BIDIRECTIONAL INFLUENCES BETWEEN MATERNAL DEPRESSION AND BOYS' AND GIRLS' EXTERNALIZING BEHAVIOR AND THE MEDIATING ROLE OF INCONSISTENT PARENTING

by

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ABSTRACT

Previous research has indicated that maternal depression and externalizing behavior can both contribute to and exacerbate each other. The current study examined a bidirectional model and found that maternal depression and externalizing behavior interacted reciprocally, such that maternal depression at Grade 5 predicted externalizing behavior at Grade 6, and externalizing behavior at Grade 4 predicted maternal depression at Grade 6. Additionally, the current study examined inconsistent discipline as a mediator for the reciprocal relationships between maternal depression and externalizing behavior. Findings suggest that inconsistent discipline at Grade 5 mediated the relationship between Grade 4 maternal depression and Grade 6 externalizing behavior, but not the reverse relationship. Clinical implications are discussed.

LIST OF ABBREVIATIONS AND SYMBOLS

α	Alpha: Measure of internal consistency
b	Regression coefficient
CFI	Comparative Fit Index
CI	Confidence Interval
GFI	Goodness of Fit Index
p	Probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value
RMSEA	Root Mean Square Error of Approximation: Test of model fit
t	Computed value of *t* test
χ^2	Chi-Square: Difference between the observed covariance matrix and the model covariance matrix
z	Computed value of *z* test
<	Less than
=	Equal to

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INTRODUCTION

Depression is one of the most common mental health disorders, and, as such, has received a lot of attention in the research literature. In addition, because women are about twice as likely to develop depression and are more likely to be caretakers, many studies have investigated the effect of maternal depression on children. Not surprisingly, affect and behavior related to depression can influence children in a number of ways. Extensive research has elucidated the family context surrounding depression and demonstrated consistent links between maternal depressive symptoms and a range of negative child problems, including behavior and affect problems as well as social, cognitive, and academic deficits (for reviews of the literature, see Cummings & Davies, 1994; Downey & Coyne, 1990). Researchers are now trying to identify factors that contribute to these relationships in both risk and protective ways. They are moving toward more process-oriented models that take family context into account, which will hopefully elucidate how and why these constructs are related. For example, in their review of the relevant literature, Goodman and Gotlib (1999) proposed a model of how this relationship may be explained by integrating several risk factors, mechanisms of risk, vulnerabilities, mediators, and moderators.

Because of the strong correlation between maternal depression and children's externalizing behavior, many researchers have studied factors that influence this specific relationship. Externalizing behavior can encompass many types of behaviors, from hyperactivity, to conduct problems, to aggression. However, they all share a common theme of

disruptive behavior that generally leads to poorer functioning and negative outcomes. In addition, this behavior frequently interferes with family functioning, classroom activities, and peer relationships. These types of behaviors displayed in middle childhood may develop into more chronic patterns of problem behavior, such as deviant behavior in adolescence and more antisocial behavior later (Hinshaw & Lee, 2003). Moreover, preventive interventions that track children as they age, such as the Early Steps Project and the Fast Track Program, have been established in order to ameliorate current problems as well as have lasting effects (Bierman et al., 2007; Shaw, Dishion, Supplee, Gardner, &Arnds, 2006). Because of the problematic early development of externalizing behavior and its link to maternal depression, many studies have examined the nature of the relationship as well as the mechanisms governing it. As a note, because studies have both found diagnosed major depression and subclinical depressive symptoms to be associated with similar child variables, in this study I will refer to both constructs as "depression".

Relationships between Maternal Depression and Child Externalizing Behavior

Parent effects. The large majority of the investigation of the established relationship between maternal depression and child behavior has been conducted from the perspective that the mother's depressive symptoms lead to the child's problems in some way (Downey & Coyne, 1990). For example, one prospective study found that maternal depression predicted later conduct problems even when ADHD was controlled for (Chronis et al., 2007). This focus on parental effects stems from the concept of the interpersonal nature of depression (Hammen, 1999); depression is not only an internal personal state, it also affects and is affected by other people. To the extent that depressive symptoms influence certain factors, it can have a large impact on child outcomes. Some mechanisms or mediating factors include: aggressive marital

conflict (Erath, Bierman, & Conduct Problems Prevention Research Group [CPPRG], 2006), hostile and coercive behavior (Lyons-Ruth, Lyubchik, Wolfe, & Bronfman, 2002), and withdrawal, lack of parental warmth, or unresponsiveness (Johnston, Murray, Hinshaw, Pelham, & Hoza, 2002). In addition, a portion of the research on the relationship between maternal depression and child externalizing behavior has focused on parenting behavior, because it is a complex social interaction that many depressed parents find difficult to successfully engage in with young children who display exaggerated affect and aversive behavior (Downey & Coyne, 1990). Overall, this area has historically focused on negative child outcomes of maternal depression and consistent pathways have been demonstrated from parental affect and behavior to child behavior.

Child effects. By contrast, not nearly as much research has examined the effect that children can have on their surrounding environments. However, this theory has been suggested for many years and some researchers have implicated that child effects on their parents may be as strong or stronger than parental effects on children (Burke, Pardini, & Loeber, 2008). Most of these studies have focused on how child behavior influences parenting. For example, in a longitudinal study, child behavior affected poor parental monitoring and inconsistent discipline consistently over time (Fite, Colder, Lochman, & Wells, 2006). On the other hand, some studies have demonstrated that children can affect their parent's well-being and that disruptive behavior is a likely stressor. One of Breen and Barkley's (1988) findings suggests that child psychopathology in general, but externalizing behavior in particular, is associated with parenting stress. Although some studies in this area investigate specific pathways from child behavior to parent outcome, they are not very common. Most examinations of child effects on their parents are found in theories of bidirectional, or reciprocal, influences between both people.

Bidirectional influences. Bidirectional models of child and parent behavior are particularly beneficial in this area of research because they take into account the reciprocal influences that people can have on each other as they interact over time. Furthermore, the parent-child relationship involves unique interactions that are complex and transactional. Although such models have been suggested in the research literature for many decades, few researchers have attempted to empirically examine these types of relationships. However, renewed interest has recently been shown, as evidenced by greater general discussion of bidirectional influences and special sections in journals (Pardini, 2008; Pettit & Lollis, 1997).

Theories of reciprocal interactions of parent and child have existed for a long time. The seminal work in this area was developed by Richard Bell (1968), who found that children affect parental behavior over time because parents alter their discipline style when the expected and actual behavior of their child are incongruent. In response to the current research that exclusively focused on how parents affect their children, he concluded that new research needed to include a reciprocal component, and so, established a basis for support of bidirectional models in the future (Lytton, 1990). Specifically, Bell described the control system model of socialization, in which child behaviors that are more frequent than expected invoke upper-limit control parenting, and behaviors that are less frequent than expected invoke low-limit control parenting (Bell, 1968). In addition, reciprocal models of child and parent behavior have been developed from Gerald Patterson's (1982) widely recognized theory of coercive family process. In this coercive cycle, a child exhibits negative behavior and the mother responds with withdrawal or hostility, which then escalates the child's negative behavior and the negative parenting. This model has greatly influenced the research on parenting and child behavior by emphasizing family interactions that are dynamic and transactional.

Although these theories have inspired some interesting research, the literature in this area is still lacking. Many studies have suggested bidirectional models as an explanation for their results (e.g., Barry, Dunlap, Cotten, Lochman, & Wells, 2005; Johnston et al., 2002), but fewer have attempted to demonstrate it explicitly in the research. In addition, many of the studies hypothesizing reciprocal effects are cross-sectional and correlational in nature, which is not sufficient for making bidirectional causal implications. Furthermore, researchers continue to emphasize parent effects on child outcomes. Even in studies that suggest a bidirectional influence, there is a tendency to imply that parental behavior has a greater effect and that influences due to child behavior can be accounted for otherwise (Belsky, 1984).

Studies that have attempted to delineate these pathways and support the underlying theories have demonstrated results consistent with the theory. For example, one longitudinal study demonstrated reciprocal relationships between boys' disruptive behavior and specific parenting behaviors (Burke et al., 2008). Furthermore, they found that child behavior might have a stronger effect on parents than the reverse, because disruptive behavior predicted more parenting behaviors than parenting predicted child outcomes. This suggested that negative behavior on the part of one person is reciprocated by the other, as predicted by a coercive cycle model.

Other studies have also evidenced reciprocal relationships between maternal depression and child behavior (e.g., Gross, Shaw, Moilanen, Dishion, & Wilson, 2008; Hammen, Burge, & Stansbury, 1990). In particular, one recent longitudinal study has demonstrated reciprocal associations at certain time points between maternal depressive symptoms and parent-rated boys' aggressive and antisocial behavior (Gross, Shaw, & Moilanen, 2008). Through the use of SEM, parallel processing models, and cross-lag auto-regressive models, the researchers showed that the

relationships between these constructs fit into a reciprocal model and revealed if, how, and when they were associated. Specifically, reciprocal effects were greatest and significant over two time points: from age 5 to 6 and from age 11 to 12. These findings were consistent with their hypothesis that periods of transition, such as school entry and the elementary to middle school transition, can be challenging as well as distressing for parents and children (Gross, Shaw, & Moilanen, 2008). Therefore, both parent and child behavior may be more unstable at this time and more likely to negatively affect the other.

This particular study is beneficial because it uses specifically defined variables rather than general parent or child psychopathology, which leads the relationships to be examined in more detail. One potential problem with this study is that it uses mother's ratings of child behavior. Some studies have found that using maternal report for both their own depressive symptoms and their child's externalizing problems can lead to a bias because the mother's own symptoms distort her perception of her child's behavior (Chi & Hinshaw, 2002). However, the Gross, Shaw, & Moilanen study represents the new direction of research that is attempting to identify bidirectional influences between maternal depression and child externalizing behavior. More research is needed in this area not only to consistently demonstrate these associations, but also to identify specific mechanisms that influence these reciprocal processes.

The Role of Parenting: Inconsistent Discipline

As discussed previously, parenting has emerged as a factor that may mediate the relationship between maternal depression and child problem behavior. In fact, Karazsia and Wildman (2009) suggested that a model with maladaptive parenting as a mediator for the link between maternal negative affect and child behavior problems serves as the most accurate description of the relationship. Parenting can have a strong effect on children and indeed, the

research has shown that poor supervision, lax or harsh parenting styles, (Downey & Coyne, 1990) and ineffective discipline (Pfiffner, McBurnett, Rathouz, & Judice, 2005) are associated with higher rates of disruptive behavior. Furthermore, these findings have also been replicated in prospective studies that indicate parenting as a substantial precedent to child outcomes (Smith, Landry, & Swank, 2000) and child improvement following parent management training (DeGarmo, Patterson, & Forgatch, 2004).

Parental inconsistent discipline has been consistently associated with aggressive and conduct disordered children (Loeber & Dishion, 1984). Inconsistent discipline refers to a style of parenting in which rules are established but not always enforced, rules and expectations may be unclear, and frequently, low rates of positive behavior and high negative behavior are involved (Barry, Dunlap, Lochman, & Wells, 2009). Consistent with the parental effects model, most of the research in this area has focused on how inconsistent parenting leads to child behavior problems. For example, Frick et al. (1992) found that high levels of inconsistent discipline predict later conduct problems and Dishion (1990), demonstrated direct pathway evidence through Structural Equation Modeling. Furthermore, evidence has suggested that lax, inconsistent, and ineffective discipline is related to depression in parents (Zahn-Waxler, Iannotti, Cummings, & Denham, 1990). Maternal depressive symptoms can greatly influence parenting in different ways because their affect as well as their behavior may be drastically altered. One study found that depression inhibits consistent parenting through stress, low self-esteem, and external locus of control, which then contribute to alternately lax, permissive, withdrawn parenting and overreactive negative parenting (Gerdes et al., 2007).

On the other hand, not as much research has examined children's effects on their parent's discipline or how these constructs might relate to parental mental health. Using longitudinal

data, one study found that boys' externalizing behavior was a robust predictor of inconsistent discipline (Fite et al., 2006). Another cross-sectional study found that of the five subscales of parenting on the APQ, inconsistent discipline was most associated with both maternal distress as well as mother-rated boys' aggressive behavior, and it functioned as a mediator between them (Barry, Dunlap, Lochman, et al., 2009). The authors proposed a transactional model, one in which both parent and child would contribute to and exacerbate inconsistent parenting, which then would further influence child behavior and parental depression.

Although some research has shown that maternal depression impacts consistent discipline and this inconsistency both affects and is affected by the child, no studies have specifically examined whether maternal depression is then exacerbated by inconsistent discipline. In a complete reciprocal relationship, inconsistent discipline might also serve as a mediator for the converse relationship of child externalizing behavior and maternal depression. Because externalizing behavior has been shown to influence both parenting and maternal depression, it may be that inconsistent parenting serves as the mechanism through which child and parent psychopathology are linked. This theory is consistent with a coercive model (Patterson, 1982), in that both parties influence the others' affect and behaviors, and these maladaptive behaviors then become more consistent. Overall, inconsistent discipline has been shown to be significantly related to the constructs of maternal depression and child externalizing behavior, but the relationship needs to be examined in more detail.

Gender and Ethnicity Differences

Girls have historically been excluded from research concerning externalizing behavior because these problems are about half as prevalent as in boys and problems may sometimes begin later, in adolescence, for girls (Hinshaw & Lee, 2003). However, research should still be

conducted on girls' externalizing behavior because it remains an important problem for girls. Similarly, research needs to determine whether girls are at differential risk for particular mechanisms and whether their development of externalizing behavior is divergent from boys, reflecting different pathways. The minimal research conducted on girls has indicated some possible differences in these relationships in boys versus girls, but the evidence is conflicting. (for a review of the relevant literature, see Keenan, Loeber, & Green, 1999). For example, one study found no major parenting differences of girls and boys (Fossum, Morch, Handegård, & Drugli, 2007), whereas another found that family factors were not as strongly related for girls as boys (Gorman-Smith & Loeber, 2005).

Other studies have demonstrated similar reciprocal relationships as previously found in boys between girls' conduct problems and parenting (Hipwell et al., 2008), as well as shown that both ADHD girls and boys lead to equal amounts of parenting stress (Breen & Barkley, 1988). On the other hand, one study found higher levels of family stress and higher maternal depression report when girls were involved (Fossum et al., 2007), which is possibly because of incongruent sex-role expectations, which then lead to greater uncertainty in parenting. As evidenced by these mixed results, more research needs to investigate how girls and boys may differ in relation to these family factors.

Similarly, although previous studies have used varied samples, examination of the constructs of interest have usually occurred using samples that are heavily dominated by Caucasians (see Table 1). Additionally, the extant literature has only rarely studied whether ethnicity serves as a moderator for these relationships. More research should investigate whether these familial processes are similar in different ethnic groups.

Purpose and Hypotheses

The literature has consistently documented an association between maternal depression and child externalizing behavior, particularly in middle childhood, and has indicated that both parent to child and child to parent pathways may account for this relationship, although the latter has been investigated less frequently. Periodically, transactional models have been proposed to account for these relationships. The current study seeks to further add to the literature on these bidirectional influences within this time period. Although some research has focused on the reciprocal influences of parenting and child behavior, very rarely have maternal depression and child externalizing behavior been examined as influences of each other. The present study will expand on this limited literature and add further strength through the use of longitudinal data. Although the study will use correlational methods, which cannot determine causality, establishment of temporal precedence of the constructs will help to assess causal influences.

In addition, the present research will identify specific variables that operate under certain conditions, which will hopefully lead to greater understanding of the pathways of the relationship. As research suggests, by determining at the outset the unique ways in which constructs are hypothesized to be related, as opposed to more general research, the relationships can be examined in more detail. Maternal depression and child externalizing behavior will both be examined as predictors and outcomes that specifically influence each other. Furthermore, inconsistent parenting will be investigated as a mediator of the bidirectional relationships between child behavior and maternal depression. Although previous research has shown that this type of parenting serves as a mediator between maternal depression and child behavior, and disruptive behavior may influence parenting, inconsistent parenting has not been investigated as contributing to maternal depression. The current study will contribute to the understanding of how a specific parenting factor may mediate the proposed reciprocal association.

As research reviewed in this paper suggests, research on gender differences within these relationships is mixed. The present study will help to elucidate any differences by examining gender as a potential moderating variable between the hypothesized associations. Finally, teacher report of child behavior will also add strength to the study because of the potential bias of using mother's ratings. This will contribute to the literature by determining if relationships hold when child behavior is assessed by a potentially less biased source.

Several hypotheses are proposed. First of all, maternal depression at earlier time points will significantly predict child externalizing behavior at later time points and child externalizing behavior at earlier time points will significantly predict maternal depression at later time points through significant correlations. This hypothesis is consistent with a bidirectional model of influence that has been theorized widely and recently demonstrated in the literature. A tentative hypothesis regarding the relative strength of different time associations is that the reciprocal correlations will be stronger during the time of transition to middle school. This phenomenon is thought to be due to new challenges and stressors, and recent findings have supported this hypothesis.

An additional component of the study will examine the mediating relationship of inconsistent parenting. The variable of inconsistent parenting during intermediate time points is hypothesized to be positively correlated with both maternal depression and child externalizing behavior at initial time points. It should also account for the majority of the significance of the relationships between the two, if not all, which would evidence complete mediation. Therefore, when inconsistent parenting is controlled for, the association between initial and ending constructs would reduce in significance. Previous research has demonstrated a link between maternal depression predicting inconsistent parenting and child externalizing behavior both as an

outcome of inconsistent parenting and a predictor of it. No research has directly investigated the role that inconsistent parenting may play in contributing to maternal depression. However, the research concerning the nature of the relationships between these constructs suggests that it is plausible and consistent with the framework of a reciprocal model, as previously discussed.

Finally, a research question will investigate gender as a potential moderator of these relationships. As the reviewed literature indicates, research in this area is conflicting, with some studies suggesting no differences and others indicating a variety of differential relationships. The present study will add to this literature by further examining how gender may impact these associations. Additionally, the present study will add to the literature on these processes in a majority African-American sample.

METHOD

Design

This study will be conducted from data collected for a larger project funded by the National Institute for Drug Abuse. The Coping Power Program is a school-based intervention designed to reduce aggression and problem behavior in middle childhood and prevent later negative outcomes. Using a correlational strategy, the design will be longitudinal, with three proposed time points beginning the summer after Grade 4 and continuing annually. Because of the reciprocal nature of the study, maternal depressive symptoms and child externalizing behavior will both be investigated as independent and dependent variables at different time points. In addition, inconsistent parenting will be the proposed mediator between these two variables and gender will be examined as a possible moderator of these relationships.

Participants

Participants will consist of the control group children and their mothers of the larger intervention study. Each school counselor was randomly assigned to the Coping Power basic training, training plus feedback, or control condition. Since 16 schools shared a school counselor, they were yoked so that there were 8 pairs of yoked schools. These pairs were also randomly assigned to conditions, resulting in two pairs in the control condition. Stratified random assignment was used in order to guarantee an equal number of schools per condition; there were 57 schools total and in each condition there were 19 schools. By only using the control group, effects of the intervention will not confound the current study's results.

In the control group, there are 179 children, consisting of 126 males (72%) and 50 females (28%), as well as 156 African American (89%) and 20 other ethnicity (11%). Demographic information for three children was missing. These children are spread across two cohorts, who were assessed at the same grade level, but a year apart from each other. At Time 1 for both cohorts, participants had just completed Grade 3, at Time 2, Grade 4, at Time 3, Grade 5, and at Time 4, Grade 6. At each time point, participants were assessed during the summer in the office or, most often, in their home. Previous research has shown that this age range is particularly important in the early development of externalizing problems (Hill, Lochman, Coie, Greenberg, & CPPRG, 2004). Researchers have suggested that using longitudinal data over a longer time period than a year enhances the conclusions that can be drawn because the stability of constructs over time can be assessed (Pardini, 2008). Retention rates were very high over time, with 98% at Time 2, 95% at Time 3, and 94% at Time 4 for the both the parents and children (see Appendix). However, teachers did not match this level of participation, although their retention was also high. A power analysis conducted at the .05 level indicated that to demonstrate a medium effect, 64 participants would be needed for a power of .80 and 111 participants for a power of .95. Therefore, the current sample size, even excluding attrited participants, is more than adequate for good power.

Procedure

Participant consent. Children were recruited from 57 local public schools and after screening, were contacted to participate in the larger study. Informed consent from the parents and assent from the children were required for participation.

Selection of participants. Children were screened in the spring of Grade 3 by their teachers on the *Teacher Report of Reactive and Proactive Aggression* (Dodge & Coie, 1987).

Teachers reported on the aggression of all of the students in their classroom and the selection criterion was the 30% of all of the students across classrooms that scored the highest on the aggression screener. The top 2% was excluded, because they were believed to be unresponsive to the larger prevention study, since they likely already displayed severely antisocial behavior. The rest of the "at-risk" children's families were contacted and those that could not be reached or who did not agree to participate were not included. However, these children's screener scores (16.9) did not differ from those that were included in the study (17.4).

A similar scale has been found to be stable over time and validity has been established for using such teacher screening methods for children's aggression in other studies (e.g., Hill et al., 2004). In addition, first-gate teacher ratings of initial aggressive behavior primarily predict later problems, more so than parent ratings (Lochman & CPPRG, 1995). Furthermore, using teacher-rated aggression is not only a valid indicator of later aggression problems, but also of more general externalizing and internalizing problems (Coie, Lochman, Terry, & Hyman, 1992).

Measures

Maternal depression measure. The Beck Depression Inventory will be used to assess mother's self-reported depressive symptoms. The BDI is a very widely used measure of severity of depression and it consists of 21 self-report items with choices ranging from 0 to 3 (Beck, Steer, & Garbin, 1988). One sample item consists of the choices "I do not feel sad" (0), "I feel sad" (1), "I am sad all of the time and I can't snap out of it" (2), and "I am so sad or unhappy that I can't stand it" (3). The BDI yields a total score and higher scores indicate greater severity of depression. A meta-analysis indicated that the BDI has high external validity (Beck et al., 1988) and for this sample at Time 4, it demonstrates good internal consistency (α = .90). The BDI has been used as an indicator of depressive symptoms in the majority of research on maternal

depression's impact on child behavior, and so the current study will be consistent with previous literature.

Child externalizing behavior measure. Teachers will report on student's classroom behavior using the Behavior Assessment System for Children. The BASC is a behavior problem checklist that consists of 14 subscales that assess both clinical problems and positive traits. There are 148 items with response alternatives ranging from 0 (*not at all*) to 3 (*almost always*) (Reynolds & Kamphaus, 1992). Several Composite scores of varying subscales can be calculated, such as the Externalizing Composite, which is derived from the Aggression, Conduct Problems, and Hyperactivity subscales. The Externalizing Composite is most relevant to this study and will therefore be used to measure children's externalizing behavior. Higher scores indicate higher levels of problem behavior. A sample item indicating aggression is "Hits other children", an item indicating conduct problems is "Lies to get out of trouble", and an item for hyperactivity is "Cannot wait to take turns". The Externalizing Composite has strong reliability for this sample at Time 4 (α = .97). The BASC also has strong construct validity, and the subscales have demonstrated substantial convergent validity with the subscales of the widely used Child Behavior Checklist (Doyle, Ostrander, Skare, Crosby, & August, 1997).

Inconsistent parenting measure. Mothers will also report on their parenting practices using the Alabama Parenting Questionnaire. The APQ is a self-report measure that consists of 42 items that yield five subscales: parental involvement, positive parenting, poor monitoring/supervision, inconsistent discipline, and corporal punishment (Shelton, Frick, & Wootton, 1996). Items are rated on a 5-point Likert scale from 1 (*never*) to 5 (*always*). The APQ has demonstrated strong construct validity (Shelton et al., 1996), and support has been shown for the factor structure through confirmatory factor analyses (Essau, Sasagawa, & Frick,

2006). For the current study, the inconsistent discipline subscale will be used, which has evidenced adequate internal consistency (α = .73) for this sample at Time 4.

The inconsistent discipline subscale consists of six items, with higher scores indicating higher levels of inconsistent parenting. The items include: "You threatened to punish your child and then do not actually punish him/her", "Your child talks you out of being punished after he/she has done something wrong", "You feel that getting your child to obey you is more trouble than it's worth", "You let your child out of a punishment early (e.g., lift restrictions earlier than you originally said)", "Your child is not punished when he/she has done something wrong", and "The punishment you give your child depends on your mood". This subscale has been shown to be related to inconsistency of discipline in the home, through observations (Hawes & Dadds, 2006). In addition, this subscale has been used in many other studies investigating the effect of parenting on children (Barry, Dunlap, Lochman, et al., 2009; Pfiffner et al., 2005).

Missing Data

Because the analyses only consider Times 2 to 4, the sample considered includes those participants who completed Time 2. Of these 177 participants, 162 (90%) had complete data on all three measures given at all time points. When the 162 retained participants were compared to the 15 attrited participants on the variables of interest at Time 2, there were no significant differences. Three independent samples t-tests were conducted: maternal depression, t (175) = -0.65, p = 0.52, inconsistent discipline, t (175) = 1.15, p = 0.25, and externalizing behavior, t (175) = -0.66, p = 0.52. Due to these findings and the fact that relatively few cases contained missing data, it was decided to use the sample with no missing data for all analyses. The final sample (N = 162) consisted of 115 males (71%) and 47 females (29%), as well as 141 African-

American (87%) and 19 other ethnicity (12%). Ethnicity information for two children was missing.

RESULTS

Preliminary Analyses

Due to lower correlations between Time 1 and variables at later time points, all analyses were conducted using only time points 2, 3, and 4. For the analyses explained below, Time 2 is Grade 4, Time 3 is Grade 5, and Time 4 is Grade 6.

A decision was made to aggregate parent and teacher BASC scores to create a multi-source variable. The parent and teacher BASC scores were averaged to create a Parent/Teacher Aggregate score, after confirming that parent and teacher ratings were significantly correlated within time points. These results are presented in Table 2, and all correlations are significant at the 0.01 level, with the exception of Parent Grade 4 to Teacher Grade 5 (significant at 0.05 level) and Parent Grade 4 to Teacher Grade 6, which is across time points. All analyses involving ratings of externalizing behavior used the Parent/Teacher Aggregate of the BASC Externalizing Composite.

Table 3 shows the means and standard deviations of the study variables for all time points and Table 4 presents their correlations. An examination of these correlations revealed that almost all of the variables were correlated at the 0.05 level, and many were correlated at the 0.01 level.

Finally, males versus females, African American versus other ethnicity, and low versus high socioeconomic status were compared to see if any significant differences existed that may have moderated the constructs of interest. First, SES was binned to create low SES and high

SES categories. Then, each pair of categories was separated and the correlations of the main study variables (maternal depression, externalizing behavior, and inconsistent discipline) were compared across the categories. No strong differences in patterns emerged. Additionally, independent samples t-tests were conducted for each pair of possible moderators across all time points. Only 3 of 27 t-tests were significantly different: Inconsistent Discipline Grade 6 for Males versus Females, Externalizing Behavior Grade 4 for African Americans versus other ethnicity, and Inconsistent Discipline Grade 5 for low versus high SES. Tables 5, 6, and 7 present these results. Because of the relatively few differences among these proposed moderators, there was no need to explore them in further analyses involving modeling and mediation. Additionally, the small sample size of females and other ethnicity would have been inappropriate for these further analyses.

Modeling

A cross-lagged autoregressive model was used to examine the timing of the relationships between the constructs of maternal depression and child externalizing behavior and to determine if a reciprocal relationship exists. This model also assessed and controlled for variance within and across time points. Although the hypothesized model proposed that each variable at Grade 4 would be significantly correlated with the other variable at Grade 5, and the same for Grade 5 to Grade 6, the model that best fit the data is presented in Figure 1. Model fit was good, χ^2 (3) = 1.46, p = 0.69, RMSEA < 0.001, 90% CI = < 0.001 – 0.10, GFI = 1.0, CFI = 1.0. Externalizing behavior and maternal depression were both stable over time, from Grade 4 to Grade 6 (all p's < 0.001). One of the paths from maternal depression to child externalizing behavior was significant. Mothers with higher depression at Grade 5 had children with higher externalizing behavior at Grade 6, b = 0.26, p = .03, but the same did not appear from Grade 4 to Grade 5.

Additionally, a child effect on mothers appeared more distally. Children with more externalizing behavior at Grade 4 had mothers with higher depression at Grade 6, $b = 0.10$, $p = .004$.

Mediation Analyses

A Sobel test of indirect effects was used to examine the meditational models, because it can provide a more direct test of indirect effects than the more traditional Baron and Kenny model of mediation (Preacher & Hayes, 2004). The Sobel test compares the strength of the indirect effect of the independent variable on the dependent variable to the point that the null hypothesis equals zero (Sobel, 1982).

Figures 2 and 3 present the mediation results. Inconsistent discipline at Grade 5 significantly mediated the association between maternal depression at Grade 4 and child externalizing behavior at Grade 6 ($z = 2.64$, $p = .008$). Bootstrapping analyses were consistent with these results. Additionally, these relations also met the Baron and Kenny requirements for mediation. Maternal depression and child externalizing behavior were significantly related, $t(160) = 2.31$, $p = 0.02$, inconsistent discipline significantly predicted maternal depression, $t(160) = 4.39$, $p < 0.001$, and predicted child externalizing behavior when controlling for maternal depression, $t(160) = 3.38$, $p = 0.001$. Finally, the relation between maternal depression and child externalizing behavior became nonsignificant when inconsistent discipline was controlled for, $t(160) = 1.15$, $p = .25$.

The relationship between child externalizing behavior at Grade 4 and maternal depression at Grade 6 did not appear to be mediated by inconsistent discipline ($z = 1.49$, $p = 0.14$). These results were also consistent with the Baron and Kenny requirements, which were not supportive of mediation either. The relation between child externalizing behavior and maternal depression

remained significant even after inconsistent discipline was controlled for, $t(160) = 2.96$, $p = 0.004$.

DISCUSSION

Results of the present study highlight the importance of reciprocal relationships between parent and child behavior and affect. The current findings suggest that maternal depression affects children's externalizing behavior at later time points, and vice versa. A large majority of the prior research investigating maternal depression and child behavior problems has focused on parent effects (Downey & Coyne, 1990), despite some indications that children have an influence on their parent's parenting (e.g., Fite et al., 2006) and even affect (Breen & Barkley, 1988). Furthermore, relatively few studies have examined these constructs within a bidirectional model, and many of those that have hypothesized one used cross-sectional data, which is not sufficient for drawing causal implications. The current study strengthened the research literature by examining maternal depression and child externalizing behavior within a bidirectional model with the use of longitudinal data. This not only contributes to understanding the specific pathways of these relationships, but also helps to establish the timing of their effects.

Additionally, the relationship between maternal depression and child externalizing behavior was mediated by inconsistent discipline. In the research literature, parental inconsistent discipline has been often associated with children's behavior problems (Loeber & Dishion, 1984). Although previous findings suggested that inconsistent discipline mediated the relationship between maternal depression and child aggression (Barry, Dunlap, Lochman, et al., 2009), no prior research had examined the reverse relationship. The current study helped to elucidate the nature of the relationships between these constructs.

Finally, all of the results appeared to hold true across gender, ethnicity, and SES. Previous research on gender differences within these constructs was very mixed (Keenan et al., 1999), and ethnicity and SES differences were very rarely examined. The current study provided evidence for the stability of these relationships across gender, ethnicity, and SES. Additionally, the current study strengthened previous literature by using a majority African-American sample. As seen in Table 1, many previous studies in this area included mostly Caucasian participants, and only a few had a sample of more than half African-American.

Model

This study used a cross-lagged auto-regressive model to examine reciprocal relationships between maternal depression and child externalizing behavior over time. Although the initially proposed model was not quite adequate, a model including significant relations from parent to child and child to parent indicated that the hypothesis was supported.

Mothers with higher depression at Grade 5 had children with more externalizing behavior at Grade 6. Although the pathway from Grade 4 maternal depression to Grade 5 externalizing behavior was not significant, it followed the same pattern, possibly indicating that these effects build and amplify during the middle school transition. Depressed mothers may have a hard time engaging in complex social interactions with their children, particularly those who display exaggerated affect and aversive behavior, and so they either withdraw or respond harshly. By consequence, these children do not receive adequate support from their mothers, and this may translate into disruptive behavior. Depressed mothers' irritability may also contribute to children's externalizing behavior. Together, these findings suggest that children are sensitive to their mother's affect, but during the middle school transition, they are more sensitive. This conclusion is consistent with previous findings and hypotheses that suggest that periods of

transition are particularly challenging and distressing for parents and children, and so their behavior may be more unstable at this time and more likely to negatively affect the other (Gross, Shaw, & Moilanen, 2008). An alternative explanation may be that these behaviors and relationships are more unstable due to pubertal influences.

Additionally, children with greater externalizing behavior during Grade 4 had mothers with higher depression in Grade 6. Due to the differences in the reciprocal pattern of the relationships, it appears that there is a differential timing of effects for the opposite pathways. Therefore, mother's distress appears to have a proximal effect on their child's behavior and children's behavior seems to have a more distal effect on their mother's depression. Although the reason for this observed difference is unclear, it may be related to the previous discussion of instability of behavior during the middle school transition. Presumably, children's behavior during Grade 4 represents their "natural" behavior and is possibly less influenced by other factors, such as the stress of a transition. Over time, the "natural" child behavior exacerbates their mother's depression, which is less affected by the variability in externalizing behavior due to the middle school transition.

Previous research in this area is very minimal, despite frequent hypothesizing that maternal depression and externalizing behavior may be related reciprocally. One previous study demonstrated reciprocal relationships between disruptive behavior and parenting behaviors (Burke et al., 2008), but it did not examine parental affect or stress. Another study demonstrated reciprocal associations at certain time points between maternal depressive symptoms and boys' aggressive and antisocial behavior (Gross, Shaw, & Moilanen, 2008). However, they only examined aggressive behavior from ages 5 to 10 and antisocial behavior from ages 10 to 15, and the time points were not annual. The current study captured a wider range of behavior and

measured these behaviors throughout the middle school transition, providing evidence that externalizing behaviors as a whole contribute to maternal depression, and vice versa, during this transition. Furthermore, the Gross, Shaw, and Moilanen (2008) study used maternal report of child behavior, which could have increased bias because the mother's own symptoms might have distorted her perceptions of her child's behavior (Chi & Hinshaw, 2002). The present study used an aggregate of mother and teacher reports, reducing this potential bias.

The current study expanded on the limited research examining reciprocal influences of parent and child affect and behavior and suggested that externalizing behavior, as a whole, is important in these processes. Furthermore, it extended the knowledge of the timing of the reciprocal effects and minimized potential bias, through the use of longitudinal data and the inclusion of teacher ratings.

Mediation

Results of the meditational analyses revealed that inconsistent discipline mediated the relationship between maternal depression and child externalizing behavior, but not the reverse pathway, supporting one hypothesis but not the other. Therefore, during the middle school transition, the relationship between maternal depression and externalizing behavior was accounted for by inconsistent discipline, which may provide evidence for a common process operating in these families. Inconsistency of discipline appears to be important in the development of children's negative behavior.

Previous research in this area identified the same relationship (Barry, Dunlap, Lochman, et al., 2009), but used cross-sectional data in which the children averaged 9 to 12 years old. The current study's finding not only replicates but also extends on these analyses, through the use of longitudinal data and identification of a specific time period. Using longitudinal data helped to

establish the specific timing of these effects. Furthermore, the Barry, Dunlap, Lochman, et al. (2009) study used mother rated aggression, whereas the current study included mother and teacher rated externalizing behavior. As discussed earlier, this reduced possible maternal bias and helped to determine that maternal depression and inconsistent discipline contribute to a wider range of negative child behavior.

On the other hand, in this sample, inconsistent discipline did not mediate the link between child externalizing behavior and maternal depression. Although this hypothesis was not supported, these findings are significant because they indicate that the effect that child behavior has on maternal depression is not due to inconsistent discipline. Prior research had suggested that behavior problems contributed to inconsistent parenting (Fite et al., 2006), but no prior research had directly examined whether inconsistent discipline exacerbated maternal depression.

Together, these findings indicate that while mother's depression seems to affect their child's behavior through the lack of consistent discipline, children's behavior may influence their mother's depression through other mechanisms.

Limitations and Directions for Future Research

The present study contributed to the understanding of the nature of the relationships between maternal depression, child externalizing behavior, and inconsistent discipline, as well as the timing of their effects on each other. Although causality cannot be determined with correlational methods, the use of longitudinal data that allowed for temporal ordering of constructs helped to identify pathways of causal influence. Future studies will hopefully build on these findings to elucidate whether these causal pathways are replicated with additional research.

Additionally, the present study indicated that the relationships appeared to be similar regardless of gender, ethnicity, or SES. However, due to the small sample size of females and other ethnicity, more detailed analyses were not available in the present study. Future research should examine these constructs as possible moderators of the observed relationships between maternal depression, child externalizing behavior, and inconsistent discipline.

Furthermore, the present study used an aggregate of mother and teacher ratings, in order to attenuate some of the potential bias of using only mothers' ratings. Future research could use only teacher ratings to determine if the relationships hold when child behavior is assessed only by a potentially less biased source.

Clinical Implications

The results of the current study highlight some important implications for treatment. Child externalizing behavior and maternal depression are not only significant functional problems, but also can be detrimental to others, as they occur in a family context. Furthermore, this study suggests that they appear to be relatively stable over time, and so parents and children continue to experience these issues and influence each other. These results suggest that family based treatment, reflecting an ecological approach, may be important when treating families with these characteristics. Family based treatment could help to minimize negative reciprocal influences by both treating maternal depression to lessen children's behavior problems and modifying behavior problems to reduce mothers' stressors. Clinicians should also be particularly aware of periods of transition that may contribute to added stress and behavior problems for these families. Additionally, inconsistent discipline could be targeted as one way to reduce children's externalizing behaviors. This could be incorporated into depression treatments for the mothers and include stress management as well as positive parenting techniques such as praising

and reinforcement and ignoring minor negative behaviors. Rather than focusing on one problem area at a time (e.g., depression, behavior problems, or inconsistent discipline), all of these areas could be targeted successively to hopefully strengthen treatment gains. It would seem that even mothers struggling with depression could learn to be more consistent, which may even help with their depressive symptoms. Finally, early identification of families in which these processes are occurring will help to increase prevention efforts and possibly attenuate some of the later negative reciprocal effects.

Finally, the current study represents a small but important period of time in children's lives. It is important to recognize that precursors to the processes investigated in this study, such as different children's temperaments or impaired attachment relationships, may have had different impacts on the constructs of interest during this time period. Similarly, children of depressed mothers demonstrate heterogeneity in outcomes, such as internalizing problems or substance use. This study focused only on children who demonstrated externalizing behavior, and their families. However, overall the current study contributes to the literature on maternal depression, externalizing behavior, and inconsistent discipline, and provides some useful indications for prevention and intervention.

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APPENDIX

Table 1

Sample Sizes of Ethnicity Composition in Related Studies

	Total N	Caucasian	African-American	Biracial/ Mixed	Latino/ Hispanic	Other
Barry et al., 2005	**215**	88	126			1
Barry et al., 2009	**215**	88	126			1
Breen & Barkley, 1988*						
Burke et al., 2008	**177**	124	53			
Chi & Hinshaw, 2002	**96**	53	26		2	15
Chronis et al., 2007	**108**	72	29			7
Erath et al., 2006	**360**	284	56			20
Fite et al., 2006	**122**	55	66			
Frick et al., 1992	**177**	124				53
Gerdes et al., 2007	**96**	80	5	6	4	
Gross, Shaw, Moilanen, 2008	**310**	164	112	15		19
Gross, Shaw, Moilanen, et al., 2008	**731**	366	204	95		65
Hammen et al., 1990	**64**	51				13
Johnston et al., 2002	**136**	88	34	11	3	
Karazsia & Wildman, 2009	**944**	733	153			49
Pfiffner et al., 2005	**149**	116		18		7

*Ethnicity information not given. *Note*: Some of the *n*'s were calculated from percentages given by the authors so as to keep the comparisons similar, and so may be slightly inaccurate.

Table 2

Correlations between Parent and Teacher BASC

	Ext G4 - Parent	Ext G5 - Parent	Ext G6 - Parent
Ext G4 - Teacher	0.34**	0.34**	0.42**
Ext G5 - Teacher	0.17*	0.34**	0.35**
Ext G6 - Teacher	0.07	0.23**	0.25**

Note. ‘Ext” stands for Externalizing Behavior and ‘G4’ stands for Grade 4, ‘G5’ stands for Grade 5, and G6’ stands for Grade 6.

*$p < 0.05$. **$p < 0.01$.

Table 3

Study Variable Means and Standard Deviations

Variable	Mean	Standard Deviation
Maternal Depression Grade 4	8.12	7.54
Maternal Depression Grade 5	8.09	7.85
Maternal Depression Grade 6	7.40	7.38
Inconsistent Discipline Grade 4	2.34	0.66
Inconsistent Discipline Grade 5	2.34	0.68
Inconsistent Discipline Grade 6	2.28	0.70
Externalizing Behavior Grade 4	27.74	13.01
Externalizing Behavior Grade 5	27.13	13.87
Externalizing Behavior Grade 6	25.12	14.55

Table 4

Study Variable Correlations

Variable	Dep G4	Dep G5	Dep G6	Dis G4	Dis G5	Dis G6	Ext G4	Ext G5	Ext G6
Dep G4	-----								
Dep G5	0.69**	-----							
Dep G6	0.68**	0.70**	-----						
Dis G4	0.21**	0.17*	0.16*	-----					
Dis G5	0.33**	0.30**	0.20*	0.60**	-----				
Dis G6	0.29**	0.19*	0.21**	0.60**	0.61**	-----			
Ext G4	0.22**	0.21**	0.26**	0.18*	0.20**	0.10	-----		
Ext G5	0.19*	0.22**	0.19*	0.18*	0.30**	0.16*	0.54**	-----	
Ext G6	0.18*	0.25**	0.21**	0.13	0.30**	0.20*	0.54**	0.61**	-----

Note. ‘Dep’ stands for Maternal Depression, ‘Dis’ stands for Inconsistent Discipline, and ‘Ext’ stands or Externalizing Behavior. ‘G4’ stands for Grade 4, ‘G5’ stands for Grade 5, and ‘G6’ stands for Grade 6.

*$p < 0.05$. **$p < 0.01$.

Table 5

Independent Samples T-tests for Males vs. Females

	t	Sig (2-tailed)
Maternal Depression Grade 4	1.05	0.30
Maternal Depression Grade 5	0.18	0.86
Maternal Depression Grade 6	1.32	0.19
Inconsistent Discipline Grade 4	1.97	0.05*
Inconsistent Discipline Grade 5	0.85	0.40
Inconsistent Discipline Grade 6	1.37	0.18
Externalizing Composite Grade 4	-1.36	0.18
Externalizing Composite Grade 5	-1.24	0.22
Externalizing Composite Grade 6	-1.56	0.12

*$p < 0.05$. **$p < 0.01$.

Table 6

Independent Samples T-tests for African Americans vs. Other Ethnicity

	t	Sig (2-tailed)
Maternal Depression Grade 4	0.01	0.99
Maternal Depression Grade 5	-0.83	0.41
Maternal Depression Grade 6	-0.76	0.45
Inconsistent Discipline Grade 4	0.53	0.60
Inconsistent Discipline Grade 5	0.45	0.66
Inconsistent Discipline Grade 6	1.58	0.12
Externalizing Composite Grade 4	-3.66	0.001**
Externalizing Composite Grade 5	-0.30	0.77
Externalizing Composite Grade 6	-0.24	0.81

*$p < 0.05$. **$p < 0.01$.

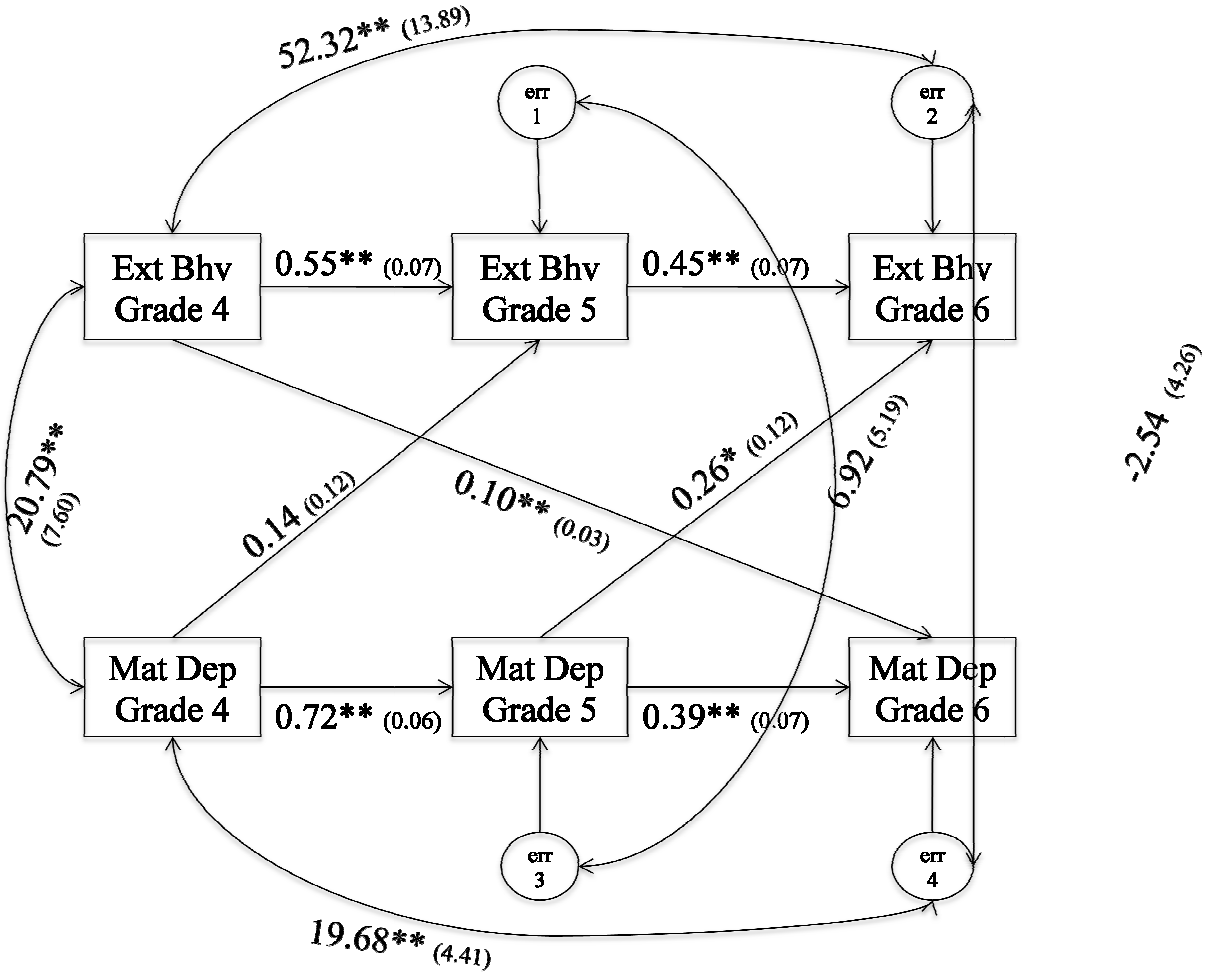
Table 7

Independent Samples T-tests for Low vs. High SES

	t	Sig (2-tailed)
Maternal Depression Grade 4	1.74	0.08
Maternal Depression Grade 5	1.47	0.14
Maternal Depression Grade 6	1.43	0.15
Inconsistent Discipline Grade 4	1.86	0.07
Inconsistent Discipline Grade 5	3.42	0.001**
Inconsistent Discipline Grade 6	1.57	0.12
Externalizing Composite Grade 4	1.29	0.20
Externalizing Composite Grade 5	1.52	0.13
Externalizing Composite Grade 6	1.95	0.05

*$p < 0.05$. **$p < 0.01$.

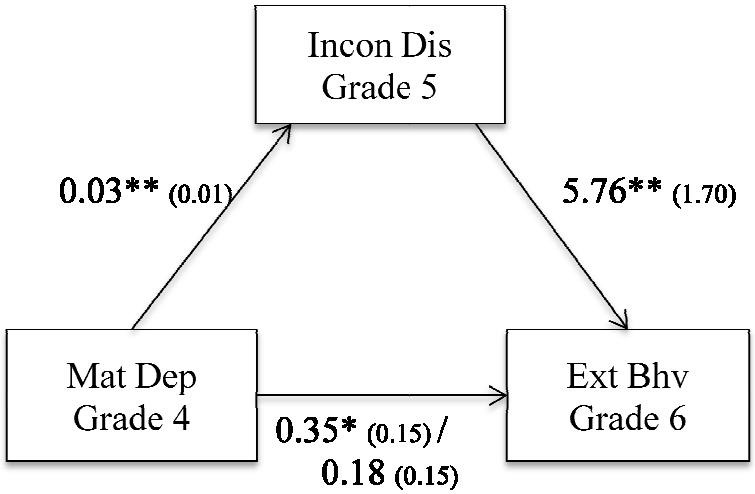
Figure 1. Coefficients and their Standard Errors within the Autoregressive Model of the Relationship between Children's Externalizing Behavior and Maternal Depression.



Note. 'Mat Dep' stands for Maternal Depression and 'Ext Bhv' stands for Externalizing Behavior.

*$p < 0.05$. **$p < 0.01$.

Figure 2. Coefficients and their Standard Errors within the Mediation Model from Maternal Depression to Child Externalizing Behavior.

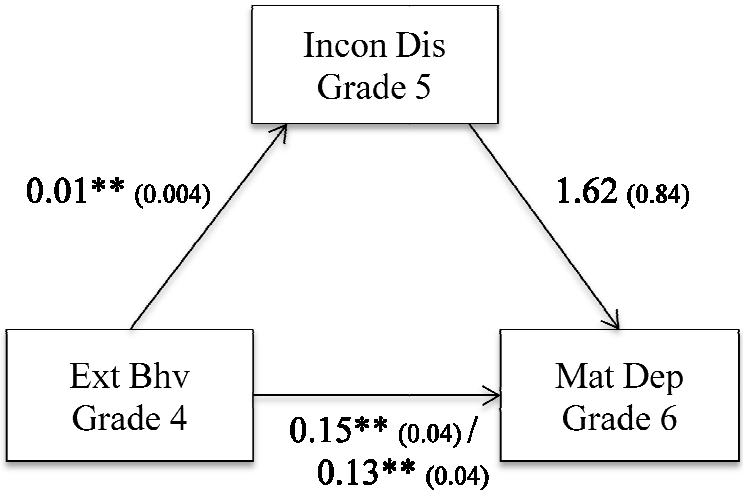


Sobel test: 2.64**

Note. On the path from Mat Dep to Ext Bhv, the first number represents the relation between Maternal Depression and Externalizing Behavior, and the second number represents their relation when controlled for by Inconsistent Discipline. 'Mat Dep' stands for Maternal Depression, 'Incon Dis' stands for Inconsistent Discipline, and 'Ext Bhv' stands for Externalizing Behavior.

*$p < 0.05$. **$p < 0.01$.

Figure 3. Coefficients and their standard errors within the mediation model from child externalizing behavior to maternal depression.



Sobel test: 1.49

Note. On the path from Ext Bhv to Mat Dep, the first number represents the relation between Externalizing Behavior and Maternal Depression, and the second number represents their relation when controlled for by Inconsistent Discipline. 'Mat Dep' stands for Maternal Depression, 'Incon Dis' stands for Inconsistent Discipline, and 'Ext Bhv' stands for Externalizing Behavior.

*$p < 0.05$. **$p < 0.01$.