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Mother–Child Relationship Quality and Effective Discipline as Mediators of the 6-Year Effects of the New Beginnings Program for Children From Divorced Families

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Abstract

This study examines whether program effects on mother–child relationship quality and effective discipline mediated the 6-year longitudinal effects of the New Beginnings Program (NBP) to improve mental health and competence outcomes in 218 adolescents from divorced families in a randomized experimental trial. The NBP is a theory-based and parenting-focused preventive intervention to help children adjust to divorce, and it has previously shown significant main and/or Program $\times$ Baseline Risk interaction effects to reduce adolescents' mental health and social adaptation problems and to promote competence. Mediation analyses were conducted using single- and two-group (high and low baseline risk) structural equation modeling. A multiple-methods and multiple-informants approach was used to assess the putative mediators and adolescents' outcomes. Results indicated that program-induced improvement in maternal effective discipline at posttest mediated the intervention effect on adolescents' GPA at the 6-year follow-up. Moreover, program-induced improvement in mother–child relationship quality mediated the intervention effect on adolescents' mental health problems for those with high baseline risk for maladjustment. The discussion focuses on the implications of the mediation findings for advancing the developmental theories that informed the design of the NBP and the implications for implementation of the NBP in community settings.

Keywords

parenting; mediators; prevention; divorce

This study tested mother–child relationship quality and discipline as mediators of the effects of a preventive intervention for children from divorced families (the New Beginnings Program, or NBP) to reduce adolescents’ mental health problems, substance use, and risky sexual behaviors and to improve their academic achievement and competence 6 years after program participation. Because outcome evaluation of the NBP found that children with higher baseline risk for adjustment problems benefited more from the intervention than those with lower baseline risk (Dawson-McClure, Sandler, Wolchik, & Millsap, 2004; Wolchik, Sandler, et al., 2002), the study also tested whether the mediators of intervention effects differed for high-risk versus low-risk families. Mediation analyses of preventive interventions can make contributions to advancing theory about developmental processes and to improving our understanding of how interventions bring about changes in children’s psychosocial outcomes (Sandler, Wolchik, Winslow, & Schenck, 2006). We first briefly review the theoretical model on which the NBP was designed and discuss how mediation analyses of a randomized intervention trial provide a unique opportunity to test the theoretical propositions on which the program was based. We then discuss how the current study furthers our understanding of the pathways through which the NBP achieved its longitudinal effects on adolescents’ psychosocial adjustment.

Roles of Mother–Child Relationship and Discipline in Children’s Postdivorce Adjustment

Parent–child relationship quality and discipline are two of the most robust predictors of child and adolescent adjustment (Parke & Buriel, 2006; Steinberg, 2001). A positive relationship, characterized by high warmth, acceptance, and positive, open parent–child communication or as reflected in a secure child–parent attachment, has been found to correlate with a wide range of positive youth outcomes, including lower internalizing, externalizing, and substance use problems; lower risky sexual behaviors; and higher academic achievement and psychosocial competence (see Cowan & Cowan, 2002, and Steinberg, 2001, for reviews; Chassin & Handley, 2006; Miller, Benson, & Galbraith, 2001). Similarly, parental effective discipline, characterized by consistency, appropriate limit setting and rule enforcement, and low use of punitive and coercive parenting practices, has been associated with child–adolescent positive adjustment (e.g., Baumrind, 1996; Steinberg, 2001).

Positive mother–child relationships and effective discipline play an especially crucial role in children’s adjustment in divorced families (Amato & Keith, 1991). A positive mother–child relationship is hypothesized to promote children’s psychological adjustment following divorce because (a) it promotes children’s sense of emotional security and decreases their fear of abandonment following this disruption in the family structure (Sandler, 2001; Wolchik, Tein, Sandler, & Doyle, 2002) and (b) it provides social support to the child in coping with divorce-related stressors (Kelly & Emery, 2003). Effective discipline is hypothesized to predict positive adjustment in children from divorced families because (a) it increases the predictability of the family environment and promotes the child’s sense of control (Wolchik, Sandler, et al., 2002); (b) it reduces coercive parent–child interactions (Patterson, 1982); and (c) it prevents the child’s involvement with deviant peers (Henry, Tolan, & Gorman-Smith, 2001). Previous research has suggested that divorced parents tend

to show decreased warmth and affection, have poorer communication with the child, and use more erratic disciplinary strategies than married parents (e.g., Astone & McLanahan, 1991; Simons & Johnson, 1996). Thus, it is possible that parenting may at least partly mediate the relationship between divorce and child adjustment problems. Consistent with this hypothesis, Martinez and Forgatch (2002) found that divorced mothers' ineffective parenting (frequent use of coercive discipline and low positive involvement, problem solving, monitoring, and skill encouragement) mediated the positive relation between accumulation of family transitions and boys' acting-out behaviors. However, despite the large volume of literature demonstrating a relation between parenting and child adjustment in general and after divorce, inferences concerning the causal nature of this relation cannot be made because the great majority of studies have used correlational or nonexperimental designs (Cole & Maxwell, 2003; Cowan & Cowan, 2002).

New Beginnings Program (NBP)

The NBP, a program aimed at preventing mental health problems and promoting competence in children from divorced families, was developed on the basis of a "small theory" (Lipsey, 1990) that specific risk and protective factors (i.e., quality of parent-child relationship, effective discipline, father-child contact, inter-parental conflict, children's coping, and appraisals of stressors) account for the development of mental health and social adjustment problems following divorce (Sandler, Wolchik, Davis, Haine, & Ayers, 2003; Wolchik, Sandler, et al., 2002). The NBP was specifically designed to change these risk and protective factors, which were considered putative mediators, because it was proposed that changes in these factors would account for program-induced improvements in children's adjustment.

The NBP includes two components: a program for residential mothers (those who reside with the child 50% or more of the time) and a component for children. Evaluation of the program compared outcomes for children who were randomly assigned to one of three intervention conditions: mother program alone, mother program and child program, and literature control condition. Previously published findings from the evaluation of the NBP reported that there were fewer than chance differences in the effects of the mother program alone as compared with the mother and child program. Thus, these two conditions were combined and compared with the literature control condition in evaluating program effects at the 6-year follow-up (Wolchik, Sandler, Weiss, & Winslow, 2007). The results indicated that adolescents who received the NBP had fewer mental health problems and a lower rate of diagnosable mental disorders; fewer internalizing, externalizing, and substance use problems; fewer sexual partners; and higher academic achievement and self-esteem than those in the literature control group (Wolchik et al., 2007).

A critical next step in evaluating the efficacy of the NBP and testing the theory behind the program is the examination of whether the 6-year effects of the NBP on adolescents' adjustment were mediated by the program-induced changes in the putative mediators. Because the short-term evaluation found that the NBP improved mother-child relationship quality and maternal discipline relative to the literature control condition but did not improve father-child contact, interparental conflict, children's coping, or children's threat appraisals (Wolchik, West, et al., 2000), in this study we tested the two maternal parenting variables as

candidate mediators of the program effects on youth outcomes 6 years later. Because the NBP has been shown to benefit a wide range of adjustment outcomes (e.g., mental health and substance use problems, academic attainment, and competence) at the 6-year follow-up, tests of mediation have the potential to indicate which domains of adolescent adjustment are most influenced by mother–child relationship quality and maternal discipline (the putative mediators) in middle childhood.

Contribution of Randomized Prevention Trials to Tests of Theoretical Mechanisms

A randomized experimental trial provides a rare opportunity to strengthen the causal inferences concerning factors involved in the development of psychopathology and competence (Cole & Maxwell, 2003; Cowan & Cowan, 2002; Hinshaw, 2002; Howe, Reiss, & Yuh, 2002; Rutter, 2005; Sandler et al., 2006). If an intervention has a positive impact on children's adjustment in a properly conducted randomized experimental trial and the intervention effect on the outcome is accounted for by changes in a putative mediator (e.g., parent–child relationship quality), then the inference concerning the causal nature of the relation between mediator and outcome is strengthened over what can be inferred from longitudinal correlational studies. This is because the relations between program-induced change in the mediator and program-induced change in the outcome cannot be accounted for by shared preexisting biological or social variables (Cowan & Cowan, 2002; Rutter, 2005).

To qualify as a mediator of the effects of an intervention in a randomized experimental trial, several conditions must be met (Kraemer, Wilson, Fairburn, & Agras, 2002; Weersing & Weisz, 2002): (a) The mediator must be measured over time, and optimally the mediator would be specified a priori in the theory underlying the intervention; (b) change in the outcome must be related to the intervention condition;¹ (c) change in the mediator must occur after the start of the intervention and be related to the intervention condition; (d) the effect of the mediator on the outcome must be significant when both the intervention condition and the mediator are included as predictors of the outcome; and (e) the mediated effect must be statistically significant. Using these guidelines, several researchers provided evidence of parenting as a mediator of intervention effects on children's adjustment in randomized experimental trials (DeGarmo & Forgatch, 2005; DeGarmo, Patterson, & Forgatch, 2004; Hinshaw et al., 2000; Tein, Sandler, Ayers, & Wolchik, 2006). For example, in their analysis of a randomized experimental trial for parentally bereaved children, Tein et al. (2006) found that the program-induced increases in positive parenting (positive parent–child relationship and effective discipline) at posttest mediated program effects in reducing girls' mental health problems at 11-month follow-up. Also, in the Oregon Divorce Study–II, a preventive intervention trial with recently separated mothers and their school-age sons, the effects of parent management training in reducing growth in boys' externalizing,

¹Although the mediational approach described by Baron and Kenny (1986) requires the predictor X (e.g., intervention) and outcome Y to be significantly related before testing for mediation, recent work on mediational models has suggested that this may be an overly restrictive requirement (MacKinnon, Krull, & Lockwood, 2000; Shrout & Bolger, 2002). A significant mediated effect despite a weak bivariate relation between X and Y may occur when X is distally related to Y through multiple mediational paths (Shrout & Bolger, 2002) or when X is positively related to Y and the mediator, whereas the mediator is negatively related to Y (i.e., inconsistent mediation; MacKinnon et al., 2000).

delinquency, and internalizing behaviors over 30 months were mediated by growth in effective parenting and reduction in coercive discipline (DeGarmo & Forgatch, 2005; DeGarmo et al., 2004). Despite this encouraging evidence that parenting mediated the effects of several intervention programs in improving child mental health problems, it is not known whether intervention-induced short-term changes in parenting exert a longer term impact on children's adjustment across developmental periods. The current study advances this literature by testing parenting as a mediator of the effects of the NBP to improve multiple indicators of youth adjustment over 6 years, spanning from childhood to adolescence.

Testing Mediation of Intervention Effects in the Context of Baseline Risk $\times$ Program Interactions

Many prevention programs have found stronger effects for individuals who were at a higher risk for adjustment problems at program entry relative to those who were at lower baseline risk (see Brown & Liao, 1999). For example, the Incredible Years parenting training program was more efficacious in reducing conduct problems and increasing prosocial behaviors for children with high baseline levels of conduct problems and children of mothers with high initial levels of critical parenting (Reid, Webster-Stratton, & Baydar, 2004). A similar pattern of Baseline $\times$ Program interaction effects was found in the 6-year follow-up evaluation of the NBP: Families who entered the program at higher risk for negative outcomes (based on a risk index composed of externalizing problems, stressful events, maternal mental health problems, interparental conflict, contact with father, and per capita income) benefited more from the program than those who entered at lower baseline risk (Dawson-McClure et al., 2004). When the Program $\times$ Baseline interaction is present, mediation analysis is more complicated because of the need to understand the processes by which the program works for a subgroup of participants (Tein, Sandler, MacKinnon, & Wolchik, 2004), in this case those with higher baseline risk. As the first demonstration of testing the mediation of Program $\times$ Baseline Risk interactions, Tein et al. (2004) showed that at high levels of baseline child externalizing problems, mother-child relationship quality and discipline at post-test mediated the NBP intervention effects on externalizing problems at the 6-month follow-up. The present study extends the Tein et al. (2004) study by testing mediation of Program $\times$ Baseline Risk interactions on youth adjustment 6 years later. Specifically, we tested multiple-group (high vs. low baseline risk) models in which mother-child relationship quality or effective discipline at posttest mediated program effects on 6-year follow-up outcomes simultaneously in the high- and low-risk groups. On the basis of findings that NBP improved adolescents' adjustment problems (reduced mental health problems and substance use) and increased competence for those with high (but not low) baseline risk (Dawson-McClure et al., 2004), we expected that the mediated effects by posttest parenting would be significant only for the high-risk group.

Method

Participants

Participants were 218 of the 240 families (91%) who had participated in an experimental evaluation of two postdivorce preventive interventions for residential mothers and their children 6 years earlier (for a detailed presentation of the assessment of participants over time, including the participant flowchart, see Wolchik, Sandler, et al., 2002). Data were obtained from 209 adolescents, 191 residential parents (174 mothers and 17 fathers), and 27 nonresidential parents. Nonresidential parent data were used in families in which the residential parent refused or could not be contacted ($n=8$) or the adolescent lived independently ($n=19$). At 6-year follow-up (Time [T] 5), adolescents were 15 to 19 years old ($M=16.9$, $SD=1.1$; 49.5% female); 80% lived with their mothers, 11% with their fathers, and 9% were independent. At T5, the families had been physically separated an average of 8.4 years ($SD=1.4$) and divorced an average of 7.2 years ($SD=0.55$). At T5, 48% of the residential parents had remarried or lived with someone as if married since completion of the NBP intervention, and 38% of the residential parents were currently living with a spouse or partner. Ethnicity for residential mothers and fathers interviewed at T5 was, respectively, 89.1% and 82.4% White, non-Hispanic; 6.4% and 17.6% Hispanic; 1.1% and 0% African American; 1.1% and 0% Asian/Pacific Islander; and 2.3% and 0% other. Average annual household income for residential mothers and fathers at T5 was \$50,760 ($SD=\$27,180$) and \$79,264 ($SD=\$23,811$), respectively.

Following the pretest, families had been randomly assigned to one of three intervention conditions: residential mother program ("mother program"; $n=77$), dual-component custodial mother and child program ("combined program"; $n=73$), or literature control condition ("control group"; $n=68$). There were no baseline differences across conditions on demographic variables or child mental health problems. We conducted attrition analyses to compare the families who were assessed at T5 ($n=218$) with those who were not ($n=22$) on baseline demographic variables (e.g., family per capita income and maternal education) and internalizing and externalizing problems. A series of 3 (intervention condition) $\times$ 2 (attrition) analyses of variance revealed no significant attrition or Condition $\times$ Attrition interaction effects. Thus, attrition did not threaten internal or external validity.

Recruitment

Court records of divorce decrees in a large Southwestern metropolitan county were the primary means of identifying potential participants (of the 218 families in the 6-year follow-up, 180 were obtained through court records, 32 obtained through the media, and 6 through referrals). Eligibility criteria were as follows: (a) The child was between the ages of 9 and 12; (b) child resided with the mother at least 50% of the time; (c) no changes to custody arrangement were anticipated during the intervention; (d) both mother and child spoke and read English fluently; (e) the child was not receiving special education services; (f) if the child had a diagnosis of attention deficit disorder, he or she was taking medication; (g) neither mother nor child was receiving treatment for psychological problems; (h) the mother had not remarried, did not plan to remarry during the intervention, and did not have a live-in boyfriend; (i) family lived within a 1-hr drive of the intervention site; and (j) divorce decree

had been granted within 2 years before the start of intervention. The following eligibility criteria were evaluated by means of the pretest assessment because of the preventive nature of the program and ethical concerns: The child did not meet clinical cutoff for depression (raw score > 17 on child report of Children's Depression Inventory), exhibit severe levels of externalizing problems ($T > 70$ on mother report of the Child Behavior Checklist; Achenbach, 1991), or endorse an item about suicidal ideation. Thirty children out of 315 who completed the pretest were above one of these cutoffs and were referred for treatment. Out of the 315 families who completed the pretest, 49 were found to be ineligible at the pretest, and 26 refused between pretest and assignment to condition. The 240 families randomized to one of the three intervention conditions represented 36% of those who were eligible. Comparison of intervention acceptors and refusers (i.e., those who refused the intervention but agreed to complete the pretest interview; $n = 62$) revealed that the refusers had lower incomes, lower maternal education, and more children than acceptors; there were no differences on children's mental health problems. For further details on recruitment, see Wolchik, West, et al. (2000) and Wolchik, Sandler, et al. (2002).

Procedure

Families were interviewed on five occasions: preintervention (T1), postintervention (T2), and 3-month (T3), 6-month (T4), and 6-year (T5) follow-ups. This study used data from T1 (baseline risk and putative mediators), T2 (putative mediators), and T5 (adjustment outcomes). Trained staff conducted separate home interviews with parents and youths. Confidentiality was explained, and parents and youths signed consent and assent forms, respectively. Families received \$45 compensation at T1 and T2, and parents and youths each received \$100 compensation at T5.

Intervention Programs

The mother program was designed to change four specific factors that research had found to predict child adjustment following divorce: mother-child relationship quality, maternal discipline, child's contact with noncustodial father, and interparental conflict (Wolchik et al., 2007). The orientation of the program is cognitive-behavioral, with a strong emphasis on skills acquisition or enhancement. Multiple empirically supported strategies were used, including modeling of program skills, role play of skills in session, and use of the skills with their children (see Wolchik et al., 2007, for a detailed description of the intervention strategies). The program was co-led by two clinicians and consisted of 10 group sessions (1.75 hr per session) and 2 structured individual sessions. Of the group sessions, 2 focused on educating the mothers on the impact of divorce on child adjustment and teaching them three relationship-building skills (family fun time, one-on-one time, and catch 'em being good), 3 focused on listening skills, 1 focused on shielding children from interparental conflict, 3 focused on teaching effective disciplinary strategies (e.g., setting clear and realistic expectations, monitoring misbehaviors, selecting appropriate consequences, and increasing consistency), and the last included a review of program skills and discussion of ways to maintain them. The two structured individual sessions focused on removing obstacles to the father-child relationship and tailoring the program skills to individual families' needs.

The child program focused on improving effective coping, reducing negative thoughts about divorce stressors, and improving mother–child relationship quality. This 11-session program (1.75 hr per session) incorporated social learning and social cognitive techniques such as identification of feelings, positive cognitive reframing, challenging negative appraisals, and communicating “I-messages.” The literature control condition consisted of books on divorce adjustment and syllabi to guide the reading. Mothers and children each received three books over an 11-week period.

Measures

Multimeasure, multireporter composites were developed to represent the putative mediators at posttest and a number of adolescent outcomes at 6-year follow-up. This procedure helps to ensure that the full breadth of each construct is represented and that measurement errors are minimized (Epstein, 1983). For constructs on which multiple measures or ratings from multiple reporters were collected, we constructed composite scores on the basis of confirmatory factor analysis (CFA). The CFAs were conducted using the maximum likelihood estimation with robust standard errors in Mplus 4.0 (Muthén & Muthén, 1998–2006). We computed the reliability coefficients for all composite scores by using the weighted alpha coefficients, weighting by the variance of each of the measures (Lord & Novick, 1968).

Baseline Risk Index (T1)—The risk index consisted of the sum of the standardized scores on baseline measures of child externalizing problems and adversity (composite of interparental conflict, negative events experienced by the child, maternal mental health problems, contact with noncustodial father, and per capita income). Using data from the NBP control group, Dawson-McClure et al. (2004) found that the baseline risk index was significantly related to adolescents’ externalizing and internalizing problems, competence, and substance use 6 years later.

Putative Mediators (T1 and T2)

Mother–child relationship quality. Mothers and children completed the 20-item Acceptance and Rejection subscales of Teleki, Powell, and Dodder’s (1982) adaptation of the Children’s Report of Parenting Behavior Inventory (Schaefer, 1965). Items were rated on a 3-point scale (ranging from 1 = *Like you [your mother]* to 3 = *Not like you [your mother]*); α s ranged from .70 to .87 for mothers’ and children’s reports of acceptance and rejection at T1 and at T2. Mothers’ and children’s reports of acceptance have been negatively related to children’s adjustment problems in another sample of about 600 divorced families (Wolchik, Wilcox, Tein, & Sandler, 2000). Moreover, mothers and children also completed the 10-item Parent-Adolescent Communication Scale (Barnes & Olson, 1982). Mothers and children rated the items on a 5-point scale (ranging from 1 = *agree a lot* to 5 = *disagree a lot*; α s = .72 and .82 for mothers’ and children’s reports at T1 and .75 and .87 at T2, respectively). Parent-Adolescent Communication Scale scores have been linked to adolescents’ psychological adjustment in previous studies (e.g., Bhushan & Shirali, 1992; Young & Childs, 1994).

Maternal discipline. Mothers and children completed the eight-item Consistency of Discipline subscale of Teleki et al.’s (1982) adaptation of the Children’s Report of Parenting

Behavior Inventory (Schaefer, 1965; α s = .81 and .72 for mothers' and children's reports at T1, respectively, and .80 and .73 at T2, respectively). In another sample of approximately 600 divorced families, both mothers' and children's reports of consistency of discipline were negatively related to children's adjustment problems (Wolchik, Wilcox, et al., 2000). In addition, mothers completed three subscales from the Oregon Discipline Scale (Oregon Social Learning Center, 1991): (a) the Appropriate Discipline sub-scale (9 items, α s = .58 and .59 at T1 and T2, respectively); (b) the Inappropriate Discipline subscale (5 items, α s = .75 and .77 at T1 and T2, respectively); and (c) follow-through (11 items, α s = .80 and .76 at T1 and T2, respectively). We calculated a ratio of appropriate and inappropriate discipline by dividing the appropriate discipline score by the sum of appropriate and inappropriate discipline scores. In a sample of parentally bereaved children, parents' and children's reports of consistency of discipline assessed with similar measures have been negatively related to children's adjustment problems (Kwok et al., 2005; Wolchik, Tein, Sandler, & Ayers, 2006).

Data reduction for putative mediators.: To reduce the number of variables in structural equation modeling, we conducted two CFAs to test the two-dimensional measurement model of parenting at T1 and T2, respectively. As shown in Figure 1, in both models the latent factor of Mother–Child Relationship Quality has four indicators—mother report of acceptance or rejection, child report of acceptance or rejection, mother report of parent–child communication, and child report of parent–child communication—and the latent factor of Maternal Discipline has four indicators—mother report of appropriate and inappropriate discipline, mother report of follow-through, mother report of consistency of discipline, and child report of consistency of discipline. For model identification, we fixed the error variances of the latent factors to 1. Moreover, as suggested by Cole and Maxwell (2003), we allowed the error variances of measures by the same reporter (e.g., mother report of appropriate and inappropriate discipline and mother report of parent–child communication, child report of parent–child communication and child report of consistency of discipline) to correlate with each other if doing so significantly improved the overall model fit. Both models had adequate fit with the data, $\chi^2(16, N=218) = 21.4$ and $\chi^2(15, N=218) = 15.4$, p s = .17 and .42, confirmatory fit indexes (CFIs) = .99 and 1.00 and root-mean-square errors of approximation (RMSEAs) = .039 and .011 for T1 and T2 models, respectively. In these models, all the model-estimated loadings for the indicators were significant and positive with the exception of child report of consistency of discipline, which did not load on T1 Maternal Discipline. Because continuing to estimate the measurement model in the mediation analyses would lead to a very low ratio of parameters to participants (Bentler & Chou, 1987), composite scores were created for parenting and used in mediation analyses. We created the composite scores for Mother–Child Quality of Relationship at T1 and T2 and Maternal Discipline at T2 by averaging the standardized scores of their respective indicators shown in the measurement models (weighted α s = .90, .94, and .82, respectively) and the composite score for Maternal Discipline at T1 (weighted α = .84) by averaging the standardized scores of the indicators that loaded significantly on the latent factor (i.e., mother report of appropriate or inappropriate discipline, mother report of follow-through, and mother report of consistency of discipline). Higher scores on the composites indicated higher qualities of mother–child relationship or more effective discipline.

Adolescent Adjustment Outcomes at 6-Year Follow-Up (T5)

Externalizing problems.: Parents completed the 33-item Externalizing Problems subscale of the Child Behavior Checklist (Achenbach, 1991; $\alpha=.89$). Adolescents completed the 27-item Divorce Adjustment Project Externalizing Scale (Program for Prevention Research, 1985; $\alpha=.84$), which assesses aggression, hostility, and delinquency. The Divorce Adjustment Project Externalizing Scale has acceptable internal consistency and has been found to be sensitive to detecting intervention-induced change (Hipke, Wolchik, Sandler, & Braver, 2002). Parents' and adolescents' reports of externalizing problems were positively correlated, $r(204) = .35, p < .01$.

Internalizing problems.: Parents completed the 31-item Internalizing Problems subscale of the Child Behavior Checklist (Achenbach, 1991; $\alpha=.86$). Adolescents completed the 27-item Children's Depression Inventory (Kovacs, 1981; $\alpha=.85$) and the 28-item Children's Manifest Anxiety Scale—Revised (Reynolds & Richmond, 1978; $\alpha=.89$). Adolescents' reports on the Children's Depression Inventory and Children's Manifest Anxiety Scale—Revised were positively correlated, $r(207) = .70, p < .01$. Thus, the two scores were standardized and averaged to create the composite for adolescents' reports of internalizing problems. Parents' and adolescents' reports of internalizing problems were positively correlated, $r(205) = .49, p < .01$.

Data reduction for externalizing and internalizing problems.: We conducted a CFA to test the two-dimensional model of T5 externalizing and internalizing problems. The latent factors of T5 Externalizing Problems and T5 Internalizing Problems were indicated by parents' and adolescents' reports. The error variances of measures from the same reporter (i.e., parents' reports of externalizing problems and their reports of internalizing problems, adolescents' reports of externalizing problems and their reports of internalizing problems) were allowed to correlate with each other if doing so significantly improved the model fit. For model identification, we fixed the error variances of the latent factors to 1. The model fit with the data well, $\chi^2(1, N=218) = 0, p = .99, CFI = 1.00, RMSEA = .000$. All the model-estimated loadings were significant in the positive direction, indicating cross-reporter agreement on externalizing and internalizing problems. Thus, we created the composite scores for T5 externalizing and internalizing problems (weighted α s = .90 and .95, respectively) by averaging the standardized scores of the corresponding parents' and adolescents' reports.

Mental disorder symptom count.: Mental disorders were assessed with the computer-assisted parent and adolescent versions of the Diagnostic Interview Schedule (Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000). Submodules and modules that are rare in adolescence were not administered (e.g., selective mutism and tic). We derived a symptom count variable (range = 1 to 112 symptoms) by taking the sum of the symptoms endorsed by either the parent or the adolescent. Parent and adolescent reports were correlated at .40 ($N = 199$), $p < .001$.

Substance use.: Adolescents' substance use was assessed with their self-report on the Monitoring the Future Scale (Johnston, Bachman, & O'Malley, 1993). Alcohol and

marijuana use were measured by on a 7-point scale of times used (ranging from 1 = 0 to 7 = 40) in the past year. Other drug use was computed as the sum of ratings on this scale for 13 other drugs (e.g., heroin, LSD, or cocaine). Polydrug use was assessed as a count of the number of different drugs, including alcohol, used in the past year. In addition, a drug abuse or dependence symptom count variable was derived from parents' and adolescents' responses to the Diagnostic Interview Schedule (Shaffer et al., 2000). The five variables of substance use (frequency of alcohol, marijuana, and other illicit drug use, polydrug use, and drug abuse–dependence symptom counts) were positively correlated, $r(206-208) = .37$ to $.84$, $ps < .01$. We conducted a CFA to test the one-dimensional measurement model for T5 substance use, which was indicated by the above five observed variables. Because all five measures were by adolescent report, we allowed their error terms to correlate with each other if doing so significantly improved the model fit. The CFA model for substance use fit the data well, $\chi^2(1, N=218) = 0.64$, $p = .42$, CFI = 1.00, RMSEA = .000. All the model-estimated loadings were significant in a positive direction, indicating that the five measures of substance use converged. Thus, we created a composite score by averaging the standardized scores across these variables.

Number of sexual partners.: Adolescents responded to the question “During the past six years, since the end of the New Beginnings Program, how many different partners you had sexual intercourse with?”

GPA.: Adolescents' cumulative GPAs for high school (based on a 4.0 scale) were obtained from the transcripts sent by the schools.

Competence.: Parents and adolescents completed the Coatsworth Competence Scale (Coatsworth & Sandler, 1993). The Coatsworth Competence Scale assesses competence defined as a developmental outcome reflecting how effectively youths are accomplishing age-appropriate tasks in peer relationships and school. Three subscales were used in the present study: (a) Academic Competence (6 items, $\alpha s = .90$ and $.81$ for parents' and adolescents' reports, respectively); (b) Activity Involvement (5 items, $\alpha s = .87$ and $.84$ for parents' and adolescents' reports, respectively); and (c) Peer Relationships (7 items, $\alpha s = .79$ and $.76$ for parents' and adolescents' reports, respectively). For both parents' and adolescents' reports, we calculated a total competence score by summing the items across all three subscales ($\alpha s = .88$ and $.88$ for parent and adolescent report, respectively). Parents' and adolescents' reports of competence were positively correlated, $r(165) = .59$, $p < .001$. In addition, adolescents completed the Self Perception Profile for Children (Harter, 1985), which assesses their global self-esteem (6 items, $\alpha = .86$). Adolescents' self-esteem score was positively correlated with their own and parents' reports of competence, $r(172) = .28$ and $r(184) = .57$, $ps < .01$, respectively. We conducted a CFA to test the one-dimensional measurement model of T5 competence, which was indicated by parents' and adolescents' reports of competence and adolescents' reports of self-esteem. The model fit with the data adequately, $\chi^2(1, N=218) = 2.02$, $p = .16$, CFI = .99, RMSEA = .069. All the model-estimated loadings were significant in a positive direction, indicating that the three measures of competence converged. A competence composite score was created by averaging the standardized scores across the three variables (weighted $\alpha = .95$).

Plan of Analyses

Structural equation modeling (SEM) was used to test the mediational models. The analytical strategies for testing mediation differed for adjustment outcomes on which there were significant Program $\times$ Baseline interaction effects versus adjustment outcomes on which only the program main effect was significant. Because comparisons of the two intervention conditions in previous outcome evaluations of the NBP (Dawson-McClure et al., 2004; Wolchik, Sander, et al., 2002; Wolchik, West, et al., 2000) were significant on only 1 of the 14 outcome variables (at posttest and 6-month and 6-year follow-ups), we combined the mother program group and the mother and child program group and compared this combined intervention group with the literature control group in the mediational analyses. Moreover, as reported elsewhere (Wolchik et al., 2007), for two of the seven adolescent (T5) outcomes examined in this study—the number of sexual partners and GPA—there was a significant program (combined intervention groups vs. literature control group) main effect without the Program $\times$ Risk interaction. At T5, adolescents in the intervention group had fewer sexual partners and higher GPAs than those in the control group, controlling for baseline risk. Therefore, for these two outcomes, we constructed a single-group mediation model (Figure 2, Model A) in which the program condition was hypothesized to predict change in the mediator (mother–child relationship quality or maternal discipline) at post-test (T2), which in turn would predict change in adjustment at 6-year follow-up (T5). The change in the mediator is represented by the T2 mediator variable controlling for the effects of baseline mediator and Program $\times$ Baseline Mediator interaction. The change in adjustment outcome is represented by the T5 adjustment outcome variable controlling for the effect of baseline risk (we did not include the Program $\times$ Baseline Risk interaction in the mediation model because the preliminary analyses suggested it was not significant in predicting these adjustment outcomes). The three paths important for testing mediation effects are the *a* path (program $\rightarrow$ mediator at T2), the *b* path (mediator at T2 $\rightarrow$ adjustment outcome at T5), and the *c* path (program $\rightarrow$ adjustment outcome at T5).² If both the *a* and *b* paths were significant (supporting the mediation hypothesis), we tested the significance of the indirect mediated effect (program $\rightarrow$ mediator at T2 $\rightarrow$ adjustment outcome at T5) by using the confidence interval method recommended by MacKinnon, Lockwood, and Williams (2004).

In contrast, Program $\times$ Baseline Risk interactions were significant (with or without significant program main effect) for five adjustment outcomes: externalizing and internalizing problems, mental disorder symptoms, competence, and substance use (Wolchik et al., 2007). The patterns of interactions were similar across these outcomes such that the differences between the intervention group and the control group on T5 outcomes were greater at higher baseline risk than at lower risk (see Figure 3 for an example). Therefore, for these five outcomes, we classified the sample into two groups on the basis of a cutoff on the baseline risk index that best differentiated (determined on the basis of the Johnson-Neyman test; Aiken & West, 1991) the high- versus low-risk groups. We used two-group SEM to examine the mediation of program effects for each group simultaneously (see Figure 2,

²Although we used only the coefficients for the *a* and *b* paths in estimating the significance of the mediated effect, the *c* path is also important in mediation analysis because the *b* path represents the relation between the mediator and the outcome adjusted for the effect of intervention on the outcome (i.e., the *c* path; MacKinnon et al., 2002).

Model B). Two-group SEM instead of single-group SEM with interaction terms (i.e., the Program $\times$ Baseline Risk interaction) was used because we were interested in examining the distinct mediational processes within the high- versus the low-risk groups.

For each of the five adjustment outcomes on which the Program $\times$ Baseline Risk interaction was significant, we used the Johnson-Neyman test (Aiken & West, 1991) to determine for which regions of the risk index the intervention and control groups differed significantly. For example, as shown in Figure 3, beyond 0.12 standard deviation above the mean on risk (about 43% of the sample), the intervention group had significantly lower externalizing problems at T5 than did the control group. In contrast, for a small number of adolescents (4%) who were more than 1.68 standard deviations below the mean on risk, the combined intervention group had significantly higher externalizing problems than did the control group. Similar patterns were found for T5 internalizing problems, mental disorder symptoms, and competence: Beyond 0.38 standard deviation (31%), 0.58 standard deviation (24%), or 0.09 standard deviation (44%) above the mean on risk (the high region of significance), the intervention group had lower internalizing problems, fewer mental disorder symptoms, and higher competence than did the control group at T5. To select the high-risk sample in which the intervention had significant positive effects on adolescents' adjustment outcomes, we took the lowest value of the Johnson-Neyman high region of significance across the five adjustment outcomes (.09 above the mean on risk) and used it as a cutoff to classify the sample into the high- (44%) and low-risk groups for analyses of mediation of program effects on all outcome variables.

Results

Mediation of Program Effects on GPA and Number of Sexual Partners: The Single-Group SEM

The means, standard deviations, and zero-order correlations among the risk index, the putative mediators, and adjustment outcomes are presented in Table 1. Before conducting the SEM analyses, we screened the variables for normality and outliers. With the exception of T5 number of sexual partners and T5 substance use (which were positively skewed and had a high kurtosis), no other variables exceeded the cutoff values of 2 for skewness and 7 for kurtosis (West, Finch, & Curran, 1995). It is not uncommon for symptomatology variables to be positively skewed in community samples. Because of the presence of non-normal variables in the models, we conducted the SEM analyses using the maximum likelihood ratio estimator of Mplus 4.0, which provides the standard errors and chi-square statistics for data with non-normal outcomes (for the robust statistics, see Muthén & Muthén, 1998–2006). In addition, we used Cook's distance to screen the data for outliers, and no outliers were found using the cutoff of 1 (Cook, 1977; Stevens, 1984). In Mplus full information maximum likelihood estimation, missing data because of attrition are allowed but the missing values are not imputed; rather, the model is estimated using all information that is available (Muthén & Muthén, 1998–2006).

We tested four single-group mediational models to examine T2 mother–child relationship quality or effective discipline as a mediator of the intervention effect on T5 number of sexual partners or GPA, respectively. The model for T2 maternal effective discipline as a mediator

of the intervention effect on T5 GPA fit the data well, $\chi^2(2, N=218) = 1.33, p = .51$, CFI = 1.00, RMSEA = .000. As presented in Figure 4, the intervention significantly predicted higher levels of effective discipline at T2 (above and beyond baseline risk, baseline discipline, and Baseline Program $\times$ Discipline interaction), which in turn predicted adolescents' higher GPA at T5 (above and beyond baseline risk); moreover, the direct intervention effect on T5 GPA was also significant (indicating partial mediation).

We tested the significance of the mediated effect (i.e., intervention $\rightarrow$ T2 effective discipline $\rightarrow$ T5 GPA) by using the confidence interval method (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; MacKinnon et al., 2004). The conventional approach to test an indirect effect is to divide the estimate of the indirect effect by its standard error and compare the resulting z statistic with a critical value from the standard normal distribution. Because the distribution of the indirect effect is rarely normal, this method is usually inaccurate. To accommodate the non-normal distribution of the indirect effect, MacKinnon et al. (2002, 2004) developed a method to calculate the confidence interval (CI) of the indirect effect based on the distribution of the product of two normal random variables. The lower and upper confidence limits are calculated using the formula $CL = a\beta \pm (\text{critical value}) \sigma_{a\beta}$, in which $a\beta$ is the product of regression coefficients for the a and b paths in the mediation model and the critical value is obtained from the distribution tables for the product of two random variables in Meeker, Cornwell, and Aroian (1981). If the CI does not include zero, the indirect effect is significant. We also calculated the proportion of the total effect of intervention on T5 GPA that was mediated by T2 effective discipline (MacKinnon, Warsi, & Dwyer, 1995). Results indicate that T2 effective discipline significantly mediated the intervention effect on T5 GPA (20% mediated), the upper confidence limit (UCL) for mediated effect was .103, and the lower confidence limit (LCL) was .006 ($p = .050$).

The model for T2 mother–child relationship quality as a mediator of intervention effect on T5 GPA also fit the data well, $\chi^2(2, N=218) = 0.72, p = .70$, CFI = 1.00, RMSEA = .00. The intervention significantly predicted higher mother–child relationship quality at T2 and higher GPA at T5. However, T2 mother–child relationship quality did not predict T5 GPA above and beyond intervention and baseline risk, indicating that mediation was not present.

The models for T2 mother–child relationship or effective discipline as a mediator of the intervention effect on the number of sexual partners at T5 fit the data adequately, $\chi^2(2, N=218) = 0.11$ and $5.75, p = .95$ and $.06$, CFIs = 1.00 and 0.97, RM-SEAs = .00 and .09, respectively. In both models, the intervention significantly predicted the mediator at T2 (i.e., more positive mother–child relationship or effective discipline) and outcome at T5 (fewer sexual partners). However, there was not a unique relation between the mediator and outcome above and beyond intervention and baseline risk. Therefore, neither mother–child relationship quality nor effective discipline at T2 mediated the intervention effect on number of sexual partners at T5.

Mediation of Intervention Effects on T5 Externalizing and Internalizing Problems, Mental Symptoms, Competence, and Substance Use: Two-Group SEM by Baseline Risk

We conducted 10 sets (2 Mediators $\times$ 5 Outcomes) of two-group SEM analyses to test the hypothesized mediational models (Figure 2, Model B) simultaneously in the high- and low-

risk groups. To examine whether the three mediational paths (*a*, *b*, and *c* paths in Figure 2, Model B) differed significantly across the two groups, for each mediator–outcome pair we tested two nested models: (a) the fully constrained model, in which all five path coefficients were constrained to be equal across the two groups, and (b) the partially constrained model, in which all but the three mediational paths (*a*, *b*, and *c* paths) were constrained to be equal across the two groups. A significant chi-square difference between the two models indicates that the mediational paths differ between the high- and low-risk groups. When the chi-square difference test was significant, the partially constrained two-group model was presented in the figures; otherwise the fully constrained model was presented.

The overall fit indices for the partially constrained models, the chi-square difference tests (comparing the fully and partially constrained models), and the standardized coefficients for the *a*, *b*, and *c* paths are presented in Table 2. Among the models examining T2 mother–child relationship quality as a mediator of intervention effect, the chi-square difference test was significant for T5 externalizing problems, internalizing problems, and mental disorder symptoms, suggesting that the mediational paths differed across the high- and low-risk groups. As shown in Table 2, a similar pattern was found in these models: In the high-risk group, intervention predicted higher mother–child relationship quality at T2, which in turn predicted lower externalizing problems, lower internalizing problems, and fewer symptoms of mental disorders at T5 (see Figure 5 for an example). Moreover, the indirect mediated effects (intervention → T2 mother–child relationship quality → T5 adjustment outcome) were significant at $p < .05$ for externalizing problems, UCL = $-.012$, LCL = $-.369$, 13% mediated; for internalizing problems, UCL = $-.010$, LCL = $-.367$, 13% mediated; and for mental disorder symptoms, UCL = $-.170$, LCL = -4.42 , 19% mediated. Note that the direct path from intervention to T5 externalizing problems remained significant above and beyond the mediated effect, suggesting partial mediation. In contrast, none of the three mediational paths (*a*, *b*, and *c*) was significant for the low-risk group for these three outcomes. For the models predicting T5 competence and substance use, in the high-risk group, although the intervention had a significant positive effect on T2 mother–child relationship quality and competence, T2 mother–child relationship quality did not predict T5 competence or substance use; in the low-risk group, intervention did not predict T2 mother–child relationship quality. Thus, the mediational hypothesis was not supported for competence or substance use in either the high-risk or low-risk groups.

For the two-group models testing T2 effective discipline as a mediator of intervention effects, all the fully constrained models fit the data marginally to adequately (see Table 2). The chi-square difference tests comparing the fully constrained and partially constrained models were nonsignificant for the models predicting externalizing problems, internalizing problems, and competence, suggesting that the mediational paths in these models were invariant across the high- and low-risk groups. Although the chi-square difference tests for the models predicting mental disorder symptoms and substance use were at least marginally significant, an examination of the path coefficients in the low- and high-risk groups indicated that the mediational hypothesis was not supported. As reported in Table 2, although intervention positively predicted T2 effective discipline (controlling for baseline discipline and Program × Discipline interaction) in both the high- and low-risk groups, T2 discipline did not predict T5 externalizing problems, internalizing problems, mental

symptoms, competence, or substance use. Thus, T2 discipline did not mediate the intervention effects on these outcomes.³

Discussion

The present study extends prior evaluations of the NBP (Dawson-McClure et al., 2004; Wolchik, Sandler, et al., 2002; Wolchik et al., 2007; Wolchik, West, et al., 2000) by testing the mediators of the long-term program effects on adolescents' adjustment outcomes. The most important findings were that program-induced improvements in mother-child relationship quality and effective discipline immediately after the program mediated program effects on adjustment outcomes 6 years later. It is also notable that the mediational effects of mother-child relationship quality were only significant for the subgroup of children who were at high risk for maladjustment at baseline. To our knowledge, this is the first report of intervention-induced changes in parenting observed in childhood to mediate program-induced changes in mental health and academic outcomes observed in adolescence. Furthermore, we found different patterns of mediation for the two aspects of parenting: Mother-child relationship quality mediated program effect on adolescents' mental health outcomes (externalizing problems and internalizing problems, especially for adolescents' reports, and mental disorder symptom counts), whereas maternal effective discipline mediated program effects on GPA. These results are discussed in terms of their implications for advancing developmental theory and for understanding how the NBP worked to improve youths' adjustment. The implications of the mediational findings for maintaining the effects of the NBP when implemented in community settings are also discussed.

Testing Mediation of Intervention Effects in Randomized Prevention Trials

The findings that program-induced changes in parenting mediated NBP effects on adolescent adjustment outcomes 6 years later extend Tein et al.'s (2004) findings that mother-child relationship quality and effective discipline at posttest partially mediated NBP effects on children's externalizing problems at 6-month follow-up for families with higher child behavior problems or poorer mother-child relationships at baseline. Moreover, the findings are consistent with those of short-term follow-ups of other randomized prevention trials for children in high-stress situations, such as parental divorce or separation (DeGarmo &

³For the outcomes measured by multiple methods and multiple reporters (i.e., externalizing problems, internalizing problems, competence, and substance use), we also conducted mediation analyses separately with each individual outcome measure. Similar to the results obtained with the composite score of externalizing problems, the two-group SEM indicated that T2 quality of mother-child relationship significantly mediated the intervention effect on T5 adolescent report of externalizing problems for the high-risk group (but not for the low-risk group; CI = -1.723, -0.049, $p = .05$, 21% mediated). However, the mediation effect was not significant for T5 parent report of externalizing problems for either the high-risk or low-risk groups. Similar to the results obtained with the composite score of internalizing problems, T2 quality of mother-child relationship significantly mediated the intervention effect on T5 adolescent report of anxiety symptoms for the high-risk group (but not for the low-risk group; CI = -1.467, -0.0459, $p = .05$, 19% mediated), and marginally mediated the intervention effect on T5 adolescent report of depressive symptoms for the high-risk group (but not for the low-risk group; CI = -0.962, -0.016, $p = .10$, 15% mediated). However, the mediation effect was not significant with T5 parent report of internalizing problems for either the high-risk or the low-risk group. Similar to the results obtained with the composite scores of externalizing and internalizing problems, T2 maternal discipline did not mediate the intervention effect on the individual indices of externalizing or internalizing problems for either the high-risk or the low-risk groups. Moreover, similar to the results obtained with the composite scores of competence or substance use, T2 mother-child relationship and T2 maternal discipline did not mediate the intervention effect on the individual indexes of competence and substance use for either the high-risk or the low-risk groups. In summary, the results of mediation analyses using individual indices of T5 outcomes were generally consistent with the results obtained with the composite scores, although the support for the mediation of intervention effect by T2 mother-child relationship is stronger for adolescent report of behavior problems than for parent report.

Forgatch, 2005; De-Garmo et al., 2004) and parental bereavement (Tein et al., 2006), which have found that program-induced changes in parenting accounted for short-term program effects to reduce child mental health problems or improve academic functioning. This growing body of work provides experimental evidence of the influence of parenting on the development of child and adolescent mental health problems and academic achievement and complements the large body of correlational studies that document a relation between parenting and child mental health outcomes (e.g., Baumrind, 1996; Parke & Buriel, 2006; Steinberg, 2001). Because of randomization to the experimental and comparison conditions, it is unlikely that third variables (e.g., biological factors such as shared genes, psychosocial variables such as parental stress, or economic factors such as poverty) account for the experimentally induced changes in parenting and adolescent adjustment outcomes. Thus, the findings from our study and prior experimental prevention trials provide stronger support for the belief that parenting is causally linked to children's postdivorce psychosocial adjustment than findings of prospective longitudinal passive correlational studies. However, because randomization at baseline does not eliminate the possibility of alternative influences that may confound the relations between the mediator and the outcomes, the mediational findings still do not prove a causal relation between higher quality parenting and better child adjustment (Holland, 1988; Pearl, 2000).

An important distinction needs to be made in interpreting the current results. Unlike studies of the mechanisms by which treatment programs lead to a reduction in children's mental health problems, the current study does not address the question of the mechanisms by which the NBP led to a reduction in mental health problems immediately after the program (Weersing & Weisz, 2002). To address the question of mechanisms of change in intervention research, one has to show a dose-response relation between the hypothesized mediator assessed at multiple periods of time over the course of the intervention and outcomes assessed at a time point after the measurement of the mediator (Kazdin & Nock, 2003; Weersing & Weisz, 2002). Rather than mechanisms of change during the intervention, the present results addressed the question of how change in the targeted mediator following the intervention affected the developmental course leading to mental health, academic, sexual behavior, and substance use outcomes 6 years later.

The results from the present study, together with those from other studies (Sandler, Ayers, et al., 2003; Wolchik, Sandler, et al., 2002), also demonstrated the malleability of adjustment outcomes in adolescence by experimentally induced changes in parenting in childhood. Indeed, several prevention programs have demonstrated that the effect size of intervention-induced improvements in child adjustment outcomes in childhood increase over a several-year time period and that these effects are accounted for by improvements in parenting (e.g., DeGarmo et al., 2004; Sandler et al., in press; Wolchik et al., 2007). The long-term benefits of changes in parenting in childhood also have significant theoretical implications for developmental theories as evidence of the malleability of the development of mental health problems from childhood to adolescence.

Links of Mother–Child Relationship Quality and Effective Discipline to Different Aspects of Adolescent Adjustment Outcomes

Lochman (2000) proposed that one of the next research issues on the effects of parent-focused prevention programs is to identify whether training on different parenting skills at different developmental periods leads to different developmental outcomes. From this perspective, it is interesting to further consider the differences found in the current study for mother–child relationship quality and effective discipline as mediators of the NBP's effects on mental health and academic outcomes in adolescence. Effective discipline (consistency of discipline, high use of appropriate discipline strategies, and low use of inappropriate strategies) mediated the program's main effect on adolescents' GPA. In contrast, mother–child relationship did not explain the intervention effect on GPA. These results suggest that discipline effectiveness in childhood plays a greater role in promoting adolescents' academic achievement than does mother–child relationship quality. Indeed, in correlational studies, Gray and Steinberg (1999) and Herman, Dornbusch, Herron, and Herting (1997) found that although both parental support or acceptance and behavioral control (e.g., monitoring and limit setting) were positively associated with adolescents' academic achievement in the general population, academic achievement was more strongly associated with monitoring than with support. Perhaps use of appropriate discipline strategies such as monitoring, limit setting, and consistent rule enforcement operates to create and maintain a structured home environment for children, which facilitates their engagement in academic activities.

For mental health outcomes, mother–child relationship quality (high maternal acceptance, low maternal rejection, and open mother–child communication) mediated the intervention effects on adolescents' externalizing and internalizing problems and mental disorder symptom count for the high-risk group. In contrast, discipline did not explain the intervention effects on mental health outcomes. The importance of mother–child relationship quality for mental health outcomes is consistent with the findings from Gray and Steinberg's (1999) correlational study that parental acceptance and involvement were more strongly associated with adolescents' psychosocial development (e.g., self-esteem) and internal distress (psychological and somatic symptoms) than was parental behavioral control. Together, these findings are consistent with the developmental theory that parental warmth and acceptance and open parent–child communication facilitate secure attachment and promote children's emotional security and emotional self-regulation (Cassidy, 1994; Cummings & Davies, 1996), which in turn reduce children's risk for mental health problems (Eisenberg & Morris, 2002). The lack of mediational effects of effective discipline are surprising given prior evidence that effective discipline mediates the effects of prevention programs on shorter term mental health outcomes (e.g., Tein et al., 2004, 2006). It may be that the short-term benefits of effective discipline for mental health outcomes are further mediated through a cascade of more proximal changes, which affect parent–child relationships and mental health problems in later developmental periods (Cummings, Davies, & Campbell, 2000). Future research should investigate these multiple linkage models of how the NBP may affect mental health problems over time.

Although the NBP has also shown efficacy in reducing adolescents' substance use problems and risky sexual behaviors, as well as in improving adolescents' competence (see Dawson-

McClure et al., 2004; Wolchik, Sandler, et al., 2002), mediation analyses did not support mother–child relationship quality or effective discipline at posttest as mediators of these effects. These results contrast with a body of prior studies using both cross-sectional and longitudinal designs that find correlations between parental support and closeness and parental discipline (e.g., monitoring and supervision) and offspring’s substance use problems (see Chassin, Ritter, King, & Trim, 2003, and Hawkins, Catalano, & Miller, 1992, for reviews), risky sexual behaviors (see Miller et al., 2001, for a review), and overall competence (Steinberg, 2001). It is plausible that in the present study, the relations between parenting in childhood and substance use, risky sexual behaviors, and competence in adolescence are more complex and may be moderated or mediated by other factors. For example, Chassin and Handley (2006) theorized that the impact of parenting on adolescent substance use may be mediated and/or moderated by factors such as parents’ own substance use or psychopathology, peer influences on substance use, or adolescents’ individual characteristics such as impulsivity. Similarly, Miller et al. (2001) suggested that the linkage between parenting before adolescence and adolescent sexual behaviors may be mediated by proximal factors (e.g., teens’ attitudes about having intercourse, depression, impulse control, and association with sexually active peers) and/or moderated by factors such as adolescent gender, race or ethnicity, and neighborhood context.

Previous evaluations of the NBP yielded no support for mediation of the program effects by other putative mediators. For example, the NBP did not change interparental conflict at posttest (Wolchik, West, et al., 2000). The lack of intervention effects on interparental conflict may be partly explained by the fact that only one session of the NBP mother program was devoted to interparental conflict (in contrast to five sessions devoted to mother–child relationship and three sessions devoted to maternal discipline). Thus, the intervention efforts may have been insufficient to produce changes in the interparental conflict. Moreover, although the NBP improved maternal attitudes toward father–child contact at posttest (Wolchik, West, et al., 2000), changes in maternal attitudes did not predict changes in child adjustment (Tein et al., 2004), suggesting that maternal attitudes toward father–child contact may not be causally linked to child adjustment outcomes.

Mediation of Intervention Effects in the Context of Baseline $\times$ Intervention Interactions

This study indicated that the Baseline Risk $\times$ Program interaction effects on adolescents’ externalizing and internalizing problems and mental disorder symptom count may be explained by the fact that for high-risk families, the intervention produced positive changes in mother–child relationship quality, which in turn mediated the program effects on adolescents’ mental health outcomes, whereas the intervention did not produce significant changes in mother–child relationship quality in low-risk families. Because the risk index reflects baseline child externalizing problems and environmental adversity (including low family income, high maternal mental health, high interparental conflict, and low contact with noncustodial father; see Dawson-McClure et al., 2004), it is possible that the mothers from families with relatively higher baseline risk showed greater improvement in mother–child relationship quality as a result of participating in the program because they entered the program with fewer coping resources and thus were in greater need of the intervention than mothers in the low-risk group. In addition, it may be that the low-risk group was already

using positive parenting behaviors when they entered the program and had little room for improvement.

Implications for Program Dissemination—Identification of mediating mechanisms has important implications for efforts to disseminate programs that have been evaluated in research settings in community settings (Wolchik, Sandler, Winslow, & Smith-Daniels, 2005). Price and Lorion (1989) suggested that an important step in program dissemination is to identify core elements of the program that are essential and must be implemented with a high degree of fidelity for positive program effects to be achieved. Because the mediation analyses showed that mother–child relationship quality and effective discipline partially mediated the program effects on adolescents’ mental health outcomes and academic performance, the NBP components that involve changing mother–child relationship and discipline should be considered core program components. Future efforts to implement the program in community settings need to ensure that these components are delivered with a high degree of fidelity. Similarly, evaluations in community settings might monitor program effectiveness to bring about short-term improvements in mother–child relationship quality and effective discipline to assess whether the program is having the desired effect. It is also important to note that parenting only partially mediated the program’s effects on adolescents’ mental health outcomes and academic performance, suggesting that additional factors may be important in bringing about positive outcomes. These factors include support by other group members and group leader support and promotion of a sense of efficacy in the mothers.

Strengths and Limitations of the Study—In addition to its randomized experimental and longitudinal design (spanning 6 years), the study has several other strengths. First, the mediators were specified in the theory underlying the design of the intervention, so the findings can be interpreted as supporting a priori hypothesized relations. Second, the mediators and adjustment outcomes were assessed with multiple methods (e.g., rating scales, clinical diagnostic interview, and school records) and multiple informants (e.g., mothers’ and youths’ reports), which resulted in more accurate assessment of the constructs than single-method or single-informant assessments. Third, multiple domains of adolescent functioning were assessed, including mental health outcomes, substance use, academic achievement, and competence.

The study has several limitations. First, because the sample consisted primarily of non-Hispanic Caucasian and middle-class families, the generalizability of the findings to culturally and socioeconomically diverse families is unknown. Second, although the two intervention conditions did not differ in most of the child–adolescent adjustment outcomes, it is possible that the mechanisms that mediate the effects differed across the two intervention conditions. However, because of the sample size restriction, we could not examine the mediating mechanisms separately for the two intervention conditions. Moreover, more complex mediation models (e.g., multiple mediator models) could not be examined because of the limitations imposed by the sample size. For example, it is possible that for the mother and child program group, the intervention-induced changes in children’s coping affected parenting, which in turn led to changes in adolescent outcomes. Third,

because individuals with severe levels of mental health problems at pretest were screened out and referred for treatment, the results on the NBP intervention effects and the mediating mechanisms may not generalize to those at highest risk relative to the population of children from divorced families. Despite these limitations, the present study indicated that two mediating pathways by which the NBP improved outcomes in adolescence were promotion of mother–child relationship quality and effective discipline of mothers in recently divorced families.

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References

- Achenbach TM (1991). Manual for the Child Behavior Checklist/4–18 and 1991 Profile. Burlington: University of Vermont, Department of Psychology.
- Aiken LS, & West SG (1991). Multiple regression: Testing and interpreting interactions. Newbury Park, CA: Sage.
- Amato PR, & Keith B (1991). Parental divorce and the well-being of children: A meta-analysis. *Psychological Bulletin*, 110, 26–46. [PubMed: 1832495]
- Astone NM, & McLanahan SS (1991). Family structure, parental practices and high school completion. *American Sociological Review*, 56, 309–320.
- Barnes H, & Olson DH (1982). Parent-adolescent communication In Olson D, McCubbin H, Barnes H, Larsen A, Muxen M, & Wilson M (Eds.), *Family Inventories* (pp. 33–49). St. Paul, MN: Family Social Sciences.
- Baron RM, & Kenny DA (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173–1182. [PubMed: 3806354]
- Baumrind D (1996). The discipline controversy revisited. *Family Relations: Journal of Applied Family & Child Studies*, 45, 405–414.
- Bentler PM, & Chou C (1987). Practical issues in structural modeling. *Sociological Methods & Research*, 16, 78–117.
- Bhushan R, & Shirali KA (1992). Family types and communication with parents: A comparison of youth at different identity levels. *Journal of Youth and Adolescence*, 21, 687–697. [PubMed: 24264170]
- Brown CH, & Liao J (1999). Principles for designing randomized preventive trials in mental health: An emerging developmental epidemiology paradigm. *American Journal of Community Psychology*, 27, 673–710. [PubMed: 10676544]
- Cassidy J (1994). Emotion regulation: Influences of attachment relationships. *Monographs of the Society for Research in Child Development*, 59, 228–283. [PubMed: 7984163]
- Chassin L, & Handley ED (2006). Parents and families as contexts for the development of substance use and substance use disorders. *Psychology of Addictive Behaviors*, 20, 135–137. [PubMed: 16784356]
- Chassin L, Rittler J, King K, & Trim R (2003). Adolescent substance use In Barkley R & Mash E (Eds.), *Handbook of child psychopathology* (pp. 119–232). New York: Plenum.
- Coatsworth D, & Sandler IN (1993). Multi-rater measurement of competence in children of divorce. Paper presented at the biennial conference of the Society for Community Research and Action, Williamsburg, VA.
- Cole DA, & Maxwell SE (2003). Testing mediational models with longitudinal data: Questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology*, 112, 558–577. [PubMed: 14674869]

- Cook RD (1977). Detection of influential observation in linear regression. *Technometrics*, 19, 15–19.
- Cowan PA, & Cowan CP (2002). Interventions as tests of family systems theories: Marital and family relationships in children's development and psychopathology. *Development and Psychopathology*, 14, 731–759. [PubMed: 12549702]
- Cummings EM, & Davies P (1996). Emotional security as a regulatory process in normal development and the development of psychopathology. *Development and Psychopathology*, 8, 123–139.
- Cummings EM, Davies PT, & Campbell SB (2000). *Developmental psychopathology and family process: Theory, research, and clinical implications*. New York: Guilford Press.
- Dawson-McClure SR, Sandler IN, Wolchik SA, & Millsap RE (2004). Risk as a moderator of the effects of prevention programs for children from divorced families: A six-year longitudinal study. *Journal of Abnormal Child Psychology*, 32, 175–190. [PubMed: 15164859]
- DeGarmo DS, & Forgatch MS (2005). Early development of delinquency within divorced families: Evaluating a randomized preventive intervention trial. *Developmental Science*, 8, 229–239. [PubMed: 15819755]
- DeGarmo DS, Patterson GR, & Forgatch MS (2004). How do outcomes in a specified parent training intervention maintain or wane over time? *Prevention Science*, 5, 73–89. [PubMed: 15134313]
- Eisenberg N, & Morris AS (2002). Children's emotion-related regulation In Kail RV (Ed.), *Advances in child development and behavior* (Vol. 30, pp. 189–229). San Diego, CA: Academic Press. [PubMed: 12402675]
- Epstein S (1983). Aggregation and beyond: Some basic issues on the prediction of behavior. *Journal of Personality*, 51, 360–392. [PubMed: 28497598]
- Gray MR, & Steinberg L (1999). Unpacking authoritative parenting: Reassessing a multidimensional construct. *Journal of Marriage & the Family*, 61, 574–587.
- Harter S (1985). *Manual for the self-perception profile of children (revision of the Perceived Competence Scale for Children)*. Unpublished manuscript, University of Denver.
- Hawkins JD, Catalano RF, & Miller JY (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin*, 112, 64–105. [PubMed: 1529040]
- Henry DB, Tolan PH, & Gorman-Smith D (2001). Longitudinal family and peer group effects on violence and nonviolent delinquency. *Journal of Clinical Child Psychology*, 30, 172–186. [PubMed: 11393918]
- Herman MR, Dornbusch SM, Herron MC, & Herting JR (1997). The influence of family regulation, connection, and psychological autonomy on six measures of adolescent functioning. *Journal of Adolescent Research*, 12, 34–67.
- Hinshaw SP (2002). Process, mechanism, and explanation related to externalizing behavior in developmental psychopathology. *Journal of Abnormal Child Psychology*, 30, 431–446. [PubMed: 12403148]
- Hinshaw SP, Owens EB, Wells KC, Kraemer HC, Abikoff HB, & Arnold LE, et al. (2000). Family processes and treatment outcome in the MTA: Negative/ineffective parenting practices in relation to multimodal treatment. *Journal of Abnormal Child Psychology*, 28, 555–568. [PubMed: 11104317]
- Hipke K, Wolchik SA, Sandler IN, & Braver SL (2002). Predictors of children's intervention-induced resilience in a parenting program for divorced mothers. *Family Relations: Interdisciplinary Journal of Applied Family Studies*, 51, 121–129.
- Holland PW (1988). Causal inference, path analysis, and recursive structural equation models In Clogg C (Ed.), *Sociological methodology* (pp. 449–484). Washington, DC: American Sociological Association.
- Howe GW, Reiss D, & Yuh J (2002). Can prevention trials test theories of etiology? *Development and Psychopathology*, 14, 673–694. [PubMed: 12549699]
- Johnston LD, Bachman JG, & O'Malley PM (1993). *Monitoring the future: Questionnaire responses from the nation's high school seniors*. Ann Arbor: University of Michigan, Survey Research Center.

- Kazdin AE, & Nock MK (2003). Delineating mechanisms of change in child and adolescent therapy: Methodological issues and research recommendations. *Journal of Child Psychology and Psychiatry*, 44, 1116–1129. [PubMed: 14626454]
- Kelly J, & Emery R (2003). Children's adjustment following divorce: Risk and resilience perspectives. *Family Relations*, 52, 352–362.
- Kovacs M (1981). Rating scales to assess depression in school aged children. *Acta Paedopsychiatrica*, 46, 305–315. [PubMed: 7025571]
- Kraemer HC, Wilson GT, Fairburn CG, & Agras WS (2002). Mediators and moderators of treatment effects in randomized clinical trials. *Archives of General Psychiatry*, 59, 877–884. [PubMed: 12365874]
- Kwok O, Haine RA, Sandler IN, Ayers TS, Wolchik SA, & Tein J (2005). Positive parenting as a mediator of the relations between parental psychological distress and mental health problems of parentally bereaved children. *Journal of Clinical Child and Adolescent Psychology*, 34, 260–271. [PubMed: 15901226]
- Lipsey MW (1990). Theory as method: Small theories of treatments In Sechrest L, Perrin E, & Bunker J (Eds.), *Research methodology: Strengthening causal interpretations of nonexperimental data* (DHHS Publication No. 90–3454, pp. 33–51) Washington, DC: U.S. Department of Health & Human Services, Agency for Health Care Policy & Research.
- Lochman JE (2000). Parent and family skills training in targeted prevention programs for at-risk youth. *Journal of Primary Prevention*, 21, 253–265.
- Lord RM, & Novick MR (1968). *Statistical theories of mental test scores*, with contributions by Alan Birnbaum. Reading, MA: Addison-Wesley.
- MacKinnon DP, Krull JL, & Lockwood CM (2000). Equivalence of the mediation, confounding and suppression effect. *Prevention Science*, 1, 173–181. [PubMed: 11523746]
- MacKinnon DP, Lockwood CM, Hoffman JM, West SG, & Sheets V (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods*, 7, 83–104. [PubMed: 11928892]
- MacKinnon DP, Lockwood CM, & Williams J (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research*, 39, 99–128. [PubMed: 20157642]
- MacKinnon DP, Warsi G, & Dwyer JH (1995). A simulation study of mediated effect measures. *Multivariate Behavioral Research*, 30, 41–62. [PubMed: 20157641]
- Martinez CR, & Forgatch MS (2002). Adjusting to change: Linking family structure transitions with parenting and boys' adjustment. *Journal of Family Psychology*, 16, 107–117. [PubMed: 12090250]
- Meeker WQ, Cornwell LW, & Aroian LA (1981). *Selected tables in mathematical statistics, Vol. VII: The product of two normally distributed random variables*. Providence, RI: American Mathematical Society.
- Miller BC, Benson B, & Galbraith KA (2001). Family relationships and adolescent pregnancy risk: A research synthesis. *Developmental Review*, 21, 1–38.
- Muthén LK, & Muthén BO (1998–2006). *Mplus: Statistical analyses with latent variables: User's guide*. Los Angeles, CA: Muthen & Muthen.
- Oregon Social Learning Center. (1991). *LIFT Parent Interview*. Unpublished manual, Oregon Social Learning Center, Eugene.
- Parke RD, & Buriel R (2006). Socialization in the family: Ethnic and ecological perspectives In Damon W, Lerner RM (Series Eds.), & Eisenberg N (Vol. Ed.), *Handbook of child psychology* (6th ed., pp. 429–504). Hoboken, NJ: Wiley.
- Patterson GR (1982). *A social learning approach to family intervention: III. Coercive family process*. Eugene, OR: Castalia.
- Pearl J (2000). *Causality: Models, reasoning, and inference*. New York: Cambridge University Press.
- Price RH, & Lorion R (1989). Prevention programming as organizational reinvention: From research to implementation In Shaffer D (Ed.), *Prevention of mental disorders, alcohol and other drug use in children and adolescents* (DHHS Pub. No. [ADM] 90–1646, pp. 33–51). Rockville, MD: Office for Substance Abuse Prevention & American Academy of Child & Adolescent Psychiatry.

- Program for Prevention Research. (1985). The Divorce Adjustment Project Externalizing scale. Unpublished manual, Arizona State University.
- Reid MJ, Webster-Stratton C, & Baydar N (2004). Halting the development of conduct problems in Head Start children: The effects of parenting training. *Journal of Clinical Child and Adolescent Psychology*, 33, 279–291. [PubMed: 15136193]
- Reynolds CR, & Richmond BO (1978). What I think and feel: A revised measure of children's manifest anxiety. *Journal of Abnormal Child Psychology*, 6, 271–280. [PubMed: 670592]
- Rutter M (2005). Environmentally mediated risks for psychopathology: Research strategies and findings. *Journal of the American Academy of Child & Adolescent Psychiatry*, 44, 3–18. [PubMed: 15608539]
- Sandler IN (2001). Quality and ecology of adversity as common mechanisms of risk and resilience. *American Journal of Community Psychology*, 29, 19–61. [PubMed: 11439827]
- Sandler IN, Ayers TS, Wolchik SA, Tein J, Kwok O, Haine RA, et al. (2003). The Family Bereavement Program: Efficacy evaluation of a theory-based prevention program for parentally bereaved children and adolescents. *Journal of Consulting and Clinical Psychology*, 71, 587–600. [PubMed: 12795581]
- Sandler IN, Wolchik SA, Ayers TS, Tein J-Y, Coxe S, & Chow W (in press). Linking theory and intervention to promote resilience of children following parental bereavement In Stroebe M, Hansson M, Stroebe W, & Schut H (Eds.), *Handbook of bereavement research: Consequences, coping and care*. Washington, DC: American Psychological Association.
- Sandler IN, Wolchik SA, Davis CH, Haine RA, & Ayers TS (2003). Correlational and experimental study of resilience for children of divorce and parentally-bereaved children In Luthar SS (Ed.), *Resilience and vulnerability: Adaptation in the context of childhood adversities* (pp. 213–243). New York: Cambridge University Press.
- Sandler IN, Wolchik SA, Winslow EB, & Schenck C (2006). Prevention as the promotion of healthy parenting following parental divorce In Beach SR, Wamboldt M, Kaslow N, Heyman R, First M, Underwood L, & Reiss D (Eds.), *Relational processes in DSM-V: Neuroscience, assessment, prevention and treatment* (pp. 195–211). Washington, DC: American Psychiatric Publishing.
- Schaefer ES (1965). Children's report of parental behavior: An inventory. *Child Development*, 36, 413–424. [PubMed: 14300862]
- Shaffer D, Fisher P, Lucas C, Dulcan MK, & Schwab-Stone M (2000). NIMH Diagnostic Interview Schedule for Children, Version IV (NIMH DISC-IV): Description, differences from previous versions and reliability of some common diagnoses. *Journal of the American Academy of Child & Adolescent Psychiatry*, 39, 28–38. [PubMed: 10638065]
- Shrout PE, & Bolger N (2002). Mediation in experimental and non- experimental studies: New Procedures and recommendations. *Psychological Methods*, 7, 422–445. [PubMed: 12530702]
- Simons RL, & Johnson C (1996). Mother's parenting In Simons RL (Ed.), *Understanding differences between divorced and intact families: Stress, interaction, and child outcome*. (pp. 81–93). Thousand Oaks, CA: Sage.
- Steinberg L (2001). We know some things: Parent-adolescent relationships in retrospect and prospect. *Journal of Research on Adolescence*, 11, 1–19.
- Stevens JP (1984). Outliers and influential data points in regression analysis. *Psychological Bulletin*, 95, 334–344.
- Tein J, Sandler IN, Ayers TS, & Wolchik SA (2006). Mediation of the effects of the family bereavement program on mental health problems of bereaved children and adolescents. *Prevention Science*, 7, 179–195. [PubMed: 16775760]
- Tein J, Sandler IN, MacKinnon DP, & Wolchik SA (2004). How did it work? Who did it work for? Mediation in the context of a moderated prevention effect for children of divorce. *Journal of Consulting and Clinical Psychology*, 72, 617–624. [PubMed: 15301646]
- Teleki JK, Powell JA, & Dodder RA (1982). Factor analysis of reports of parental behavior by children living in divorced and married families. *Journal of Psychology*, 112, 295–302. [PubMed: 7175769]
- Weersing VR, & Weisz JR (2002). Mechanisms of action in youth psychotherapy. *Journal of Child Psychology and Psychiatry*, 43, 3–29. [PubMed: 11848335]

- West SG, Finch JF, & Curran PJ (1995). Structural equation models with nonnormal variables: Problems and remedies In Hoyle RH (Ed.), *Structural equation modeling: Concepts, issues and applications* (pp. 56–75). Thousand Oaks, CA: Sage.
- Wolchik SA, Sandler IN, Millsap RE, Plummer BA, Greene SM, Anderson ER, et al. (2002, 10 16). Six-year follow-up of preventive interventions for children of divorce. A randomized controlled trial. *JAMA*, 288, 1874–1881. [PubMed: 12377086]
- Wolchik S, Sandler I, Weiss L, & Winslow E (2007). New Beginnings: An empirically-based intervention program for divorced mothers to help children adjust to divorce In Briesmeister JM & Schaefer CE (Eds.), *Handbook of parent training: Helping parents prevent and solve problem behaviors* (3rd ed., pp. 25–62). Hoboken, NJ: Wiley.
- Wolchik SA, Sandler IN, Winslow E, & Smith-Daniels V (2005). Programs for promoting parenting of residential parents: Moving from efficacy to effectiveness. *Family Court Review*, 43, 65–80.
- Wolchik SA, Tein J, Sandler IN, & Ayers TS (2006). Stressors, quality of the child-caregiver relationship, and children's mental health problems after parental death: The mediating role of self-system beliefs. *Journal of Abnormal Child Psychology*, 34, 221–238. [PubMed: 16502140]
- Wolchik SA, Tein J, Sandler IN, & Doyle KW (2002). Fear of abandonment as a mediator of the relations between divorce stressors and mother-child relationship quality and children's adjustment problems. *Journal of Abnormal Child Psychology*, 30, 401–418. [PubMed: 12108768]
- Wolchik SA, West SG, Sandler IN, Tein J, Coatsworth D, & Lengua L, et al. (2000). An experimental evaluation of theory-based mother and mother-child programs for children of divorce. *Journal of Consulting and Clinical Psychology*, 68, 843–856. [PubMed: 11068970]
- Wolchik SA, Wilcox KL, Tein J, & Sandler IN (2000). Maternal acceptance and consistency of discipline as buffers of divorce stressors on children's psychological adjustment problems. *Journal of Abnormal Child Psychology*, 28, 87–102. [PubMed: 10772352]
- Young DW, & Childs AN (1994). Family images of borderline adolescents. *Psychiatry Interpersonal and Biological Processes*, 58, 164–172.

Model A. Measurement Model for T1 Parenting.

Model B. Measurement Model for T2 Parenting.

Figure 1.

The measurement models for Time (T) 1 and T2 parenting. The numbers in the figures are standardized loadings or correlations between latent factors. M-C =mother-child; Rep =report. * $p < .05$. *** $p < .001$.

Model A. Single-Sample Mediation Model for Adjustment Outcome on which Only the Intervention Main Effect was Significant.

Low Risk Group

High Risk Group

Model B. Two-Group Mediation Model for Adjustment Outcome on which the Intervention × Baseline Risk Interaction was Significant.

Figure 2. Two-way strategies for testing mediation of intervention effect on Time 5 (T5) adjustment outcomes.

*Baseline Risk by Program Interaction
in the Prediction of Adolescent Externalizing Problems*

Figure 3.

The Intervention $\times$ Baseline Risk interaction effect on adolescent externalizing problems. The two vertical lines mark the Johnson-Neyman lower and higher regions of significance, respectively.

Figure 4.

Single-group mediational model for Time (T) 2 effective discipline as a mediator of intervention effect on T5 GPA. The numbers in the figure are standardized path coefficients.

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

Figure 5.

Two-group partially constrained model for Time (T) 2 mother-child relationship quality as a mediator of intervention effect on T5 externalizing problems. The standardized path coefficients are presented in the figure. P-C =parent-child. * $p < .05$. *** $p < .001$.

Table 1
Means, Standard Deviations, and Zero-Order Correlations Among the Risk Index, Putative Mediators, and Outcomes

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. T1 risk	—											
2. T1 M-C relationship	-.36***	—										
3. T1 discipline	-.34***	.50***	—									
4. T2 M-C relationship	-.39***	.68***	.40***	—								
5. T2 discipline	-.26***	.31***	.60***	.53***	—							
6. T5 externalizing	.34***	-.13*	-.23**	-.22**	-.16*	—						
7. T5 internalizing	.25***	-.13 [†]	-.13 [†]	-.18**	-.04	.63***	—					
8. T5 competence	-.24***	.27***	.17*	.24***	.14*	-.51***	-.59***	—				
9. T5 GPA	-.32***	.17*	.23**	.21***	.28***	-.43***	-.21**	.53***	—			
10. T5 mental symptom counts	.43***	-.20**	-.25***	-.24***	-.13 [†]	.63***	.59***	-.50***	-.37***	—		
11. T5 no. of sexual partners	.12 [†]	-.07	-.03	-.11	-.07	.26***	.23**	-.16*	-.27***	.23**	—	
12. T5 substance use	.22**	-.15*	-.14*	-.11	-.03	.36***	.35***	-.25***	-.29***	.43***	.49***	—
<i>M</i>	0.00	0.00	0.00	0.00	0.00	0.02	0.02	-0.08	2.84	35.61	1.13	-0.004
<i>SD</i>	1.00	0.89	0.78	0.90	0.76	1.73	1.77	2.56	0.68	20.12	2.26	0.85

Note. T = Time; M-C = mother-child.

[†] $p < .10$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 2

Summary of the Model Fit Indexes and Path Coefficients for Two-Group Mediation Models

Models testing	a^a	b	c	$\chi^2{}^b$	df	RMSEA	CFI	$\chi^2(3)^c$
T2 M-C relationship quality as a mediator of intervention effect on T5 outcomes								
1. Intervention → T2 M-C relationship quality → T5 externalizing				3.83	6	.000	1.00	8.14 [*]
High-risk group	.16 [*]	-.21 [*]	-.22 [*]					
Low-risk group	.08	-.04	.01					
2. Intervention → T2 M-C relationship quality → T5 internalizing				2.78	6	.000	1.00	10.34 [*]
High-risk group	.16 [*]	-.20 [*]	-.21 [*]					
Low-risk group	.08	.02	.07					
3. Intervention → T2 M-C relationship quality → T5 symptoms of mental disorders				6.69	6	.032	0.99	8.59 [*]
High-risk group	.16 [*]	-.23 [*]	-.16					
Low-risk group	.08	-.04	.11					
4. Intervention → T2 M-C relationship quality → T5 competence				6.71	6	.033	0.99	5.45
High-risk group	.16 [*]	.10	.25 [*]					
Low-risk group	.08	.24 ^{**}	.01					
5. Intervention → T2 M-C relationship quality → T5 substance use				6.07	6	.010	1.00	6.75
High-risk group	.16 [*]	-.10	-.17					
Low-risk group	.08	-.04	.11					
T2 effective discipline as a mediator of intervention effects on T5 outcomes								
6. Intervention → T2 effective discipline → T5 externalizing				12.22	6	.098	0.94	5.64
High-risk group	.22 [*]	-.13	-.21 [*]					
Low-risk group	.21 ^{**}	-.01	.02					
7. Intervention → T2 effective discipline → T5 internalizing				8.40	6	.061	0.98	5.66
High-risk group	.22 [*]	.03	-.23 [*]					
Low-risk group	.21 ^{**}	.04	.06					
8. Intervention → T2 effective discipline → T5 symptoms of mental disorder ^d				7.36	4	.088	0.97	7.93 [*]
High-risk group	.22 ^{**}	.14	-.24 ^{**}					
Low-risk group	.21 ^{**}	.12	-.03					
9. Intervention → T2 effective discipline → T5 competence				7.57	6	.049	0.99	4.34
High-risk group	.22 [*]	.05	.25 [*]					
Low-risk group	.21 ^{**}	.06	.02					
10. Intervention → T2 effective discipline → T5 substance use ^d				4.36	4	.029	1.00	7.41 [†]
High-risk group	.22 [*]	.18	-.24 [*]					
Low-risk group	.21 ^{**}	.10	-.003					

Note. M-C =mother-child; T =Time.

^aThe *a*, *b*, *c* report the standardized path coefficients for the three mediational paths for the high- and low-risk groups, respectively.

^bThe chi-square, root-mean-square error of approximation (RMSEA), and confirmatory fit index (CFI) are for the partially constrained model in which all but the three mediational paths (*a*, *b*, and *c*) were constrained to be invariant across the two groups.

^cThe χ^2 is the difference in chi-squares between the fully constrained and the partially constrained models, which indicates whether releasing the three mediational paths (*a*, *b*, and *c*) to be invariant across the high- and low-risk groups significantly improved the model fit.

^dFor the models of discipline as a mediator of the intervention effect on T5 mental symptoms, the original partially constrained models did not fit the data well. After examining the modification indices, we added an additional path (from T1 effective discipline to T5 mental symptoms or T5 substance use), and the model fit indexes improved significantly. Although the chi-square difference tests between the fully constrained and the partially constrained models, mediation by T2 effective discipline was not present in either the high-risk or the low-risk group for both sets of models.

[†] $p < .10$.

^{*} $p < .05$.

^{**} $p < .01$.