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Bidirectional Effects Between Parenting Practices and Child Externalizing Behavior: A Cross-Lagged Panel Analysis in the Context of a Psychosocial Treatment and 3-Year Follow-Up

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Abstract

In the current study, we examined longitudinal changes in, and bidirectional effects between, parenting practices and child behavior problems in the context of a psychosocial treatment and 3-year follow-up period. The sample comprised 139 parent-child dyads (child ages 6–11) who participated in a modular treatment protocol for early-onset ODD or CD. Parenting practices and child behavior problems were assessed at six time-points using multiple measures and multiple reporters. The data were analyzed using cross-lagged panel analyses. Results indicated robust temporal stabilities of parenting practices and child behavior problems, in the context of treatment-related improvements, but bidirectional effects between parenting practices and child behavior were less frequently detected. Our findings suggest that bidirectional effects are relatively smaller than the temporal stability of each construct for school-age children with ODD/CD and their parents, following a multi-modal clinical intervention that is directed at both parents and children. Implications for treatment and intervention are discussed.

Keywords

Parenting; Disruptive behavior disorders; Intervention; Bidirectional

Since Bell's (1968) seminal paper on the bidirectional nature of socialization effects, researchers have actively considered models in which children influence parents just as parents influence children (Pettit & Arsiwalla, 2008). What started with an appreciation for how characteristics or behaviors of the child can evoke different parental responses has grown more complex in recent years. The study of transactional effects between parents and children is consistent with a developmental psychopathology perspective in investigating interactions among systems at multiple levels, and the roles of bidirectional influence on development (Cowan & Cowan, 2006; Sameroff, 2000). That is, it is not only the case that parenting behaviors can produce changes in child behaviors, but that child behaviors also influence parents' behavior and adjustment. The importance of understanding the process and mechanisms of treatment effects (e.g., the order of treatment effects, the relevance of intermediate changes during treatment) is becoming more widely recognized. Yet at the same time, empirical research has lagged behind in addressing these issues using actual outcome data to address questions of why and how psychological treatments work for

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children and families (Kazdin & Nock, 2003; Weersing & Weisz, 2002). This research is not only of theoretical interest, to enhance our understanding of how our developmental models of child psychopathology are applied and borne out in treatment outcome research, but is also of critical importance to improving and enhancing clinical practice (Kazdin & Nock, 2003). The goal of the current study was to identify and describe 3-year longitudinal continuity and potential transactional relations between child behavior and parenting practice, in the context of a treatment study designed to improve parenting behavior and reduce child externalizing behavior problems.

Bidirectional Parent-Child Effects in Developmental Studies

Several studies from the developmental literature focused on bidirectional effects with the advent of sophisticated statistical modeling techniques for longitudinal data. For example, Burke and colleagues reported on reciprocal relations between child disruptive behaviors and parenting behaviors using annual assessments over a period from middle childhood to late adolescence (Burke, Pardini, & Loeber, 2008). Specifically, they found stronger influences from child disruptive behaviors (i.e., ODD) to decrements in multiple parenting practices, including harsh parenting and timid discipline, as compared to parent-to-child effects. Parents' timid discipline (i.e., reluctance to enforce limits or hesitation to carry out discipline) was the only parenting behavior that predicted increases in child behavior problems over time in this study. Investigating similar bidirectional processes in a diverse sample, Pardini and colleagues found evidence of bidirectional effects between negative parenting practices and conduct problem that did not vary in their magnitude across developmental periods from middle childhood to adolescence, and were largely similar across racial groups (Pardini, Fite, & Burke, 2008).

In another recent study that examined reciprocal effects between parent disciplinary practices and child behavior problems, Lansford and colleagues reported consistent parent-to-child effects of physical discipline on increasing child antisocial behavior in annual assessments across two samples of different ages (i.e., middle childhood and early adolescence; Lansford et al., 2011). However, their findings were less consistent across the two samples regarding child-to-parent effects, with only the middle childhood sample evidencing significant effects of child antisocial behavior on increasing parental physical discipline. Yates and colleagues have also investigated bidirectional relations between child adjustment and indicators of positive parenting quality (e.g., observed supportive presence with the child, structure and limit-setting in interactions), as well as the contextual effects of social stressors, in a nonclinical sample of families with children assessed at 24, 42, and 72 months of age (Yates, Obradović, & Egeland, 2010). Of note, this study reported the strongest effects for individual stability of child behavior and parenting, with less consistent evidence of transactional effects between parents and children across early childhood, with the exception of a developmental cascade from child regulation/adaptation to parenting quality, and later to academic achievement at 72 months detected for boys. In another study of parents and male children, no effects of parenting behaviors (i.e., positive parenting, involvement, monitoring, and inconsistent discipline) were detected in relation to child externalizing behaviors beyond within-domain stability of these behaviors across grades 4 to 8 (Fite, Colder, Lochman, & Wells, 2006). In contrast, child externalizing behaviors did predict a worsening of parental monitoring and inconsistent discipline over time. Taken together, these developmental studies provide a mixed picture and indications that child age and the relative stability of parent and child behavior at different developmental periods should be taken into account.

Models of Behavior Change in the Treatment Literature

When considering treatment and behavior change that occurs in family context, it is necessary to consider the "nonindependence" of the data and the fact that parents and children are mutually influential in their emotions and behaviors. This is implied in parent-directed treatments, where the parent is necessarily the mediator of change in child disruptive behavior – by intervening to change parenting, this effectively changes the behavioral contingencies and patterns of responsivity in the parent-child relationship, leading in turn to improvements in child behavior (Forgatch & DeGarmo, 1999; Masten & Shaffer, 2006). In the disruptive behavior disorder (DBD) treatment literature, inter-relations between changes in parent and child behavior have mostly been studied using traditional mediation models (Kazdin & Nock, 2003) rather than reciprocal or bidirectional models. In traditional mediation models (Baron & Kenny, 1986), the independent variable (in this case, the treatment) exerts its influence on the dependent variable indirectly, through direct relations to the mediator variable which subsequently causes or influences the dependent variable. To this end, and consistent with the behavioral theories explicated above, change in child behavior is thought to be mediated by change in parenting. In fact, parent-directed treatments are built on the supposition that ineffective, harsh, or inconsistent parenting behaviors have inadvertently reinforced or maintained disruptive behaviors, and can be modified to result in subsequent improvements in child behavior (Patterson, Reid, & Dishion, 1992; Reid & Patterson, 1989). The parenting interventions that have been built on these theories purport that improvements in child behavior result from intervention-related changes in parenting (Weersing & Weisz, 2002).

The proposed intervention mechanisms by which parent-directed treatment improves parenting behavior and leads to subsequent improvements in child behavior is in need of further investigation (Diamond & Josephson, 2005), though there is growing support for these theoretical assertions in the empirical literature (e.g., Beauchaine, Webster-Stratton, & Reid, 2005; DeGarmo, Patterson, & Forgatch, 2004; Martinez & Forgatch, 2001). As specific examples, recent outcome data reported by Shaw and colleagues, utilizing latent growth models, detected the reduction of maternal depression as a mediator of the effects of a behavioral parenting intervention, the Family Check Up, on improvements in child internalizing and externalizing problems from ages 2 to 4 (Shaw, Connell, Dishion, Wilson, & Gardner, 2009). Cascading effects of a preventive parenting intervention have also been noted in outcomes from the New Beginnings program for divorced families, including improvements in effective parental discipline leading to improvements in child externalizing behavior over time (McLain et al., 2010).

These mediation models have moved the literature forward in many ways, but also present some major limitations to the study of bidirectional effects between parents and children in the study of DBD treatment. First, these models generally are unidirectional in nature, considering the influence of treatment on parents, and subsequently on children. Yet parenting researchers have long called for the consideration of bidirectional relations between parent and child variables (Bell, 1968; Emery, Binkoff, Houts, & Carr, 1983; Sameroff, 1975). While developmental research has more recently illustrated the nature of these bidirectional effects over time, as noted above (e.g., Lansford et al., 2011; Yates et al., 2010), the child and parent clinical intervention literature lags behind with regard to these methodological advances (see Burke et al., 2008 for an exception). Indeed, the nature of bidirectional effects between parent and child behavior may be different in a clinical context as compared to a general developmental context: in the treatment of disruptive behaviors, parents are coached to respond less aggressively or coercively to child problem behaviors. Therefore, it might be reasonable to expect attenuated child-to-parent effects in the context of a longitudinal treatment study as compared to a non-clinical study of development.

Second, the time points of the assessments are concurrent in many of the treatment outcome studies, where changes in both parent and child outcomes are only measured at post-treatment (but see McLain et al., 2010, for an exception). In contrast, the rigorous assessment of mediation effects, and especially bidirectional effects, requires multiple time points in order to assess processes of indirect or cascading influence (Kraemer, Stice, Kazdin, Offord, & Kupfer, 2001; Kraemer, Wilson, Fairburn, & Agras, 2002). Patterson, DeGarmo, and Forgatch (2004) have utilized longitudinal data collected every 6 months across 30 months following a behavioral parenting intervention to examine cross-lagged relations among parenting practices, maternal depression and child behavior problems in middle childhood. This research approach enables the investigation of family systemic effects of parenting interventions. In this study by Patterson and colleagues, a significant cross-lag effect was detected such that improvements in maternal depression predicted later improvements in effective parenting practices (e.g., positive involvement, monitoring), beyond the effects of longitudinal continuity in all domains (Patterson et al., 2004).

Third, less research has examined how behavior change occurs and may be reciprocal across parents and children in interventions that target both parent and child behavior. While studies such as those outlined above (e.g., Patterson et al., 2004) have been informative, they focus on interventions that are directed exclusively at parents. As noted byBurke et al. (2008), interventions that are directed at both parents and children could be more effective than interventions than target parents alone (see also Pardini, 2008). However, the majority of clinical studies that have examined bidirectional relations between parent and child behavior following intervention have focused on treatments that are primarily parent-directed (e.g., Patterson et al., 2004; Shaw et al., 2009). Thus, the nature of bidirectional relations in the context of multi-modal treatments for disruptive behavior disorders remains understudied.

Finally, many of the extant studies of bidirectional effects have been subject to the possible effects of reporter bias, due to reliance on a single reporter, such as mother report, for both parent and child behavior or functioning (e.g., Shaw et al., 2009). For example, numerous studies have shown child-to-parent longitudinal relations between behavior problems among adolescents and subsequent decrements in parenting (e.g., Albrecht, Galambos, & Jansson, 2007; Huh, Tristan, Wade, & Stice, 2006; Reitz, Dekovic, & Meijer, 2006); however, these studies have relied only on adolescent self-report of behavior and perceptions of parenting. Exceptions have been presented in the developmental literature, with research on transactional parent-child effects that also incorporates multiple reporters (e.g., Lansford et al., 2011; Yates et al., 2010); however, the literature on clinical interventions for disruptive behavior disorders can benefit from continued attention to this methodological issue.

Expanding Treatment Targets Beyond Parents: Implications for Parent-Child Relations and Treatment Outcome Measurement

Although there are numerous examples of treatments for disruptive behavior that are primarily parent-directed (e.g., Parent Management Training; Patterson, Reid, Jones, & Conger, 1975; Helping the Noncompliant Child, McMahon & Forehand, 2003; Parent-Child Interaction Therapy, Zisser & Eyberg, 2010) or child-directed (e.g., Problem-Solving Skills Training, Kazdin, 2010; Anger Coping Program, Larson & Lochman, 2002), some treatments include protocols for working both with children and their parents (e.g., Incredible Years; Webster-Stratton & Reid, 2010; combined Parent Management Training and Problem-Solving Skills Training, Kazdin, 2010).

While the processes of treatment effects are well articulated for parent-directed interventions that address child disruptive behavior, as outlined in the preceding section, this is not the

case for other types of interventions. For interventions with child disruptive behavior disorders that target both parents and children as the recipients of treatment, there is a need to understand the inter-related and potentially complex effects of the treatment on two (or more) related individuals.

Current Study

The current study examined longitudinal and bidirectional effects over a 3-year period, between child externalizing behavior and negative parenting practices in the context of a psychosocial treatment designed to improve parenting as well as reduce child externalizing behavior problems. The study sample includes 139 families (child participants ranged in age from 6–11 and were predominantly male) who participated in a modular treatment protocol developed for early-onset ODD or CD, which was delivered in either the research clinic or community settings. The protocol consisted of seven brief treatment modules; treatment content included evidence-based interventions for child cognitive behavioral therapy (CBT) training, parent management training, parent–child treatment, school/educational intervention, peer/social network intervention, community liaison work, case/crisis management or monitoring, and medication management (Kolko, 1995; Kolko & Swenson, 2002) directed at both child and parent participants. Previous research has demonstrated that this intervention is associated with post-treatment improvements in child behavior problems, including internalizing and externalizing symptoms (Kolko et al., 2009), that are maintained over 3 years with no differences in treatment effects across treatment settings (i.e., research clinic vs. community). Comparable improvements have also been demonstrated for parenting practices and parent functioning (Shaffer, Lindhiem, & Kolko, under review).

Method

Participants

Participants were 139 caregiver-child dyads who were referred due to concerns of child behavior problems. The sample was recruited from an urban environment in the mid-Atlantic region. Of the children, 118 (85%) were male and 21 (15%) were female. Age at enrollment ranged from 6 to 11 years (M = 8.8; SD = 1.6). Twenty-nine (21%) met DSM-IV criteria for Conduct Disorder (CD) and 115 (83%) met DSM-IV criteria for Oppositional Defiant Disorder (ODD). (Five met criteria for both CD and ODD.) A significant majority (76%) met DSM-IV criteria for comorbid Attention-Deficit/Hyperactivity Disorder (ADHD). Caregivers identified their children as: 1) African American, not of Hispanic origin (n = 64; 46%), 2) White, not of Hispanic origin (n = 66; 47%), 3) biracial (n = 8; 6%), and 4) Hispanic (n = 1; 1%). Family income for the sample was generally modest to low (median family income < $25,000) and over half ($n$ = 85; 61%) of parents were unmarried. Although more than one caregiving adult could participate in treatment, only one was identified as the respondent for all caregiver measures. This was generally the mother (n = 116; 83%). Fathers accounted for 10% of respondents (n = 14) and the remaining nine respondents (6%) were generally grandparents. Additional details describing the sample can be found elsewhere (see Kolko et al., 2009).

Measures

Child behavior problems—Child behavior problems were assessed using the externalizing scales of the Child Behavior Checklist (CBCL; Achenbach, 1991) and the Teacher Rating Form (TRF; Achenbach, 1991). At each of the six assessments, the CBCL was completed by a parent using standard procedures whereas the TRF was completed by one of the child's teachers. This provided data on child behavior problems from two independent reporters. Both the CBCL and TRF have well-established validity and

reliability. The CBCL asks respondents to report on behaviors that have occurred in the "past six months," which was appropriate to the time range of follow-up assessments. Standardized scores are normed with a mean of 50, with scores above 65 indicating clinical significance.

Parenting practices—Parenting practices were assessed using the Alabama Parenting Questionnaire (APQ; Shelton, Frick, & Wootton, 1996) and the Parent Perception Inventory (PPI; Hazzard, Christensen, & Margolin, 1983). At each of the six assessments, the APQ was completed by the parent whereas the PPI was completed by the child. This provided data on parenting practices from both the parent and child for each dyad. The PPI is individually administered by a trained staff person who reads descriptions and examples of each parenting behavior and the child responds on a 5-point scale ("never," "a little," "sometimes," "pretty much," or "a lot"). In our analyses we used the Inconsistent Discipline (α = .67), Poor Monitoring (α = .75), and Corporal Punishment (α = .68) scales from the APQ and the Negative Parenting (α = .80) scale from the PPI. On all of these measures, higher scores indicate more negative parenting behaviors. In terms of validity, the APQ discriminates well between families of children with disruptive behavior disorder diagnoses and normal controls. The PPI also has good evidence of both convergent and discriminant validity (Glaser, Horne, & Myers, 1995; Hazzard et al., 1983).

Procedure

Recruitment procedures—Families were referred by program sites affiliated with the University of Pittsburgh Medical Center and all procedures for the ethical treatment of participants were obtained by the relevant Institutional Review Board. Eligibility requirements included child-age (6–11 years) and a current diagnosis of Oppositional Defiant Disorder (ODD) or Conduct Disorders (CD). Exclusion criteria included concurrent treatment for a disruptive behavior disorder (except psychotropic medication for disruptive behavior disorders), IQ below 70, suicidality with a plan, homicidality, substance abuse, and presence of an eating disorder or major psychiatric condition. Of a total 704 families who were screened, 470 (67%) were ruled-out during the screen due to ineligibility or disinterest in participating. An additional 53 (8%) did not complete the initial assessment and 42 (6%) were deemed ineligible at the initial assessment. Informed consent (caregiver) and assent (child) were obtained before beginning the initial pre-treatment assessment. Families enrolled in the final sample were randomized to either a "clinic" condition (n = 70) or "community" condition (n = 69). The only difference between the two conditions was the setting in which the treatment was delivered. Both conditions received identical treatment content. The treatment was equally effective for both conditions in term of reducing child behavior problems (Kolko et al., 2009) and improving parenting practices (Shaffer et al., under review). As such, the two conditions are combined into a single sample in the current study.

Treatment and assessment procedures—Treatment in the clinic condition was delivered in a university clinic whereas treatment in the community condition was delivered in a community setting (generally the home). Clinicians were masters-level female therapists with training in cognitive-behavioral therapy and at least two years of experience treating childhood externalizing behavior problems. Study clinicians delivered all of the treatment content with the exception of supplemental medication consults, which were conducted by a board-certified child and adolescent psychiatrist. Treatment sessions were scheduled weekly. The same caregiver who completed all forms and interviews participated in treatment. On average, families participated in 18 (SD = 8) treatment sessions over approximately four months. Therapists were encouraged to complete treatment within six months. Outcome measures were completed at each of six assessments: 1) pre-treatment (n = 139), 2) post-

treatment (n = 137), 3) 6-month follow-up (n = 135), 4) 12-month follow-up (n = 135), 5) 24-month follow-up (n = 134), and 6) 36-month follow-up (n = 129). Assessments were conducted by full-time research specialists who were blind to treatment condition, study design, hypotheses, and all other study data. Additional details describing the study design and procedures can be found elsewhere (Kolko et al., 2009).

Treatment content—The treatment protocol consisted of seven modules found to be efficacious in prior outcome studies of childhood disruptive behavior disorders (Kolko, 1995; Kolko, Loar, & Sturnick, 1900), childhood fire-setting (Kolko, 2001), and working with aggressive/abusive families (Kolko, 1996a, 1996b; Kolko & Swenson, 2002; Kolko, Iselin, & Gully, in press). The seven modules were as follows: 1) parent management training, 2) child CBT/skills training, 3) parent-child family sessions, 4) teacher consultation, 5) peer relations/community activities development, 6) medication consult for comorbid ADHD cases, and 7) crisis management. The first three modules were core modules designed to be conducted with all families, whereas the remaining four modules were supplemental modules designed to be conducted on an as-needed basis. Psychosocial treatment sessions were scheduled weekly and therapists were encouraged to complete treatment within six months. Families participated in 0–41 treatment sessions (M = 17.7; SD = 8.2) over 0–8 months (M = 4.3; SD = 1.7). Additional details describing the treatment content can be found elsewhere (Kolko et al., 2009). In summary, the vast majority of families received parent management training (94.2%), child CBT/skills training (94.2), parent-child family sessions (95.7%), and teacher consultation (80.6%). A minority of families received peer relations/community activities development sessions (11.5%), medication consults (13.7%), and crisis management (24.5%).

All modules were administered by the primary clinicians, except the medication consult which was conducted by a board-certified child and adolescent psychiatrist. Of the 106 children who were diagnosed with comorbid ADHD at intake, only 29 (27%) were already on psychotropic (generally stimulant) medication; 90% of these children continued to take medication during the treatment phase of the study. Forty-one (53%) of the remaining children with ADHD who were not already taking medication at the beginning of the study initiated medication management via participation in the medication consult module. In total, only 29% of the total sample (41/139) initiated medication management during the active phase of treatment. A separate paper documents the clinical correlates and outcomes associated with the medication management module (Demidovich, Kolko, Bukstein, & Hart, 2011). In summary, medication was associated with some reduction in ADHD symptoms but did not contribute to reduction in ODD or CD symptoms.

Data Analyses

Preliminary data analyses were conducted using SPSS. Cross-lagged longitudinal path models were tested using Mplus version 6.11 (Muthen & Muthen, 2010). Mplus has the capability to adjust for the relatively small amount of missing data using full information maximum estimation. Because the parenting and child behavior measures were somewhat skewed (generally low and positive), we used Mplus's MLR estimator. The MLR estimator provides parameter estimates that adjust for non-normality of observations. Eight separate cross-lagged path models were tested, each using a different combination of parenting construct (e.g., APQ Corporal Punishment), and child behavior measure (parent report [i.e., CBCL] versus teacher report [i.e., TRF]). Each path model included ten stability paths from one time point to the next (e.g., 6 Months Externalizing to 12 Months Externalizing) and ten cross-lagged paths (e.g., 6 months Externalizing to 12 months Corporal Punishment). The term "stability," as it is used in the context of cross-lagged path models, does not necessarily mean that scores change very little. The term "stability path" is used in the literature to

characterize beta coefficients for a variable at one time point regressed on the same variable and another time point. It is important to keep in mind, therefore, that significant stability paths are not incompatible with treatment effects (i.e. mean changes in scores).

Results

Descriptive statistics for all of the variables at each of the six time points are summarized in Table 1. The values indicate a decrease in both negative parenting practices and child externalizing behavior from pre-treatment to post-treatment (Time 1 to Time 2). Most measures also evidenced maintenance of these gains through the 36-month follow-up assessment, consistent with previous reports (Kolko et al., 2009; Shaffer et al., under review). The one exception was "poor monitoring" on the APQ which increased again over the next 2.5-year follow-up period (Time 2 to Time 6). It is not unexpected that "poor monitoring" scores increase with age (Shelton, Frick, & Wootton, 1996); parental monitoring often decreases as children get older, quite intuitively, resulting in higher scores on "poor monitoring."

Bivariate correlations between the variables at timepoint 1 are summarized in Table 2. The first cross-lagged path model was tested using child reports of negative parenting (PPI) and teacher reports of child behavior problems (TRF). Bivariate correlations between the variables in the model are summarized in Table 3. Overall, the model demonstrated excellent fit, χ^2 (20) = 19.51, p = .49, comparative fit index (CFI) = 1.00, root mean square error of approximation (RMSEA) = .000. Standardized regression weights for the model paths are presented along with the path diagram (Figure 1). Unstandardized regression weights are presented in Table 4. All ten stability paths including adjacent time points were statistically significant at the preset alpha level of .05 (all ps < .01), indicating temporal stability from one time point to the next. One of the ten cross-lagged paths was statistically significant, the path from time 3 externalizing to time 4 negative parenting.

The remaining seven cross-lagged path models are summarized in Table 5. Tables of the descriptive statistics and bivariate correlations between the variables in each of these models can be obtained from the authors. These models included multiple negative parenting constructs (e.g., corporal punishment), multiple measures (PPI; APQ; CBCL; TRF), and multiple reporters (child; caregiver; teacher). The models all had relatively similar χ^2 values and model fit indices, all reflecting adequate to excellent fit with the data. χ^2 values ranged from 15.87 to 31.33, ps > .05 (ranging from .05 to .73). CFIs ranged from .977 to 1.00. RMSEAs ranged from .064 to .000. In each of the models, all ten of the adjacent time point stability paths were statistically significant (all ps < .05) whereas no more than one of the ten cross-lagged paths were statistically significant in each model. Four of the five significant cross-lag effects were in the direction of child behavior to parenting. These were TRF externalizing (time 3) to PPI negative parenting (time 4), TRF externalizing (time 3) to APQ inconsistent discipline (time 4), TRF externalizing (time 1) to APQ poor monitoring (time 2), and CBCL externalizing (time 4) to APQ poor monitoring (time 5). The remaining significant cross-lag effect was from APQ corporal punishment (time 1) to TRF externalizing (time 2). Finally, chi-square difference tests indicated no improvement in model fit (all p-values > .05) for each model when the model that contained the ten cross-lagged paths was compared to a model with the same constructs and measures that did not contain the cross-lagged paths.[1]

[1]Sample size prevented analyses with child sex as a covariate or moderator. However, exploratory cross-lagged analyses with the subsample of males (n = 118) were very similar in terms of longitudinal stability and cross-domain paths. Details of these analyses are available from the authors.

Discussion

Summary of Goals and Findings

The current study extends the extant literature on the relationship between parenting and child behavior by examining the temporal stability and bidirectional effects of these constructs in the context of a behavioral intervention that is delivered simultaneously to a sample of predominantly male school-age children with ODD/CD and their caregivers. The examination of these relations is also consistent with identified needs within the child treatment literature to address treatment process and the order of treatment effects, to better refine intervention development and dissemination (Kazdin & Nock, 2003; Weersing & Weisz, 2002).

Temporal stability and bidirectional effects—Results of the longitudinal analyses suggested consistent evidence of within-domain stability for child behavior problems and for parenting practices. Although child behavior problems and negative parenting practices showed significant decreases post-treatment, these longitudinal analyses reflect rank-order stability within the sample. In contrast to the strong within-domain stability, there was less evidence of statistically significant cross-lagged effects between child behavior problems and parenting practices. Although the relative lack of transactional effects between child behavior and parenting might appear somewhat surprising given previous findings in the literature, there are several possible explanations for these findings. First, careful review of the previous literature suggests that when bidirectional effects are detected in similar studies, they are actually quite small in magnitude (e.g., Lansford et al., 2011). Furthermore, other studies have reported stronger evidence for longitudinal within-domain stability, as compared to bidirectional processes of change, from middle childhood to early adolescence (e.g., Fite et al., 2006). In addition, studies with larger sample sizes are more likely to detect small effects that reach the threshold of statistical significance. In the first study described by Lansford and colleagues, for example, the large sample size ($N = 562$) resulted in the detection of relatively small transactional effects (regression weights ranging from .06–.08) when contrasted with the temporal stability of both discipline and child behavior (regression weights ranging from .41–.59).

The current findings suggest that the nature of longitudinal and bidirectional relations between parent and child behavior may be different in a clinical context, as compared to previously published results using developmental samples without a treatment focus. Furthermore, the intervention that is evaluated in the current study was directed at both parents (i.e., reducing negative/aggressive parenting and supporting positive parenting) and children (i.e., cognitive-behavioral skills coaching) simultaneously, which is in contrast to previous studies that have examined cross-domain effects of treatment that is only targeted at parents (e.g., Patterson et al., 2004; Shaw et al., 2009). Although previous studies have shown that significant improvements can be detected in areas not targeted directly by treatment (e.g., maternal depression in studies of Family Check Up; Shaw et al., 2009), the current intervention targeted several domains for both parent and child, which may limit ability to detect cross-domain or “spreading” effects of treatment. Indeed, the lack of effects from child problem behavior to negative parenting practices may be reflective of treatment effects, as parents are taught not to respond coercively to defiant behaviors. Of note, the current study only examined treatment targets (i.e., parenting practices, child behavior) as the variables of interest; it may be that different patterns of reciprocal relations would be detected if contextual variables, such as maternal depression, or child social competence, were included in analyses. Furthermore, observational measures of parenting to assess parenting behaviors in the context of parent-child interactions may be additionally informative in this regard, as observations of treatment-related improvement in parenting

behaviors have been shown to mediate treatment outcome effects on child behavior problems in a preschool sample (Dishion et al., 2008); additional research is needed to see if similar results obtain with older children.

The findings of the current study are consistent with the continued provision of clinical services to both caregiver and school-age children affected by disruptive behavior disorders, following Pettit and Arsiwalla's (2008) note that "effective interventions… must necessarily take into account the parent's role and the child's role within a comprehensive developmental framework" (p. 716). The previous documentation of reciprocal parent-child effects that are relatively small in magnitude has also been met with calls to continue simultaneous intervention at the level of the caregiver and the child (Hipwell et al., 2008). Previous research by Webster-Stratton and colleagues has shown that child intervention alone may not be sufficient to improve conduct problems in children who also experience negative parenting, and so dual interventions to target both child and caregiver are often necessary (Webster-Stratton & Reid, 2010). Kazdin (2010) has also suggested that combined interventions for both caregivers and school-age children can be most effective. Although the results of the current study provided limited evidence for bidirectional or transactional effects between caregivers and school-age children when behavioral interventions target both simultaneously, it would be premature to extend these findings to suggest that parenting interventions are unnecessary in the treatment of child behavior problems. Even in the absence of bidirectional effects, it is reasonable to assume that the maintenance of improved child behavior is facilitated by a context of stably improved parenting behavior.

Of note, the findings from the current study were consistent across multiple reporters of both child behavior and parenting practices. We employed multiple reporters of our variables of interest in order to reduce shared method variance, as in studies with caregiver report of both parenting and child behavior, and to assess both objective and subjective reports of the outcome measures. To this end, child behavior was assessed using caregiver and teacher report, and positive and negative parenting practices were reported by caregivers and target children. This strengthens our confidence in concluding that within-domain stability was more consistently detected than transactional relations between caregivers and children, although the risk of shared method variance could be further reduced through the incorporation of observational measures of the study variables.

Limitations and Future Directions

Some limitations to the current study must be noted, as well. First, the relatively small sample size limited the ability to detect small bidirectional effects between caregivers and children. Despite the small sample size for a cross-lag path analysis, we had very good fit indices and enough statistical power to detect large effects (i.e. all stability paths were significant at $p < .05$). Additionally, although variability in outcome measures may sometimes be reduced following intervention, we observed consistency in measures of variability (i.e., SDs) in our sample. We can therefore be confident that we did not miss any large cross-lag effects. In addition, there are examples in the extant literature of similar analyses conducted with even smaller sample sizes (e.g. Fite et al., 2006; Verhoeven et al., 2010). However, it must be noted that small sample size may have attenuated the ability to determine bidirectional outcomes, especially given the high temporal stability of the parenting and child behavior variables, and the relatively weak associations between these domains as reported in the bivariate correlations (see Table 3). Second, the preponderance of boys in the sample prevents testing for potential child sex differences, although exploratory analyses with only males were largely consistent with the findings with the full sample. In addition, it may be that symptom-level clinical measures of child behavior would be more sensitive to change than the broadband scales of the CBCL.

Although sample size in the current study prevented the consideration of child age as a moderating variable in the analyses, the developmental changes in the stability of parenting and child behavior (and the relative lack of bidirectional effects) are consistent with some previously published studies that extend into adolescence. Extant research has documented the relative stability of child externalizing behavior problems in samples with age ranges from middle childhood to adolescence over follow-up periods spanning four years in both clinical (e.g., Biederman et al., 2001 and nonclinical (e.g., Fite et al., 2006) samples. Similarly, findings of the current study are consistent with previous literature on the stability of parenting behaviors during this age range. Specifically, previous studies (e.g., Fite et al., 2006, Loeber et al., 2000) have reported on the relative stability of most parenting behaviors from middle childhood to adolescence, but have also noted relative decrements in parental supervision over time, as found in the current study. Of note, the current study did not include measures of positive parenting practices. Future research on bidirectional effects between parent and child behavior would benefit from examining these relations with respect to positive parenting, particularly in the context of treatment outcome studies with goals of improving parenting.

In terms of future directions, continued research is needed to investigate both longitudinal stability and potential transactional relations between parenting and child behavior in the context of treatment outcomes studies, providing empirical tests to developmental theories regarding the development of ODD/CD (Lahey, Waldman, & McBurnett, 1999; Patterson, 1982). In addition, future studies may move from macro-level analyses of bidirectionality, using data obtained at monthly or yearly intervals, to more fine-grained analyses of how these relations develop and can be observed during interactions (Pettit & Arsiwalla, 2008), perhaps using dynamic models, including state-space grids (Hollenstein, 2003), to examine bidirectional processes in real-time parent-child interactions (DeRubeis & Granic, 2012; Granic & Patterson, 2006). It may be that the observation of these micro-level interactions could yield further information to guide the evaluation and development of parenting interventions, by analyzing minute-by-minute patterns of parent-child interactions as an augmentation of the panel studies that examine stability and change in behavior over time.

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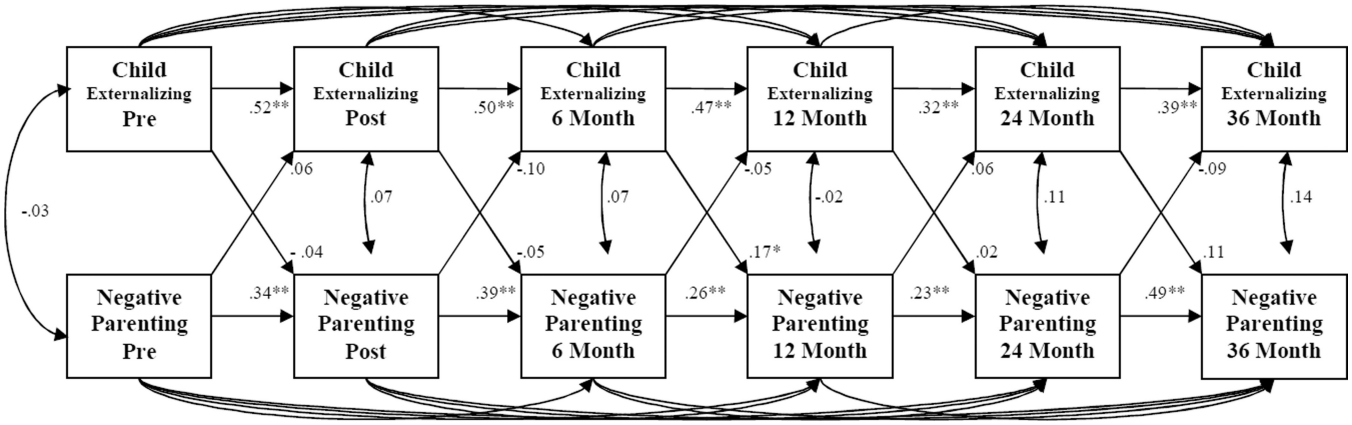

Figure 1.

Cross-lagged path model examining bidirectional effects between child externalizing behavior (TRF) and negative parenting practices (PPI) in the context of a psychosocial treatment and 3-year follow-up period.

χ^2 (20) = 19.51, p = .49; CFI = 1.00; RMSEA = .000

* $p < .05$; ** $p < .01$

Note. Diagram indicates standardized regression weights.

Table 1

Descriptive Statistics

Measure (reporter)	Time 1 Mean (*SD*)	Time 2 Mean (*SD*)	Time 3 Mean (*SD*)	Time 4 Mean (*SD*)	Time 5 Mean (*SD*)	Time 6 Mean (*SD*)
PPI Negative (child)	13.72 (7.39)	11.16 (5.93)	10.61 (5.84)	10.73 (5.43)	10.61 (5.71)	10.80 (6.76)
APQ Inconsistent Discipline (parent)	16.02 (3.74)	14.39 (4.07)	14.40 (4.06)	14.69 (3.65)	14.47 (4.00)	14.42 (3.64)
APQ Poor Monitoring (parent)	15.79 (5.48)	14.87 (5.08)	14.82 (4.54)	15.34 (5.18)	16.16 (5.51)	17.25 (5.78)
APQ Corporal Punishment (parent)	6.24 (2.14)	5.17 (1.92)	5.33 (2.08)	5.11 (1.97)	5.03 (2.08)	4.74 (1.91)
TRF Externalizing t-scores (teacher)	68.98 (11.15)	63.84 (11.53)	63.87 (11.71)	62.88 (11.21)	62.09 (11.13)	61.90 (9.67)
CBCL Externalizing t-scores (parent)	71.27 (7.61)	63.79 (9.95)	63.55 (10.88)	62.34 (10.46)	62.48 (10.36)	61.71 (11.25)

Note. APQ = Alabama Parenting Questionnaire; CBCL = Child Behavior Checklist; PPI = Parent Perception Inventory; TRF = Teacher Report Form. Standardized *T* scores are reported for the TRF and CBCL.

Table 2

Bivariate Correlations at Time 1

	2	3	4	5	6
1. PPI Negative (child)	−.01	−.15	.13	−.03	.05
2. APQ Inconsistent Discipline (parent)	-	.15	.06	−.03	.13
3. APQ Poor Monitoring (parent)		-	.11	.20*	.12
4. APQ Corporal Punishment (parent)			-	.23*	.06
5. TRF Externalizing (teacher)				-	.18*
6. CBCL Externalizing (parent)					-

APQ = Alabama Parenting Questionnaire; CBCL = Child Behavior Checklist; PPI = Parent Perception Inventory; TRF = Teacher Report Form

*$p < .05$;

**$p < .01$.

Table 3

Bivariate Correlations for the PPI (Negative Parenting) and TRF (Externalizing) Variables in Model 1

	2	3	4	5	6	7	8	9	10	11	12
1. Negative Parenting Pre	.35**	.35**	.21*	.21*	.24**	−.03	.05	−.08	.08	.06	−.02
2. Negative Parenting Post	-	.46**	.38**	.39**	.27**	−.05	.05	−.08	−.04	.10	.05
3. Negative Parenting 6 Month		-	.39**	.36**	.29**	−.11	−.04	−.02	−.10	.01	.02
4. Negative Parenting 12 Month			-	.37**	.31**	.06	.13	.15	.09	.13	.08
5. Negative Parenting 24 Month				-	.55**	−.07	−.04	−.11	.03	.10	−.07
6. Negative Parenting 36 Month					-	−.01	.06	.01	.17	.12	.15
7. Child Externalizing Pre						-	.51**	.38**	.42**	.58**	.24*
8. Child Externalizing Post							-	.53**	.44**	.55**	.31**
9. Child Externalizing 6 Month								-	.61**	.44**	.41**
10. Child Externalizing 12 Month									-	.57**	.41**
11. Child Externalizing 24 Month										-	.48**
12. Child Externalizing 36 Month											-

*$p < .05$;

**$p < .01$.

Table 4

Cross-Lagged Path Model Summary for Model 1

	B	SE	C.R.	*p*
Stability Paths				
$Child_1 \rightarrow Child_2$	.53	.07	7.46	<.001
$Child_2 \rightarrow Child_3$	.50	.10	5.17	<.001
$Child_3 \rightarrow Child_4$	.46	.10	4.64	<.001
$Child_4 \rightarrow Child_5$	.31	.10	3.18	<.01
$Child_5 \rightarrow Child_6$	.37	.14	2.74	<.01
$Parent_1 \rightarrow Parent_2$	.27	.06	4.73	<.001
$Parent_2 \rightarrow Parent_3$	.38	.08	4.56	<.001
$Parent_3 \rightarrow Parent_4$	.24	.08	2.93	<.01
$Parent_4 \rightarrow Parent_5$	.24	.08	2.92	<.01
$Parent_5 \rightarrow Parent_6$	.58	.12	4.82	<.001
Cross-Lagged Paths				
$Child_1 \rightarrow Parent_2$	−.01	.03	−.44	.66
$Child_2 \rightarrow Parent_3$	−.02	.03	−.66	.51
$Child_3 \rightarrow Parent_4$	.06	.03	2.21	<.05
$Child_4 \rightarrow Parent_5$	.01	.02	.35	.73
$Child_5 \rightarrow Parent_6$	.05	.03	1.63	.10
$Parent_1 \rightarrow Child_2$	.14	.18	.75	.45
$Parent_2 \rightarrow Child_3$	−.27	.19	−1.45	.15
$Parent_3 \rightarrow Child_4$	−.15	.18	−.79	.43
$Parent_4 \rightarrow Child_5$	.16	.19	.87	.38
$Parent_5 \rightarrow Child_6$	−.24	.25	−.97	.33

Table 5

Cross-Lagged Path Model Summaries

Model	Parent Measure (reporter)	Child Measure (reporter)	χ^2 (20)	CFI	RMSEA	# of stability paths at $p < .05$	# of cross-lagged paths at $p < .05$
1	PPI Negative (child)	TRF Externalizing (teacher)	19.51, $p = .49$	1.00	.000	10 of 10	1 of 10
2	PPI Negative (child)	CBCL Externalizing (parent)	19.77, $p = .47$	1.00	.000	10 of 10	0 of 10
3	APQ Inconsistent (parent)	TRF Externalizing (teacher)	15.90, $p = .73$	1.00	.000	10 of 10	1 of 10
4	APQ Inconsistent (parent)	CBCL Externalizing (parent)	31.33, $p = .05$	.983	.064	10 of 10	0 of 10
5	APQ Monitoring (parent)	TRF Externalizing (teacher)	30.60, $p = .06$	.977	.062	10 of 10	1 of 10
6	APQ Monitoring (parent)	CBCL Externalizing (parent)	15.87, $p = .72$	1.00	.000	10 of 10	1 of 10
7	APQ Punishment (parent)	TRF Externalizing (teacher)	18.34, $p = .57$	1.00	.000	10 of 10	1 of 10
8	APQ Punishment (parent)	CBCL Externalizing (parent)	29.53, $p = .08$	.984	.059	10 of 10	0 of 10

APQ = Alabama Parenting Questionnaire; CBCL = Child Behavior Checklist; PPI = Parent Perception Inventory; TRF = Teacher Report Form; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation