions aimed at counteracting risk factors and reinforcing protective factors that mitigate pathways and processes leading to future dysfunction (Coie et al., 1993).

Consistent with the tenets of prevention science, an intervention that effectively reduces a specific factor associated with dysfunction, but fails to alter the *pathogenic process underlying* dysfunctional development, is of limited utility (Coie et al., 1993). Further, given the complexity of developmental processes over time, interventions that alter a key developmental process may not exert a measurable effect on a particular outcome initially, but may have far-reaching future implications. Innovative approaches, informed by developmental psychology and psychopathology, are necessary to understand how preventive interventions may *alter developmental cascades* leading to maladjustment.

Consequently, researchers have been urged to incorporate a developmental psychopathology perspective into prevention science (Cicchetti & Hinshaw, 2002; Cox, Mills-Koonce, Propper, & Gariépy, 2010; Masten & Cicchetti, 2010). By elucidating maladaptive developmental processes, factors that may redirect such processes toward more desirable trajectories can be identified. Parenting interventions represent a noteworthy example of strong designs that rely on random assignments and experimental manipulation to interrupt maladaptive developmental sequences. Aspects of the parent–child relationship are particularly meaningful targets. Even a subtle improvement in the quality of the relationship may trigger changes in developmental cascades, leading to better child outcomes (Masten & Cicchetti, 2010). Nonetheless, a recent review of 46 preventive parenting interventions suggests that, despite modest evidence for long-term effects of these interventions, it is unclear *how* they lead to better child outcomes (Sandler, Schoenfelder, Wolchik, & MacKinnon, 2011).

This research was funded by NIMH Grants R01 MH6309 and K02 MH01446 (to G.K.), NICH Grant R01 HD069171 (to G.K.), and the Stuit Professorship (to G.K.). We thank the many students and staff members for their help with data collection, coding, and file creation, including Jarilyn Akabogu, Lea Boldt, Sanghag Kim, and Jeung Eun Yoon; Mark Greenberg for expertise regarding research on intervention; and the participants in the Play Study for their commitment to this research.

Address correspondence and reprint requests to: Rebecca L. Brock, Department of Psychology, University of Iowa, Iowa City, IA 52242-1407; E-mail: rebecca-brock@uiowa.edu.

https://doi.org/10.1017/S0954579415000607 Published online by Cambridge University Press

One way to elucidate how parenting interventions may promote adaptive development is to focus on pathogenic cascades that eventually lead to child maladjustment. Such an approach can be effectively informed by the growing science of relationships and developmental psychology and psychopathology. That science has produced robust evidence about many processes that over time produce maladaptive developmental cascades and increase risk of children's psychopathology (Masten & Cicchetti, 2010, and the Special Issue of *Developmental Psychopathology,* 2010). Examples include insecure, suboptimal attachment that may lead to deficient emotion regulation, which in turn may lead to a broad range of behavior problems; or the child's coercive and aversive noncompliance that may lead to the parent's adversarial control, which in turn may lead to children's biased social information processing and, in turn, to aggression. In such developmentally informed approach, parenting interventions may be conceptualized as tools that can redirect or disrupt pathogenic cascades that would otherwise unfold. An intervention aims to initiate change in the form of a cascade from the intervention to the mediator to the outcome (Cicchetti & Hinshaw, 2002; Masten & Cicchetti, 2010).

Note that such an approach may also inspire a new strategy to evaluate the effectiveness of parenting interventions. That strategy would entail going beyond main effects (changes in mean levels of certain constructs found for all participants), and beyond simple moderated effects (changes found for certain subsets of participants), although both approaches are, of course, valuable. Instead, or in addition, the focus would be on *changes in developmental chains of events or processes* that ultimately lead to differential outcomes. A noteworthy example comes from the well-known Family Check-Up (FCU) intervention program for high-risk families with young children (e.g., Sitnick et al., 2015). FCU is a brief, annually delivered intervention focused on improving positive parenting skills, with parenting consultants discussing multiple strategies with parents and using videotaped feedback. A recent longitudinal report of the findings from ages 2 to 5 illustrates how FCU altered a developmental process (or cascade) by increasing parent–child positive engagement, which in turn led to a reduction in parent–child coercion, which then led to the child's decrease in oppositional and aggressive behavior problems.

The current study illustrates such process-oriented approach, drawing from a play-based intervention, implemented in a randomized experimental design. We targeted a pathogenic cascade supported by considerable research: it has been widely shown that difficult, angry, hard to manage, unresponsive children elicit more negative, adversarial parenting, and that such negative parenting leads to child maladjustment (Bates, Schermerhorn, & Petersen, 2012; Bell, 1968; Bradley & Corwyn, 2013; Dadds & Salmon, 2003; Dishion & Patterson, 2006; Lipscomb et al., 2011; Lorber & Egeland, 2011; Pardini, 2008; Patterson, DeBaryshe, & Ramsey, 1989; Putnam, Sanson, & Rothbart, 2002; Reid & Patterson, 1989; Shaw & Bell, 1993; Smith et al., 2014). This process is particularly likely to unfold in families that experience ecological adversity, such as poverty, stress, or chaos, and such high-risk families are often targeted for preventive interventions.

Recent conceptualizations and empirical studies have revealed that the early parent–child relationship may serve as a powerful moderator, or catalyst, that may either amplify or defuse such parent–child dynamics. Although *main* effects of the early parent–child relationship may not be found, it can indirectly influence future parent–child processes (Sroufe, 2005). In our longitudinal nonexperimental work, replicated across several community samples, the parent–infant relationship (insecure vs. secure attachment, as assessed in Strange Situation in infancy) has been found to serve as a significant moderator of the future sequence from the child's difficulty to negative parenting to child maladaptive future outcomes. In insecure relationships, the cascade was likely to unfold. By contrast, in relationships that had been secure, such a cascade was defused and absent (Kochanska, Barry, Stellern, & O'Bleness, 2009; Kochanska & Kim, 2012).

We apply that model to a randomized experimental design that targeted high-risk mother–toddler dyads. This article represents a preliminary test of an expectation that a play-based intervention, by presumably enhancing the mother–toddler relationship in subtle ways, may significantly alter the causal developmental sequence from child difficulty to maternal adversarial, negative parenting to child maladaptive outcomes, such that the cascade would be weakened or absent in dyads that had been assigned to the intervention condition, compared to those that had not (for whom the maladaptive cascade would be expected to unfold).

Method

Participants

Mothers responded to flyers displayed on community boards and in libraries, pediatric offices, and daycare centers in a Midwestern state. Locations frequented by low-income families (e.g., thrift stores and Head Start locations) were especially targeted. Mothers had to receive/be eligible for aid from a local, state, federal, or faith-based agency (or Earned Income Tax Credit), the child had to be free of major health problems, and the mother had to be able to speak English during sessions. Graduate students were not eligible. A total of 186 mothers and their toddlers (90 girls) were accepted. Mothers signed informed consent prior to the study. All procedures were approved by the institutional review board.

The demographic data are as follows: children's age, $M =$ 30.33 months, $SD = 5.40$; mothers' age, $M = 27.54$ years, $SD = 4.87$; annual family income, $M =$ \$20,385, $SD =$ \$13,010; and number of children, $M = 2.20$, $SD = 1.08$. In terms of education, 5.4% of mothers did not complete high school, 50% had a high school diploma or GED, 19.4% had an associate degree, and 15.3% had a bachelor's or a technical degree. In terms of marital status, 54.3% were married, 13.4% cohabitated, 30.6% were single or divorced, and 1.6%

https://doi.org/10.1017/S0954579415000607 Published online by Cambridge University Press

reported other arrangements. Regarding ethnicity and race, 10.8% were Hispanic, 87.1% not Hispanic, and 2.2% reported "other"; 1.6% were American Indian, 1.6% Asian, 14.5% African American, 72.6% White, 7% more than one race, and 2.7% did not report race. There were no significant differences between the two intervention groups in demographic characteristics. However, there was a trend in terms of race. In the child-oriented play group, there were 79% White and 21% non-White mothers, and in the play-as-usual group, 67% and 33%, respectively, χ^2 (1) = 3.20, $p < 0.10$.

Overview of design

For every mother–child dyad, the study's sequence (~10 months total) included pretest; random assignment to a child-oriented play group, $N = 94$, or a play-as-usual group, $N = 91$ (one mother dropped before assignment; training session; play sessions and daily play over 9–10 weeks; Posttest 1; and Posttest 2 (6 months after Posttest 1). The mothers received $700 for their participation (paid in installments, following the completion of consecutive stages of the study). The mothers and children also received small gifts after each session. Children received cards and gifts on their birthdays.

The play-based intervention was rooted in research on child-oriented play and positive interaction, presumed to enhance the quality of the mother–child relationship (Barkley, 1981; Eyberg & Bussing, 2010; McMahon & Forehand, 2003; Moss et al., 2011; Webster-Stratton & Reid, 2011). The dyads were randomized into two groups.[1] In the child-oriented play group, mothers allowed children to lead the play; responded positively to them; followed their lead; focused positive attention on, offered positive regard to, and reinforced the children; and refrained from any commands, criticism, and any form of negative or punitive influence or control. In the play-as-usual group (active control group), they were asked to play in the usual manner. The dyads were then observed in eight home and laboratory play sessions over approximately 10 weeks, and mothers and children engaged in one-on-one play once a day at home, consistent with the received instructions.

Procedures

Pretest, Posttest 1, Posttest 2. Dyads completed 3-hr sessions in a naturalistically furnished laboratory, with largely parallel scripts that encompassed multiple contexts (e.g., play, snack, and mother busy). The laboratory contained a low shelf with attractive toys, which were off-limits to the child. Mothers were asked to issue the prohibition and prevent children from touching the toys. The entire sessions were videotaped for later behavioral coding. Multiple teams of coders were all blind to group assignments and details of the design. They established reliability using typically approximately 20% of cases. Reliability was followed by multiple realignments to prevent observers' drift.

Intervention. During the training session, in the child-oriented play group, a staff member taught the mother play techniques drawn from Child's Game using a handout, video produced in our laboratory, featuring racially diverse mothers engaging in each technique. The staff member also modeled each technique. The mother then practiced the techniques and received feedback (McMahon & Forehand, 2003). The techniques focused positive attention on the child and/or allowed the child to direct the play as often as possible. Techniques shifting control to the mother, particularly all forms of power-assertive discipline, criticism, or negative influence, were discouraged. In the play-as-usual group, no play techniques were mentioned, and the mother was asked to play with the child as usual.

Following the training session, all dyads took part in eight half-hour laboratory and home play sessions, one every 7–10 days, playing according to the training received. All sessions were videotaped; 95% percent of mothers completed all eight sessions, and 98% completed at least seven. At the outset of a play session, a staff member reviewed briefly the play techniques and elicited questions from the mother. She then observed the entire play session and took notes, and then delivered feedback to the mother. In the child-oriented play group, she reviewed the mother's use of each play technique. The feedback was supportive, positive, and encouraging in tone, but also substantive and pointing out possible room for improvement. In the play-as-usual group, the "rhythm" of the play sessions was parallel, and the feedback consisted of general neutral or pleasant comments about the child or dyad (e.g., "She seemed to enjoy the animals" or "You guys had fun with those trucks"). The groups did not differ in the number of play sessions (child-oriented play, $M = 7.73$, $SD = 1.22$; play as usual, $M = 7.34$, $SD = 1.89$, *ns*). Mothers were also asked to play daily at home for 20 min in the same manner (consistent with the group assignment). They kept simple daily diaries provided to them, in which they recorded the daily play (later collected by the staff). That period of the study lasted on average 62.76 days.

Fidelity and integrity. Extensive and rigorous fidelity procedures were deployed (for more information, see Kochanska, Kim, Boldt, & Nordling, 2013). All coders of observational data were blind to the mothers' group assignments and to all parts of the video records that may have revealed the assignment. For every mother–child dyad, four out of eight play sessions were selected randomly, and for each, blind coders completed a checklist of four key points of the initial instruction and feedback given to the mother by the staff member (thus, the perfect compliance with the protocol

1. This study was not designated as a randomized controlled trial, either at the time of original funding or at the time of competitive renewal. Nevertheless, it does represent an experimentally based intervention with random assignment, blind coding, and ongoing rigorous checks of fidelity, integrity, and quality of data at all levels.

https://doi.org/10.1017/S0954579415000607 Published online by Cambridge University Press

meant implementing 16 items (4 coded sessions × 4 items) in the child-oriented play group and 0 items in the play-as-usual group. In the former group, the staff members implemented 14–16 items with 94% of mothers, and 12–13 items with the remaining 6%; in the latter group, compliance was 100%. Regular staff meetings were held to review performance, for consistency with each other and the protocol.

Child difficulty: Pretest. The measures of child difficulty integrated scores from three observational paradigms: child's unresponsiveness to the mother's cues, the child's lack of cooperation with the mother's prohibition, and negative affect expressed in interactions with the mother.

Child unresponsiveness to the mother in naturalistic interactions. The child's responses to maternal cues were coded during naturalistic interactions (62-min total) in seven scripted contexts: introduction to the laboratory room (5 min), mother busy with questionnaires (10 min), a snack (12 min), play (10 min), toy cleanup (10 min), free time (10 min), and gift (5 min). For each context, the coders rated child behavior from 1 (*highly unresponsive*) to 7 (*highly responsive*). The code integrated positive attention and orientation toward the mother, sensitivity to her cues, promptness of response, enjoyment of interaction, and cooperation with maternal bids. Intercoder reliability (intraclass correlations [ICCs]) ranged from 0.90 to 0.92. The scores cohered across the contexts (Cronbach $\alpha = 0.83$) and were averaged into a score of the child's overall responsiveness toward the mother, and reversed such that higher scores indicate more *unresponsiveness*.

Child lack of cooperation with the mother's prohibition. Dyads were observed in the laboratory for 45 min, in naturalistic interactions that took place in the room with easy access to the off-limit toys that allowed us to observe the prohibition control encounters that involved those toys. Child behavior was coded for each 30-s segment within the earlier identified (by another team) episodes when the child oriented toward the prohibited toys. In the current report, we focus on *committed compliance*: self-regulated, eager adherence to maternal prohibition, with child complying without the need for maternal sustained control, and indicating a wholehearted endorsement of the prohibition (pointing to the toys, shaking head, and saying "no-no toys" or "don't touch"; Kochanska & Aksan, 1995). The κ value was 0.88. All instances of each behavior were tallied, divided by the number of the 30-s segments, standardized, and reversed, such that higher scores reflected the *lack of cooperation with maternal prohibition*.

Child negative affect toward the mother. The child's affect was coded in the same seven contexts as their responsiveness (62 min), for every 30-s segment (by another team). The κs ranged from 0.72 to 0.84. We tallied all instances of the child's intense or pervasive (more than 15 s) negative affect (weighed by 3), discrete negative emotions (weighed by 2), and neutral/negative mood, such as signs of fatigue, disengagement, or boredom, negatively "tinged" but not reaching a full expression of a discrete negative emotion (weighted by 1). Those figures were added and divided by the number of coded segments into a score of *child negative affect toward the mother* (see, e.g., Kochanska, Kim, & Koenig Nordling, 2012).

Data aggregation. The scores of child unresponsiveness, lack of cooperation, and negative affect were standardized and averaged to into a score of *child difficulty* (internally consistent, Cronbach $\alpha = 0.77$).

Maternal adversarial, negative parenting: Posttest 1. The measure of maternal adversarial, negative parenting integrated the scores from three observational paradigms and a self-report: the mother's observed power-assertive control, observed unresponsiveness to the child, observed negative affect expressed toward the child, and mother-reported unresponsiveness to the child.

Mother observed power-assertive control. The dyad was observed for 45 min in the room with the off-limits toys (e.g., snack, free time, and mother busy). All control encounters involving the prohibition were coded. Coders identified all episodes of control (starting when child attention turned to the toys, until the child reoriented away from them; ICC reliability for this episodic coding were 0.85 to 0.99). Then, another team coded, for every 30-s segment within those episodes, the mother's *overall control style*. Codes reflecting power assertion included assertive control (matter of fact, firm, decisive control style), and forceful, negative control (negative, angry, threatening, or harsh control style). The κ was 0.86. In addition, for each 30-s segment, mother *physical power-assertive strategies* were coded: assertive physical control (firmly holding child or taking a toy away), and forceful, negative physical control (handling child roughly or spanking). The κs ranged from 0.78 to 0.86. The instances of each code were tallied, divided by the number of coded segments, and standardized. The two scores for the overall control style were averaged, and the two scores for physical power-assertive strategies were averaged, and finally those two scores were averaged into the mother's *observed power-assertive control* score.

Mother observed unresponsiveness to the child. Maternal responsiveness was coded in the same seven contexts as the child's. For each context, the coders rated mother responsiveness from 1 (*highly unresponsive*) to 7 (highly *responsive*). The code integrated sensitivity–insensitivity to the child's cues and signals, cooperation–interference, or support for the child's autonomy, and acceptance–rejection, or affection and enjoyment of the interaction (Ainsworth, Bell, & Stayton, 1971). The reliability among the coders (ICCs) ranged from 0.81 to 0.93. The scores cohered across the contexts (Cronbach $\alpha = 0.89$ at pretest and $\alpha = 0.87$ at Posttest 1), and

https://doi.org/10.1017/S0954579415000607 Published online by Cambridge University Press

were averaged into the mother's overall responsiveness score toward the child. Scores of maternal responsiveness were reversed, such that higher scores reflect greater *unresponsiveness*.

Mother negative affect toward the child. Mothers' affect was coded in the same seven contexts as their responsiveness (62 min), for every 30-s segment. Kappas ranged from 0.62 to 0.85. We then tallied and weighed the instances of the mothers' intense or pervasive negative affect (weighed by 3), discrete negative emotions (weighed by 2), and neutral/negative mood (weighted by 1). Those figures were added and divided by the number of coded segments into a score of *mother negative affect toward the child.*

Mother-reported unresponsiveness. Mothers completed the Parenting Inventory (Kochanska, 1995), a 26-item measure assessing responsiveness to the child's needs (e.g., "I simply must comfort my child at the first sign of distress," "I often let my child take the lead when we are playing or interacting," and "I tend to have a hard time understanding what my child wants"). Responses ranged from 1 (*not at all true*) to 6 (*highly true*). After reversing 11 items, the Cronbach αs were adequate ($\alpha = 0.68$ at pretest, $\alpha = 0.67$ at Posttest 1). The final score was reversed to denote *unresponsiveness.*

Data aggregation. Scores of observed power assertion, unresponsiveness, negative affect toward the child, and self-reported unresponsiveness were standardized and averaged into a score of *maternal adversarial, negative parenting*. The Cronbach αs were adequate at 0.66 and 0.70 at pretest and Posttest 1, respectively.

Child outcome: Mother-rated maladjustment: Posttest 2. Mothers completed the Early Childhood Inventory (Gadow & Sprafkin, 2000), an established, DSM-compatible clinical instrument for children aged 3–5 that produces scores for multiple disorders. We used the symptom severity scoring approach, where most items are rated as 0 = *never*, 1 = *sometimes*, 2 = *often*, or 3 = *very often*, according to the guidelines. We created a total *maladjustment* score by summing severity scores for oppositional defiant disorder, conduct disorder, separation anxiety, specific phobia, obsessive–compulsive disorder, general anxiety disorder, depression, social phobia, posttraumatic stress disorder, and attention-deficit/hyperactivity disorder. The Cronbach α (0.71) indicates adequate internal consistency.

The covariate: Child inhibitory control. To control for individual initial differences in child temperament, we used the scores of inhibitory control rated by mothers at pretest ($M = 3.99$, $SD = 1.01$; possible range = 1–7) in the Early Childhood Behavior Questionnaire (Putnam, Gartstein, & Rothbart, 2006, $\alpha = 0.89$). Inhibitory control has been broadly implicated in parent–child interactions and behavior problems.

Results

Overview

First, we conducted preliminary analyses to examine the pattern of associations among the variables for the entire sample, and separately for the child-oriented play and play-as-usual groups. Second, we conducted a traditional comparison of the groups with regard to differences in mean levels of the variables. Third, we implemented our new approach that tested *differences in the developmental cascades from child difficulty (pretest) to maternal adversarial, negative parenting (Posttest 1) to child maladjustment (Posttest 2)* for the two groups.

Preliminary analyses

Descriptive data and intercorrelations are in Table 1. Overall, there was evidence of the anticipated and well-established cascade such that child difficulty (pretest) was significantly associated with maternal adversarial, negative parenting (Posttest 1), which was associated with child maladjustment (Posttest 2). Correlations for the two groups (child-oriented play or play as usual), however, suggested differential patterns. Whereas the correlation between child difficulty (pretest) and maternal negative parenting (Posttest 1) was large in magnitude for the play-as-usual group, it was only moderate in the child-oriented play group. Further, the association between maternal negative parenting and child maladjustment was significant and moderate in magnitude for the play-as-usual group, but not significant for the child-oriented play group. Thus, the patterns of associations were consistent with the possibility that group assignment may serve as a moderator of the cascade from child difficulty to maternal adversarial, negative parenting to child maladjustment.

Traditional group comparison

We compared the groups to examine *mean-level differences*. The groups did not differ with regard to child difficulty at pretest, $t\ (183) = -1.03$, $p = .30$, which was expected given the random assignment of participants to the groups. However, despite randomization, the play-as-usual group had higher levels of maternal adversarial, negative parenting relative to child-oriented play group *at pretest,* $t\ (183) = -2.86$, $p = .005$. Consequently, maternal adversarial parenting at pretest was controlled in all analyses.

Maternal adversarial negative parenting at Posttest 1 was regressed on intervention group (1 = *child-oriented play*; 0 = *play as usual*, covarying maternal adversarial parenting at pretest). Child gender and pretest child inhibitory control were also entered as covariates. There were no differences between the groups with regard to mean levels of maternal adversarial, negative parenting at Posttest 1, attributable to the intervention, $\beta = 0.01$, $t\ (163) = 0.15$, $p = .88$. Finally, the groups did not differ with regard to child maladjustment

https://doi.org/10.1017/S0954579415000607 Published online by Cambridge University Press

Table 1. *Descriptive data and intercorrelations*

	Child Difficulty, Pretest	Adversarial, Negative Parenting, Posttest 1	Child Maladjustment, Posttest 2
Full Sample			
Child difficulty, pretest	—		
Adversarial, negative parenting, Posttest 1	0.43****	—	
Child maladjustment, Posttest 2	0.17*	0.23***	—
M	0.00	0.00	32.25
SD	0.83	0.66	16.44
N	185	168	162
Child-Oriented Play			
Child difficulty, pretest	—		
Adversarial, negative parenting, Posttest 1	0.25*	—	
Child maladjustment, Posttest 2	0.10	0.12	—
M	−0.06	−0.10	32.48
SD	0.84	0.52	16.84
N	94	88	84
Play-as-Usual Group			
Child difficulty, pretest	—		
Adversarial, negative parenting, Posttest 1	0.58****	—	
Child maladjustment, Posttest 2	0.26*	0.35***	—
M	0.06	0.11	32.00
SD	0.82	0.78	16.11
N	91	80	78

*$p < .05$. ***$p < .005$. ****$p < .001$.

at Posttest 2, $\beta = 0.08$, $t\,(158) = 1.09$, $p = .28$, controlling for gender and pretest child inhibitory control (no Early Childhood Inventory pretest scores were available, because many children were too young for this instrument).

Conditional process analysis

A *conditional process model* was tested (Hayes, 2013) using a bootstrap approach to estimate conditional indirect effects of child difficulty (predictor; pretest) on child maladjustment (outcome; Posttest 2) via maternal adversarial, negative parenting (mediator; Posttest 1) for the two groups (moderator; child-oriented play or play as usual). The score analogous to the mediator (maternal adversarial, negative parenting), obtained at pretest, was again included as a covariate in the model. This was a particularly strong control strategy given the robust correlation between the pretest and Posttest 1 scores, $r\,(166) = .80$, $p < .001$. Child gender and pretest child inhibitory control were also included as covariates.

Bootstrapping provides a sampling distribution of indirect effects to provide confidence intervals of estimates; if zero does not fall within the confidence interval, the indirect effect is present. A bootstrapping sampling method is preferential because (a) no assumptions need to be made about the shape of the sampling distribution, (b) power is maximized while minimizing Type I error rate, and (c) no particular formula for the standard error is required (MacKinnon, Lockwood, & Williams, 2004; Preacher, Rucker, & Hayes, 2007; Shrout & Bolger, 2002). Data were analyzed with PROCESS, a computation tool for SPSS (Hayes, 2013). We performed a nonparametric resampling method (bias-corrected bootstrap) with 5,000 resamples drawn to derive the 95% confidence intervals for the conditional indirect effects.

The results of the conditional process models are presented in Figure 1. As discussed by Preacher et al. (2007), the conditional indirect effects (i.e., the value of the indirect effect conditioned on one or more values of a moderator) are the parameters of interest in the estimation of a moderated mediation model, and the bootstrap CI for the conditional indirect effects is the preferred inferential method.

The results were consistent with our expectations. For the child-oriented play group, the conditional indirect effect of child difficulty on child maladjustment via maternal adversarial, negative parenting was absent, as indicated by a bias-corrected bootstrap 95% confidence interval (CI) = (–1.30, 0.31). In contrast, for the play-as-usual group, the conditional indirect effect was present, 95% CI = (0.18, 3.56).

The conditional process analysis was conducted with the 162 mother–child dyads who provided data at all three assessments (pretest, Posttest 1, Posttest 2). Of note, when testing the exact same model using linear interpolation to address missing data, the pattern of results replicated. The conditional

https://doi.org/10.1017/S0954579415000607 Published online by Cambridge University Press

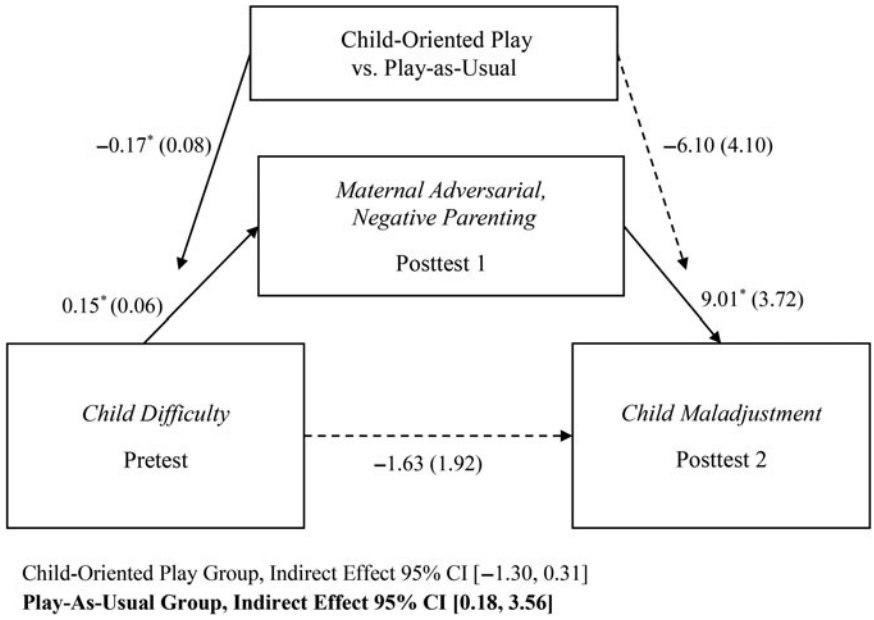


Figure 1. Conceptual model including unstandardized parameter estimates of the primary tested paths. *$p < .05$. The indirect effect from child difficulty to maternal adversarial, negative parenting to child maladjustment was present for the play-as-usual group (in bold). Gender, pretest child inhibitory control, and pretest maternal adversarial, negative parenting were included as covariates in the model (not depicted).

indirect effect was absent for the child-oriented play group, 95% CI = (–0.46, 1.29), but present for the play-as-usual group, 95% CI = (0.47, 3.72).

Probing significant interactions

The results of the conditional process analysis revealed a significant interaction between group assignment (child-oriented play vs. play-as-usual) and child difficulty, assessed at pretest, predicting maternal adversarial, negative parenting at Posttest 1 ($b = –0.17$, $SE = 0.08$, $p = .02$; see Figure 1). Accordingly, we probed this significant interaction to better understand how the intervention interrupts the larger cascade. As depicted in Figure 2, the effect of child difficulty on maternal negative parenting was present for the play-as-usual group, 95% CI = (0.08, 0.33), but not for child-oriented play group, 95% CI = (–0.08, 0.13). The intervention appears to exert the greatest impact on the first link in the cascade by weakening the association between child difficulty and maternal adversarial, negative parenting at Posttest 1, controlling for gender, pretest child inhibitory control, and maternal adversarial, negative parenting at pretest.

A regions of significance analysis in PROCESS (Hayes, 2013) allowed us to further probe the nature of this interaction, and identify under which conditions the two groups differed in their levels of maternal adversarial parenting at Posttest 1. The Johnson–Neyman technique revealed an upper bound of 1.22. Thus, the two regression lines (i.e., group assignment, child-oriented play vs. play-as-usual, predicting maternal adversarial, negative parenting at Posttest 1) were significantly different for all possible scores exceeding 1.22 for child difficulty. That score was equal to 1.47 *SD* above the mean level of child difficulty ($M = 0.00$, $SD = 0.83$). Thus, when interacting with children high in difficulty, the mothers in the play-as-usual group engaged in *significantly more* negative, adversarial parenting than did mothers in the child-oriented play group.

To summarize, our findings have three conceptual components. First, the overall cascade from child difficulty to maternal adversarial, negative parenting to child maladjustment (a significant indirect effect) occurred only in the play-as-usual group, as expected in those stressed families, but was defused, or absent, in the child-oriented play group, presumably as a result of the intervention. Second, the "defusion" of the cascade in the child-oriented play group was primarily due to the weakening of the first link (between child difficulty and maternal negative parenting). Third, consistent with traditional conceptualizations of treatment efficacy, focused on group differences at posttreatment, the results indicate that the intervention was effective for reducing maternal adversarial, negative parenting for a subset of mother–child dyads in which children were particularly difficult. Mothers of highly difficult children who were in the play-as-usual group engaged in significantly more adversarial, negative parenting than mothers in the child-oriented play group.

Discussion

This article implements a novel approach to parenting interventions, consistent with a recent growing emphasis on the need for an integration of developmental psychopathology with intervention science (Cicchetti & Hinshaw, 2002; Cox et al., 2010; Masten & Cicchetti, 2010). That approach was rooted in the conceptualization of the mother–child relation-

https://doi.org/10.1017/S0954579415000607 Published online by Cambridge University Press

https://doi.org/10.1017/S0954579415000607 Published online by Cambridge University Press

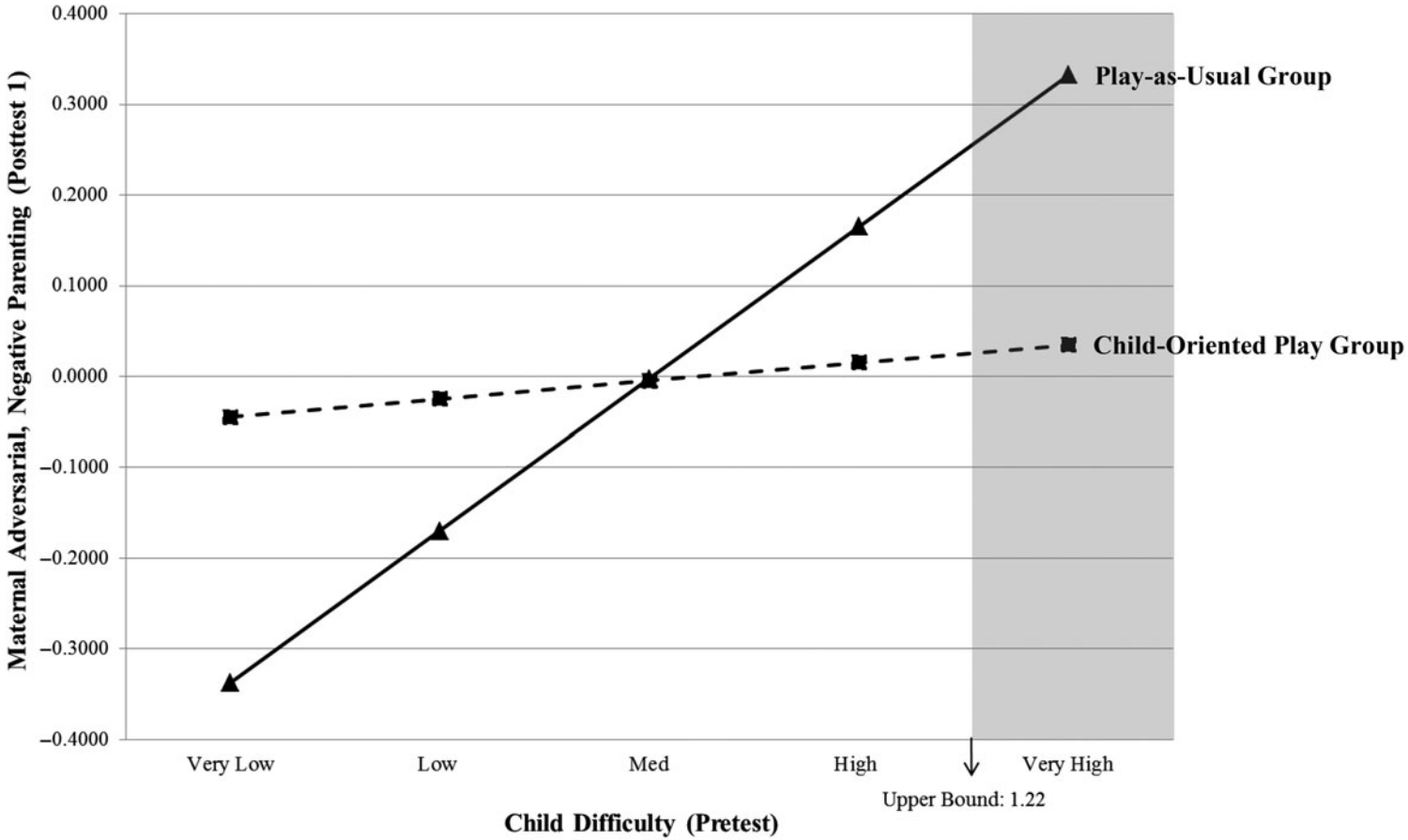


Figure 2. Child difficulty at pretest interacts with group assignment to predict maternal adversarial, negative parenting at Posttest 1. The simple slope for the effect of child difficulty on maternal negative parenting was significant for the play-as-usual group, 95% confidence interval = (0.08, 0.33), but not the child-oriented play group, 95% confidence interval = (–0.08, 0.13). The shaded area represents the level of child difficulty scores at which there were significant group differences in maternal adversarial, negative parenting. Child gender, child inhibitory control at pretest, and maternal adversarial, negative parenting at pretest were covaried (not depicted); estimates are based on setting covariates to their sample means.

ship as a critical catalyst that can alter the extensively studied developmental cascade from child difficulty to maternal adversarial, negative parenting to future maladaptive child outcomes. That conceptual model has been supported in several longitudinal community samples (Kochanska et al., 2009; Kochanska & Kim, 2012). In those earlier studies, early attachment organization significantly moderated such cascade. We now present an initial translational application of that approach to a multimethod, multitrait randomized parenting intervention study.

We examined whether, for mother–toddler dyads, a 2- to 3-month experience of regular engagement in child-oriented play would defuse such maladaptive sequences. By contrast, we expected the maladaptive sequence to unfold over time in the control group (play-as-usual). Consequently, the focus was not on the potential mean-level differences in maternal behavior or child outcomes in the two groups (although those were tested), as traditionally examined, but on "hidden" effects of intervention as presumably enhancing, perhaps in subtle ways that are hard to measure, the quality of the mother–child relationship. We expected that the indirect effect from child difficulty to child maladjustment via maternal negative parenting would be present for the dyads in the play-as-usual (control) condition, but absent, or defused, for the dyads in the child-oriented play condition. We implemented PROCESS, a flexible moderated mediation tool (Hayes, 2013). The pattern of results was fully consistent with expectations.

Note that we are not claiming that the present approach ought to invalidate and replace traditional group analyses of intervention efficacy. We have previously successfully implemented the traditional approach (e.g., Brock, Kochanska, O'Hara, & Grekin, 2015; Kochanska et al., 2013). Rather, we propose that the method illustrated in the present preliminary report has promise as a developmentally informed approach for identifying potential effects of a parenting intervention on dyadic processes linked to key outcomes. It not only elucidates dynamics of developmental processes that may be effectively altered but also allows for the examination of group differences in key variables within the cascade.

The recent parenting intervention literature includes many well-conducted studies that have produced patterns of results quite similar to ours: failing to find overall main effects between groups but revealing compelling differences in developmental processes that take place under different conditions (e.g., Blair, 2002; Cassidy, Woodhouse, Sherman, Stupica, & Lejuez, 2011; Klein Velderman, Bakermans-Kranenburg, Juffer, & van IJzendoorn, 2006). Sitnick et al. (2015) found that treatment group assignment was only linked to child outcomes via certain mechanisms (i.e., positive engagement leading to coercion), but the group main effect was absent in univariate analyses. Thus, intervention effects may be underestimated, especially in the case of preventative parenting interventions; researchers, informed by developmental psychopathology, would be well advised to seek more subtle, or hidden, changes in developmental cascades.

A closer examination of the moderated mediation model points to the intervention exerting its primary influence at the first step of the cascade: from child difficulty to maternal negative parenting. In view of the overall findings that supported the presence of the indirect effect from child difficulty to child maladjustment in the play-as-usual group but not in the child-oriented play group, we believed that a follow-up examination of this specific portion of the cascade was warranted. Thus, we examined the different relations between child difficulty and maternal negative parenting in the two groups, as depicted in Figure 2. The simple slope for the effect of child difficulty on maternal negative parenting was significant for the play-as-usual group, but not for the child-oriented play group, suggesting that the intervention exerts its primary influence on the first link in the cascade.

Further, and consistent with a more traditional approach to conceptualizing intervention effects, group differences favoring the child-oriented play group were detected at Posttest 1, for a subset of the mother–child dyads. This finding was supported by the regions of significance analysis. That analysis revealed that mothers in the play-as-usual group displayed significantly more adversarial, negative parenting at Posttest 1 (controlling for pretest) than did mothers who had been randomly assigned to the child-oriented play group, when dealing with children who posed above-average difficulty. This finding is consistent with meta-analyses reporting that children exhibiting more problematic behavior at baseline (Shelleby & Shaw, 2014) and more distressed families (Nowak & Heinrichs, 2008) may benefit most from parenting interventions. Attachment researchers have reported similar findings in interventions aimed at enhancing security, with the effects of the intervention found for the most difficult infants (Cassidy et al., 2011). Our results provide an extension of such findings to parental behavior. We suggest that parents of the most challenging and hard to manage children, those who might otherwise likely engage in highly coercive, negative parenting to deal with their difficult children, may benefit most from training in adaptive parenting practices and, more generally, from attempts to enhance their relationship with the child.

In the current study, we have presented a novel approach to examining intervention effects that accounts for group differences in maladaptive developmental cascades. The next step might be to elucidate specific mechanisms that alter developmental cascades (in this case, from child difficulty to maternal negative parenting to child maladjustment). For example, it may be productive to examine the specific ways in which a parenting intervention enhances the quality of the mother–child relationship (e.g., a more positive dyadic affective ambience, more positive mutual perceptions and expectations, improved mutual synchrony and positive reciprocity, and greater attachment security and a closer mother–child bond). Changes in the relationship may be difficult to detect and measure, particularly in prevention research with subclinical groups. This may require the development of more sensitive measures with the capacity to capture relatively subtle relational effects. We believe that such an approach may ulti-

https://doi.org/10.1017/S0954579415000607 Published online by Cambridge University Press

mately inform the science of relationships and developmental psychopathology.

The present study had several limitations that warrant caution when interpreting the findings. First and foremost, admittedly, the children in the two groups did not differ in terms of their overall maladjustment measure at the 6-month follow-up, even though we have demonstrated the hidden, subtle but significant, differences in the developmental process from child difficulty to maternal negative parenting to child maladjustment. Perhaps a period of 6 months was not sufficient for substantial and developmentally meaningful dynamics to unfold. Research in developmental psychopathology has amply demonstrated that qualities of early parent–child relationships often have complex implications for long-term, and not necessarily immediate, adaptation (Sroufe, 2005). This may be particularly true in case of parenting interventions, which may exert a subtle and hard to detect impact on the relationship, but which may nevertheless alter, or begin to alter, developmental dynamics between the parent and child. In addition, such follow-ups may reveal long-term mean-level gains in maternal and child outcomes. Furthermore, and consistent with the cascade models (Masten & Cicchetti, 2010), child effects may become evident in other domains, which we did not measure (e.g., strengths and competencies, mastery, and cognitive gains).

Second, and related, although the sample included only low-income mothers and thus may be considered at risk, the children were not screened for elevated behavior problems. Consequently, their levels of difficulty and maladjustment were in the relatively typical range. Perhaps the findings would have been amplified with more troubled toddlers, and differences in children's outcomes may have been detected.

Third, the scope of our play-based intervention was relatively narrow. Perhaps effects would have been bolstered by the use of video feedback of the mothers' and children's actual play, in addition to our verbal feedback and review of the play provided by staff members. Research demonstrates that video feedback interventions are effective for enhancing parenting skills and parental engagement during interactions with children (see review by Fukkink, 2008). In addition, our intervention focused only on certain aspects of the mother–child interaction. Addressing other risk factors often present in low-income populations (e.g., maternal depression, poor child care resources, single parenthood or unstable/conflictual parent–parent relationships, neighborhood danger, and chaos) in a comprehensive manner may have bolstered the effects of child-oriented play and led to significant main effects of group assignment. Such a comprehensive approach, however, may have obscured the specific mechanisms that account for the intervention's impact.

Fourth, it is important to acknowledge the role of fathers as caregivers. Our study included only mother–child dyads. Although the findings are informative, the picture of potential effects is incomplete, because it does not address dysfunctional father–child dynamics.

Despite those limitations, this study contributes to the continuing rapprochement between developmental psychopathology and prevention and intervention science. It highlights subtle, *hidden* changes in the process of parenting evolving between the mother and child over time, and elucidates potential points of entry for future relationship-oriented interventions, particularly for parents of difficult, challenging children, who may need help the most.

References

Ainsworth, M. D. S., Bell, S. M. V., & Stayton, D. J. (1971). Individual differences in strange-situation behavior in one-year-olds. In H. R. Schaffer (Ed.), *The origins of human social relations* (pp. 17–57). London: Academic Press.

Barkley, R. A. (1981). *Hyperactive children: A handbook for diagnosis and treatment*. New York: Guilford Press.

Bates, J. E., Schermerhorn, A. C., & Petersen, I. T. (2012). Temperament and parenting in developmental perspective. In M. Zentner & R. Shiner (Eds.), *Handbook of temperament* (pp. 425–441). New York: Guilford Press.

Bell, R. Q. (1968). A reinterpretation of the direction of effects in studies of socialization. *Psychological Review*, *75*, 81–95.

Blair, C. (2002). Early intervention for low birth weight, preterm infants: The role of negative emotionality in the specification of effects. *Development and Psychopathology*, *14*, 311–332. doi:10.1017/S0954579402002079

Bradley, R. H., & Corwyn, R. F. (2013). From parent to child to parent . . . : Paths in and out of problem behavior. *Journal of Abnormal Child Psychology*, *41*, 515–529.

Brock, R. L., Kochanska, G., O'Hara, M. W., & Grekin, R. (2015). Life satisfaction moderates the effectiveness of a play-based parenting intervention in low-income mothers and toddlers. *Journal of Abnormal Child Psychology.* Advance online publication. doi: 10.1007/s10802-015-0014-y

Cassidy, J., Woodhouse, S. S., Sherman, L. J., Stupica, B., & Lejuez, C. W. (2011). Enhancing infant attachment security: An examination of treatment efficacy and differential susceptibility. *Development and Psychopathology*, *23*, 131–148. doi:10.1017/S0954579410000696

Cicchetti, D., & Hinshaw, S. P. (2002). Prevention and intervention science: Contributions to developmental theory. *Development and Psychopathology*, *14*, 667–671.

Coie, J. D., Watt, N. F., West, S. G., Hawkins, J. D., Asarnow, J. R., Markman, H. J., et al. (1993). The science of prevention: A conceptual framework and some directions for a national research program. *American Psychologist*, *48*, 1013–1022.

Cox, M. J., Mills-Koonce, R., Propper, C., & Gariépy, J. (2010). Systems theory and cascades in developmental psychopathology. *Development and Psychopathology*, *22*, 497–506.

Dadds, M. R., & Salmon, K. (2003). Punishment insensitivity and parenting: Temperament and learning as interacting risks for antisocial behavior. *Clinical Child and Family Psychology Review*, *6*, 69–86.

Dishion, T. J., & Patterson, G. R. (2006). The development and ecology of antisocial behavior in children and adolescents. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology* (Vol. 3, 2nd ed., pp. 503–541). Hoboken, NJ: Wiley.

Eyberg, S. M., & Bussing, R. (2010). Parent–child interaction therapy for preschool children with conduct problems. In R. C. Murrihy, A. D. Kidman, & T. H. Ollendick (Eds.), *Clinical handbook of assessing and treating conduct problems in youth* (pp. 139–162). New York: Springer.

Fukkink, R. G. (2008). Video feedback in widescreen: A meta-analysis of family programs. *Clinical Psychology Review*, *28*, 904–916. doi:10.1016/j.cpr.2008.01.003

Gadow, K. D., & Sprafkin, J. (2000). *Early Childhood Inventory—4: Screening manual*. Stony Brook, NY: Checkmate Plus.

Hayes, A. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford Press.

Kazdin, A. E., & Nock, M. K. (2003). Delineating mechanisms of change in child and adolescent therapy: Methodological issues and research recommendations. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *44*, 1116–1129.

https://doi.org/10.1017/S0954579415000607 Published online by Cambridge University Press

Klein Velderman, M., Bakermans-Kranenburg, M. J., Juffer, F., & van IJzendoorn, M. H. (2006). Effects of attachment-based interventions on maternal sensitivity and infant attachment: Differential susceptibility of highly reactive infants. *Journal of Family Psychology*, *20*, 266–274. doi:10.1037/0893-3200.20.2.266

Kochanska, G. (1995). *Parenting Inventory.* Unpublished manuscript.

Kochanska, G., & Aksan, N. (1995). Mother–child mutually positive affect, the quality of child compliance to requests and prohibitions, and maternal control as correlates of early internalization. *Child Development*, *66*, 236–254.

Kochanska, G., Barry, R. A., Stellern, S. A., & O'Bleness, J. J. (2009). Early attachment organization moderates the parent–child mutually coercive pathway to children's antisocial conduct. *Child Development*, *80*, 1288–1300.

Kochanska, G., & Kim, S. (2012). Toward a new understanding of legacy of early attachments for future antisocial trajectories: Evidence from two longitudinal studies. *Development and Psychopathology*, *24*, 783–806.

Kochanska, G., Kim, S., Boldt, L. J., & Nordling, J. K. (2013). Promoting toddlers' positive social–emotional outcomes in low-income families: A play-based experimental study. *Journal of Clinical Child and Adolescent Psychology*, *42*, 700–712.

Kochanska, G., Kim, S., & Koenig Nordling, J. K. (2012). Challenging circumstances moderate the links between mothers' personality traits and their parenting in low-income families with young children. *Journal of Personality and Social Psychology*, *103*, 1040–1049.

Kraemer, H. C., Wilson, G. T., Fairburn, C. G., & Agras, W. S. (2002). Mediators and moderators of treatment effects in randomized clinical trials. *Archives of General Psychiatry*, *59*, 877–883.

Lipscomb, S. T., Leve, L. D., Harold, G. T., Neiderhiser, J. M., Shaw, D. S., Ge, X., et al. (2011). Trajectories of parenting and child negative emotionality during infancy and toddlerhood: A longitudinal analysis. *Child Development*, *82*, 1661–1675.

Lorber, M. F., & Egeland, B. (2011). Parenting and infant difficulty: Testing a mutual exacerbation hypothesis to predict early onset conduct problems. *Child Development*, *82*, 2006–2020.

Mackinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research*, *39*, 99–128.

Masten, A. S., & Cicchetti, D. (2010). Developmental cascades. *Development and Psychopathology*, *22*, 491–495.

McMahon, R. J., & Forehand, R. (2003). *Helping the noncompliant child: A clinician's guide to effective parent training*. New York: Guilford Press.

Moss, M., Dubois-Comtois, K., Cyr, C., Tarabulsy, G. M., St-Laurent, D., & Bernier, A. (2011). Efficacy of a home-visiting intervention aimed at improving maternal sensitivity, child attachment, and behavioral outcomes for maltreated children: A randomized control trial. *Development and Psychopathology*, *23*, 195–210.

Nowak, C., & Heinrichs, N. (2008). A comprehensive meta-analysis of Triple P-Positive Parenting Program using hierarchical linear modeling: Effectiveness and moderating variables. *Clinical Child and Family Psychology Review*, *11*, 114–414.

Pardini, D. A. (2008). Novel insights into longstanding theories of bidirectional parent-child influences: Introduction to the special section. *Journal of Abnormal Child Psychology*, *36*, 627–631.

Patterson, G., DeBaryshe, B., & Ramsey, E. (1989). A developmental perspective on antisocial behavior. *American Psychologist*, *44*, 329–335.

Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research*, *42*, 37–41.

Putnam, S. P., Gartstein, M. A., & Rothbart, M. K. (2006). Measurement of fine-grained aspects of toddler temperament: The Early Childhood Behavior Questionnaire. *Infant Behavior and Development*, *29*, 386–401.

Putnam, S. P., Sanson, A. V., & Rothbart, M. K. (2002). Child temperament and parenting. In M. H. Bornstein (Ed.), *Handbook of parenting: Vol. 1. Children and parenting* (2nd ed., pp. 255–277). Mahwah, NJ: Erlbaum.

Reid, J. B., & Patterson, G. R. (1989). The development of antisocial behaviour patterns in childhood and adolescence. *European Journal of Personality*, *3*, 107–119.

Sandler, I. N., Schoenfelder, E. N., Wolchik, S. A., & MacKinnon, D. P. (2011). Long-term impact of prevention programs to promote effective parenting: Lasting effects but uncertain processes. *Annual Review of Psychology*, *62*, 299–329.

Shaw, D. S., & Bell, R. Q. (1993). Developmental theories of parental contributors to antisocial behavior. *Journal of Abnormal Child Psychology*, *21*, 493–518.

Shelleby, E. C., & Shaw, D. S. (2014). Outcomes of parenting interventions for child conduct problems: A review of differential effectiveness. *Child Psychiatry and Human Development.* Advance online publication.

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods*, *7*, 422–445.

Sitnick, S. L., Shaw, D. S., Gill, A., Dishion, T., Winter, C., Waller, R., et al. (2015). Parenting and the Family Check-Up: Changes in observed parent-child interaction following early childhood intervention. *Journal of Clinical Child & Adolescent Psychology.* Advance online publication. doi:10.1080/15374416.2014.940623

Smith, J. D., Dishion, T. J., Shaw, D. S., Wilson, M. N., Winter, C. C., & Patterson, G. R. (2014). Coercive family process and early-onset conduct problems from age 2 to school entry. *Development and Psychopathology.* Advance online publication.

Sroufe, L. A. (2005). Attachment and development: A prospective, longitudinal study from birth to adulthood. *Attachment and Human Development*, *7*, 349–367. doi:10.1080/14616730500365928

Webster-Stratton, C., & Reid, M. J. (2011). The Incredible Years program for children from infancy to pre-adolescence: Prevention and treatment of behavior problems. In R. C. Murrihy, A. D. Kidman, & T. H. Ollendick (Eds.), *Clinical handbook of assessing and treating conduct problems in youth* (pp. 117–138). New York: Springer.

https://doi.org/10.1017/S0954579415000607 Published online by Cambridge University Press