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Parenting Mediates the Impact of Maternal Depression on Child Internalizing Symptoms

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Abstract

Background—To examine the potential mediating role of parenting behaviors in the longitudinal, bidirectional relationships between maternal depression and child internalizing symptoms (i.e., depression and anxiety).

Methods—We analyzed data from 4,581 mother-child dyads from the Fragile Families and Child Wellbeing Study, assessed when the child was 3, 5, and 9 years old. Data included maternal depression diagnosis, child internalizing symptoms, and parenting behaviors (i.e., psychological aggression, non-violent discipline, and physical assault). Data were analyzed using cross-lagged panel models.

Results—Results indicated bidirectional relationships between maternal depression and child internalizing symptoms over childhood. Mediation analyses suggested that maternal depression led to subsequent increased psychological aggression towards their child, which in turn led to increased child internalizing symptoms. Non-violent discipline and physical assault did not mediate this relationship. However, greater use of non-violent discipline at age 5 among all parents predicted higher child internalizing symptoms at age 9. No parenting behaviors were both predicted by earlier child internalizing symptoms and predictive of subsequent maternal depression.

Conclusions—Our results suggest a bi-directional relationship between child and maternal internalizing psychopathology that is partially explained by depressed mothers' greater use of psychological aggression towards their children. It is important to note that the size of these effects were small, suggesting that the relationship between parent and child psychopathology is likely additionally explained by factors not assessed in the current study. Nonetheless, these results have implications for prevention and intervention strategies targeting child anxiety and depression.

Keywords

pediatric anxiety; pediatric depression; maternal depression; parenting; mediator

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Major depressive disorder (MDD) is the most common of all mental illnesses, with a lifetime prevalence of approximately 17% (Kessler et al., 2005; Kessler, Petukhova, Sampson, Zaslavsky, & Wittchen, 2012). Depressive disorders are a leading cause of disability worldwide (Ferrari et al., 2013; Üstün, Ayuso-Mateos, Chatterji, Mathers, & Murray, 2004) and are associated with significant functional impairment across work, school, and social functioning (Balázs et al., 2013; Ulbricht & Rothschild, 2016) as well as increased medical illness (Evans et al., 2005; Messay, Lim, & Marsland, 2012; Wulsin & Signal, 2003).

Moreover, MDD is highly familial (McGue & Christensen, 2003; Merikangas et al., 2014). Parental MDD is associated with increased risk of symptoms of pediatric depression, such as irritability and internalizing behaviors (i.e., depressive and anxiety symptoms), and even adult depression and anxiety among offspring (Colletti et al., 2009; Goodman, 2007; Goodman et al., 2011; Weissman et al., 2006; Wickramaratne & Weissman, 1998; Wiggins, Mitchell, Stringaris, & Leibenluft, 2014). Maternal MDD is more strongly related to internalizing problems in children than paternal depression (Connell & Goodman, 2002). Considering depression affects women at higher rates than men (Kessler, McGonagle, Swartz, Blazer, & Nelson, 1993; Kessler et al., 2012; Riolo, Nguyen, Greden, & King, 2005) this suggests a particular need to understand the transmission of risk for depressive and anxiety disorders from mothers to their children in order to design interventions.

Transmission of depressive and anxiety disorders across generations is likely explained by both genetic and environmental factors (Ferentinos et al., 2015; Lau & Eley, 2008; Rice, 2010). Given the need to identify modifiable mechanisms of childhood anxiety and depressive disorders so as to support preventative efforts, a significant body of research in this area has focused on parenting practices. A recent review of 181 studies identified that lack of parental warmth, high inter-parental conflict, over-involvement, high levels of expressed hostility, less autonomy-granting, and low levels of parental monitoring were associated with increased associations with anxiety and/or depression among children (Yap, Pilkington, Ryan, & Jorm, 2014). Additionally, more extreme parenting behaviors, including physical abuse, emotional abuse, and neglect, have also been linked to increased rates of childhood depressive and anxiety disorders (Norman et al., 2012).

However, advances in our understanding of mediating parenting practices in explaining the relationship between maternal depression and child internalizing psychopathology have been limited by methodological features of extant research. The majority of empirical studies and existing reviews in this area have focused either on the relationship between maternal depression and child psychopathology (Goodman et al., 2011), parenting practices and child psychopathology (McLeod, Weisz, & Wood, 2007; McLeod, Wood, & Weisz, 2007; Yap et al., 2014), or maternal depression and parenting practices (Turney, 2011), but have not linked all of these factors within the same study in order to test mechanistic models. While a limited number of studies have tested mechanistic models, they are limited by small sample sizes (for a review of studies, see Goodman, 2007). Given the expected small effect size in this relationship, large samples are needed to be powered to test mediation models (Fritz & MacKinnon, 2007). Finally, examination of mechanistic models is also limited by a preponderance of cross-sectional designs, with existing reviews often excluding longitudinal

studies due to too few studies (Goodman et al., 2011; McLeod, Weisz, et al., 2007; McLeod, Wood, et al., 2007).

In the current study, we sought to address several methodological limitations of previous studies in order to advance an understanding of potential parenting mechanisms whereby risk associated with having a mother with depression is manifested in the form of childhood internalizing symptoms. We present data from a large population-based sample of mother and child dyads (Reichman, Teitler, Garfinkel, McLanahan, 2001) assessed from birth longitudinally for the presence of maternal depression, parenting practices implemented, and child anxiety and depressive symptoms. These data thus allowed us to examine bi-directional mediation models explaining the association between maternal depression and child internalizing psychopathology as it unfolds over a six-year period. Specifically, we focused on several potential mediating parenting practices, including psychological aggression, non-violent discipline, and physical assault.

Methods

Participants

Participants included 4,898 mother-child dyads assessed as part of the Fragile Families and Child Wellbeing Study—a population-based birth cohort of families in 20 large US cities (Reichman, Teitler, Garfinkel, McLanahan, 2001). Data presented in the current study were collected when the child was 3, 5, and 9 years of age. Participants were included in the current study if they had data from at least one variable of interest (see below) from at least one timepoint, which reduced the analytic sample to 4,581 mother-child dyads. Demographic characteristics are presented in Table 1.

Measures

Maternal depression—Maternal depression was assessed at each time point using the Composite International Diagnostic Interview-Short Form (CIDI-SF), Section A (Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998). This measure is used to assess criteria for a major depressive episode in the past year based on the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) (American Psychiatric Association, 1994). Mothers were assigned a caseness score of 1 or 0, indicating a probable or non-probable case for major depression, based on whether they had reported at least two weeks of depressive symptoms lasting at least half the day. Using the CIDI-SF, 20.6%, 17.0%, and 16.5% of mothers reported being depressed at ages 3, 5 and 9 respectively. Bivariate correlations in Supplementary Table 1 show that maternal depression was moderately correlated overtime, but weakly correlated with child internalizing and parenting.

Child internalizing symptoms—The Child Behavior Checklist (CBCL) was completed by the primary caregiver at each timepoint to assess presence of child internalizing (i.e., depression, anxiety) and externalizing symptoms. Because different version of the CBCL exist for different age groups and the CBCL underwent revisions during the timeframe of this longitudinal study, different version of the CBCL were administered at each timepoint, age 3: CBCL/2-3 (Achenbach, 1992); age 5: CBCL/4-18 (Achenbach, 1991); age 9: CBCL/

6-18 (Achenbach & Rescorla, 2001). However, the constructs assessed remained the same across versions. We created an internalizing score for each timepoint based on the six CBCL internalizing items that were consistent across versions. Parents are asked to respond on a 0–2 scale with anchors of *never true*, *sometimes or somewhat true*, or *very true or often true* to statements querying child behaviors and symptoms (i.e., lacks energy, shy, self-conscious, nervous, withdrawn, sad). To remain consistent with previous research (Wiggins, Mitchell, Hyde, & Monk, 2015), we also present supplementary analyses using the full CBCL internalizing scales (without somatic symptoms at age 9). We created a score ranging from 0–2 based on mean item response. Cronbach's α values for the consistent six-item CBCL were .57, .47, and .66 at ages 3, 5, and 9, respectively. These values were higher for the full internalizing scale (.75, .75, .84 at ages 3, 5, and 9). We performed additional analyses with the Wiggins et al, 2015 scales in addition to the six-item scales to examine the extent to which results were driven by differences in Cronbach's α values (see Supplementary Figures 1–3). Childhood internalizing was moderately correlated over time, but only weakly correlated with maternal depression and parenting.

We used a composite of childhood anxiety and depressive symptoms as the dependent variable for multiple reasons. First, recent reviews have underlined the importance of considering both childhood depression and anxiety as outcomes when examining the role of parental factors (Yap et al., 2014), which is supported by evidence suggesting shared parental risk factors for these disorders (Bogels & Brechman-Toussaint, 2006; Dozois, Seeds, & Collins, 2009; Wilamowska et al., 2010). Secondly, childhood anxiety is predictive of later childhood and adolescent depressive symptoms (Bittner et al., 2007; Foley, Pickles, Maes, Silberg, & Eaves, 2004), often above the predictive ability of prior depressive symptoms themselves (Cole, Peeke, Martin, Truglio, & Seroczynski, 1998).

Parenting behaviors—The Parent Child Conflict Tactics Scales (Straus, Hamby, Finkelhor, Moore, & Runyan, 1998) were completed by the primary caregiver at each timepoint to assess frequency of a variety of parenting behaviors in the past year. This measure includes four scales including psychological aggression (e.g., shouted at child, called child names), non-violent discipline (e.g., explained why something was wrong, took away privileges), physical assault (e.g., spanked child, shook child), and neglect (e.g., not able to get child food he/she needed). Yearly chronicity scores were calculated, which represent a percentage of maximum score for each scale (Straus, 2001; Straus et al., 1998). Cronbach's α values for the psychological aggression were .52, .56, .62; non-violent discipline scale were .73, .78, .83; and physical assault were .61, .61, and .71 at ages 3, 5, and 9, respectively. Due to poor psychometric properties (i.e., α values ranged from .13–.54 at each timepoint; strong floor effect) we did not include the neglect subscale in our analyses. Parenting measures are strongly correlated both over time and with each other (at the same timepoint).

Analytic Plan

To characterize the effect of maternal depression on child internalizing behavior and vice versa across time, we generated three cross-lagged panel models with bi-directional pathways between maternal depression and child internalizing behavior, predicting the

subsequent timepoints (i.e., age 3 variables predicting age 5 variables, age 5 variables predicting age 9 variables). In three models, we examined the potential mediating roles of three types of parenting practices (psychological aggression, non-violent discipline, and physical assault) in the relationship between maternal depression and child internalizing symptoms. Models probed bi-directional mediation pathways, such that mediation could occur either through (1) a significant relationship between maternal depression at age 3 with parenting behaviors at age 5 and a significant relationship between parenting behaviors at age 5 and child internalizing at age 9, or (2) a significant relationship between child internalizing at age 3 with parenting behaviors at age 5 and a significant relationship between parenting behaviors at age 5 and maternal depression at age 9. All models included autoregressive paths for each variable, which evaluated stability of each construct.

Because we tested three potential parenting mediators, we used a Bonferroni-corrected alpha value of p=0.017 (.05/3) to determine significance of pathways in the model. We evaluated overall model fit for each of the three mediation models based on the root mean squared error of approximation (RMSEA) and comparative fit index (CFI), which are more appropriate indices of model fit in large samples than typical chi-squared tests (Bentler & Bonnet, 1980; Fan, Thompson, & Wang, 1999). RMSEA values close to .06 and CFI values close to .95 are typically considered indicative of good fit between the observed data and the hypothesized model (Hu & Bentler, 1999). We report standardized paths using beta weights with STDYX standardization for continuous covariates/predictors (i.e., parenting behaviors, child internalizing symptoms) and STDY standardization for binary covariates/predictors (i.e., maternal depression) (Muthén & Muthén, 2010). Data were analyzed using Mplus (Muthén & Muthén, 2010). Correlations among variables are presented in Supplementary Table 1.

Analysis of these archival data was approved by the San Diego State University Institutional Review Board.

Results

In all models, autoregressive effects for child internalizing (βs=0.33–0.38), maternal depression (βs=0.41–.61), and parenting (psychological aggression, βs=0.53–0.58; nonviolent discipline, βs=0.55–0.57; physical assault, βs=0.45–0.55) were significant. Regarding direct effects of maternal depression on child internalizing symptoms (and vice versa), across timepoints and all models there were significant bidirectional predictive relationships between these constructs (βs=0.09–0.15). Autoregressive, direct, and mediation effects for all models are shown in Figs. 1–3.

Psychological Aggression

The mediation model of the relationship of maternal depression with child internalizing by psychological aggression demonstrated overall good model fit, χ^2=146.47, df=12, p<.001; RMSEA=0.049 (90% CI: 0.042, 0.057); CFI=0.963. Beta weights and significance levels for all paths in the model are presented in Figure 1. Maternal depression at age 3 predicted increased parental psychological aggression at age 5 (β=0.06, p=.001), which in turn predicted increased child internalizing symptoms at age 9 (β=0.07, p=.001), indicating

evidence of mediation. However, evidence for reverse mediation was not found; child internalizing symptoms at age 3 did not predict parental psychological aggression at age 5 (β=–0.004, p=.849), although greater parental psychological aggression at age 5 was associated with increased likelihood of maternal depression at age 9 (β=0.08, p=.007).

Nonviolent Discipline

The mediation model for nonviolent discipline (see Figure 2) demonstrated overall good model fit, χ^2=119.03, df=12, p<.001; RMSEA=0.044 (90% CI: 0.037, 0.052); CFI=0.963. The model did not indicate support for the mediating role of nonviolent discipline in either direction. Maternal depression at age 3 did not predict nonviolent discipline at age 5 (β=0.02, p=.275), although increased nonviolent discipline at age 5 did predict increased child internalizing symptoms at age 9 (β=0.06, p=.005). Child internalizing symptoms at age 3 did not significantly predict nonviolent discipline at age 5 (β=−0.04, p=.028), and nonviolent discipline at age 5 was not associated with likelihood of maternal depression at age 9 (β=0.05, p=.080).

Physical Assault

The mediation model for physical assault (see Figure 3) demonstrated overall good model fit, χ^2=126.83, df=12, p<.001; RMSEA=0.046 (90% CI: 0.039, 0.053]; CFI=0.970. This model examined the potential mediating role of parental physical assault in explaining these bi-directional relationships. The model did not indicate support for the mediating role of physical assault in either direction. Maternal depression at age 3 did not predict physical assault at age 5 (β=0.02, p=.225), and physical assault at age 5 did not predict child internalizing symptoms at age 9 (β=0.03, p=.085). Child internalizing symptoms at age 3 did not significantly predict physical assault at age 5 (β=−0.02, p=.277), and physical assault at age 5 was not associated with likelihood of maternal depression at age 9 (β=0.03, p=.249).

Additional Analyses

We additionally re-ran each of the above models using the full CBCL internalizing scales at each timepoint, minus somatic items, as in Wiggins et al. 2015, as internal consistency values were higher in the full scales compared to the 6-item version that was consistent across timepoints. Results were largely the same. There was little change in significance for any of the paths, and discrepancies in beta weights were generally small (Supplementary Figures 1–3).

Discussion

We examined the role of parenting practices as potential mechanisms explaining the relationship between maternal depression and child internalizing psychopathology. Consistent with a large body of previous research, we found significant, bi-directional associations between maternal depression and child internalizing psychopathology (Goodman et al., 2011). These findings suggest a transactional model explaining the unfolding and reciprocal influences of maternal and child internalizing symptoms over time (Hammen, Burge, & Stansbury, 1990; Sameroff & Mackenzie, 2003). The role of parenting practices in mediating these bidirectional relationships appeared to be unidirectional in

nature such that parenting partially explained the impact of maternal depression on subsequent child internalizing symptoms, but not the reverse. This suggests that factors other than parenting may explain our findings whereby child internalizing symptoms predict later maternal depression (e.g., increased parenting stress; Berryhill & Durtschi, 2017). Such research represents a critical area for continued research.

Specifically, our results indicate that increased use of psychological aggression (i.e., shouting at child, threatening child, name calling) partially accounts for the impact of maternal depression on subsequent child internalizing symptoms. That is, mothers who were depressed at the child's age of 3 were more likely to be psychologically aggressive towards their child at age 5 relative to non-depressed mothers, which was in turn associated with the development of greater child internalizing symptoms at age 9. The reverse, however, was not supported – mothers' use of psychological aggression did not appear to be influenced by the child's pre-existing internalizing symptoms. These findings are in line with existing reviews of cross-sectional studies which found that parental hostility towards the child—a similar construct to our psychological aggression scale—is related to depression (McLeod, Weisz, et al., 2007) and anxiety (McLeod, Wood, et al., 2007) in children. Our findings are informative in that they establish directionality of this association over time. Thus, interventions aimed at reducing psychological aggression expressed by depressed mothers may potentially mitigate development of internalizing symptoms among their children.

Although a number of studies have found positive effects of prevention programs among offspring of depressed or anxious parents, many have focused on providing the child with cognitive-behavioral coping skills rather than directly targeting parenting practices (Beardslee et al., 2013; Garber et al., 2009; MacLeod & Clarke, 2015). Although results from these studies clearly support this approach, data from the current study suggest that it may additionally be helpful to directly address mothers' psychological aggression as part of these prevention programs. Several studies have examined the effects of prevention programs targeting parenting practices among depressed (Compas et al., 2009) or anxious (Ginsburg, 2009) parents with positive effects on child outcomes. Interestingly, a study examining mechanisms of a family-based prevention program among children with depressed parents found that changes in positive parenting practices (e.g., warmth, responsive listening) but not negative parenting practices (e.g., hostility, intrusiveness) mediated effects on child internalizing symptoms (Compas et al., 2010). Of note, this intervention focused largely on development of positive parenting skills (Compas et al., 2009) and thus the intervention did not produce an effect on negative parenting skills (Compas et al., 2010), suggesting that perhaps factors such as psychological aggression should be targeted more directly in parent-based prevention programs.

Whereas our results did not support a mediating role of non-violent discipline in explaining the relationship between maternal depression and child internalizing symptoms, the data did indicate that regardless of maternal depression status, mothers' greater use of non-violence discipline strategies at age 5 was associated with higher levels of child internalizing symptoms at age 9. These results are perhaps surprising, as greater scores on this scale indicate greater use of strategies, including time-out and removal of privileges, which are generally accepted as evidence-based parenting techniques for promoting adaptive child

behavior (Calzada, Basil, & Fernandez, 2013; Wyatt Kaminski, Valle, Filene, & Boyle, 2008). There are several possible explanations for this finding. Mild punishment techniques such as these are generally considered as secondary recommendations to the use of other positive parenting practices, such as positive reinforcement (Kazdin, 1997). Thus, high use of these punishment techniques without corresponding positive parenting practices may be perceived relatively harshly by the child, leading to greater internalizing symptoms. Moreover, the non-violent discipline subscale includes an item querying the extent to which parents explain to their child why they are wrong, which may be reflective of greater criticism of children and thus associated with child internalizing symptoms (Drake & Ginsburg, 2012).

Our results did not support a mediating role of physical assault. We note that this scale demonstrated a strong floor effect, which is perhaps unsurprising as physical assault questions were self-reported by parents. Therefore, in addition to the lack of true association, it is possible that our results are due to poor psychometric properties of this measure, response biases, or fear of reporting requirements.

Small effect sizes observed in the current study for the mediating role of parenting practices suggest that additional factors may explain the bidirectional relationships between maternal depression and child anxiety (e.g., genetics, other environmental influences) (Ferentinos et al., 2015; Lau & Eley, 2008; Rice, 2010). This is consistent with previous reviews which suggest that, on average, parenting accounts for only 4% of the variance in child anxiety symptoms (McLeod, Wood, et al., 2007) and 8% of the variance in child depressive symptoms (McLeod, Weisz, et al., 2007). However, these reviews have also suggested that the contribution of parenting ranges from <1–18% of variance explained for child anxiety (McLeod, Wood, et al., 2007) and 4–11% of variance explained for child depressive symptoms (McLeod, Weisz, et al., 2007), depending on the dimension of parenting behaviors assessed. In line with these findings, the assessment of multiple domains of parenting behaviors is a strength of the current study. However even when narrowing the scope of parenting impact to specific domains, the observed effect size for psychological aggression predicting child internalizing symptoms (β=0.07) was lower than might be expected based on previous literature. For example, findings from two longitudinal studies suggest that observed maternal aggressive behavior towards their children in an event-planning interaction predicted later development of child depressive and/or anxiety symptoms with βs=0.18–0.30 (Schwartz et al., 2012, 2014).

Several issues related to the small effect sizes observed in the current study warrant consideration. First, previous research suggests that parent-rated measures of parenting behaviors are less predictive of child internalizing symptoms relative to that of observer-rated parenting behaviors (McLeod, Wood, et al., 2007). Second, as internal consistency estimates set the upper limit on a measure's ability to predict another measure, effect sizes may have been attenuated by low internal consistency values (Schmitt, 1996). Low internal consistency estimates may be partially explained by the limited length of our scales (Cortina, 1993; Green, Lissitz, & Mulaik, 1977; Miller, 2009), although repeating analyses with the long version of the CBCL yielded very similar results (Supplemental Figures 1–3). Third, the study from which these data are derived over-sampled participants from unmarried

parents (Reichman, Teitler, Garfinkel, McLanahan, 2001) which is, on average, indicative of lower socio-economic status (SES) (Conger, Conger, & Martin, 2010). Previous meta-analytic research suggests that the impact of parenting practices on child depressive symptoms may be lessened among families from low SES backgrounds, perhaps because these children experience greater stress for a multitude of reasons (McLeod, Weisz, et al., 2007). We conducted post-hoc sensitivity analyses to test this possibility; however these did not indicate systematic differences in our psychological aggression mediation model across SES groups (Supplemental Materials). Fourth, in smaller samples, in order for the estimate to reach significance, effect sizes must be larger; thus it is possible that earlier estimates were inflated (i.e. winner's curse).

Our study has several notable strengths, including a large sample size (N=4,581) and longitudinal assessment of all constructs of interest. However, assessment of child, mother, and parenting factors were fairly widely spaced in time (i.e., 2–4 years). More frequent assessment of child and parent factors as well as additional timepoints may allow researchers to better understand the transactional nature of these processes as they unfold over time.

Conclusion

In conclusion, this pattern of findings supports the value of examining maternal depression, potential mediating parenting practices, and child internalizing symptoms within a comprehensive and longitudinal framework. Moreover, it is notable that parenting practices mediated the association between maternal depression and child internalizing symptoms over a fairly long period of time, underscoring the relevance of continued research on the pathways through which maternal depression may exert influences on child development.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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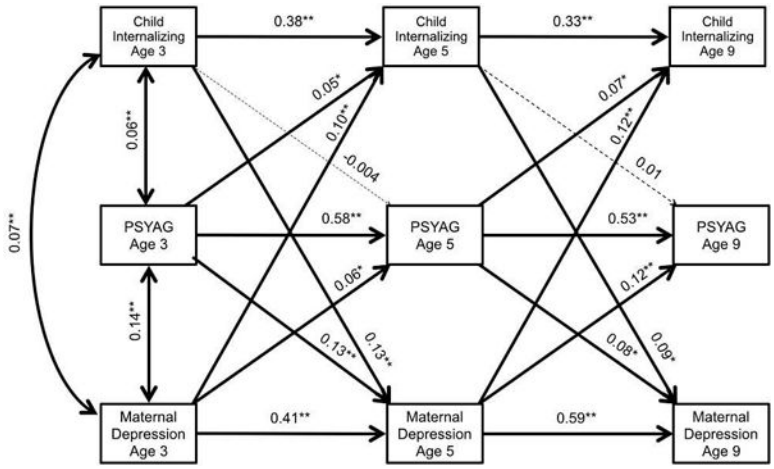

Figure 1.

Psychological Aggression as a Mediator of the Relationship between Maternal Depression and Child Internalizing Symptoms

Note. †$p<.05$, *$p<.017$ (Bonferroni-corrected significance level), **$p<.001$. Non-significant paths represented by dotted lines. Child internalizing symptoms assessed using 6-item Child Behavior Checklist version consistent across timepoints. PSYAG=psychological aggression.

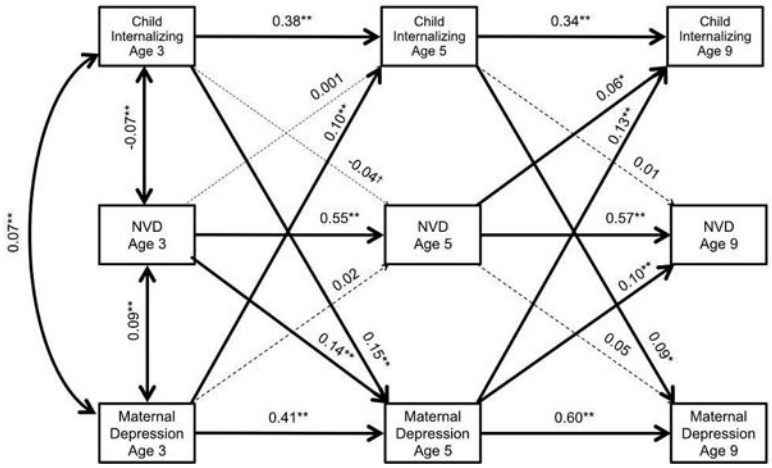

Figure 2.

Non-Violent Discipline as a Mediator of the Relationship between Maternal Depression and Child Internalizing Symptoms

Note. †$p<.05$, *$p<.017$ (Bonferroni-corrected significance level), **$p<.001$. Non-significant paths represented by dotted lines. Child internalizing symptoms assessed using 6-item Child Behavior Checklist version consistent across timepoints. NVD=non-violent discipline.

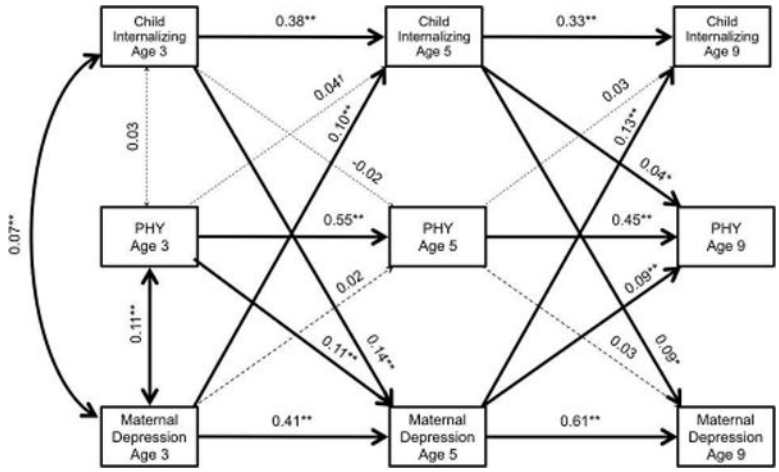

Figure 3.

Physical Assault as a Mediator of the Relationship between Maternal Depression and Child Internalizing Symptoms

Note. †$p<.05$, *$p<.017$ (Bonferroni-corrected significance level), **$p<.001$. Non-significant paths represented by dotted lines. Child internalizing symptoms assessed using 6-item Child Behavior Checklist version consistent across timepoints. PHY=physical assault.

Table 1

Family demographic characteristics assessed at child's birth

Child Sex	% Female
	47.4
Maternal Age	M (SD)
	25.2 (6.1)
Maternal Education	%
Less than high school degree	39.1
High school diploma or equivalent	25.5
Some college or technical training	24.4
Completed college or graduate school	10.8
Maternal Race/Ethnicity	%
White, non-Hispanic	21.2
Black, non-Hispanic	47.9
Hispanic	26.9
Other	3.8
Marital Status of Biological Parents	%
Married	24.4
Not married	75.6
Cohabitating but not married	36.3