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Maternal BIS Sensitivity, Overprotective Parenting, and Children's Internalizing Behaviors

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Abstract

Although sensitivity to the Behavioral Inhibition System within Gray's (1970) reinforcement sensitivity theory relates to individuals' own depressive and anxious symptomatology, less is known about how parental BIS sensitivity relates to early indicators of internalizing problems in young children. Moreover, the extent to which this parental characteristic relates to parenting behavior, and children's internalizing problems above and beyond parenting, remains unknown. The current study assessed maternal BIS sensitivity, overprotective parenting, and toddlers' internalizing behaviors in a sample of 91 mothers while controlling for mothers' own internalizing symptomatology. Heightened BIS sensitivity related to both overprotective parenting and internalizing behaviors. Overprotective parenting partially mediated the relation between BIS sensitivity and children's internalizing behaviors, although BIS sensitivity maintained a marginal relation to internalizing behaviors. Maternal BIS sensitivity and toddler internalizing behaviors may represent a shared disposition towards inhibition that is somewhat accounted for by overprotective parenting.

Keywords

BIS sensitivity; parenting; toddlers; internalizing

I. Introduction

Childhood internalizing problems consist of anxiety, depression, and withdrawal, affecting over 20% of youth (Sawyer et al., 2001). Research literature and prevention programs generally focus on school-aged children with less attention to difficulties beginning in early childhood (Bayer, Sanson, & Hemphill, 2006). This is unfortunate given that early-emerging internalizing problems appear to be moderately stable and predictive of maladaptation (Briggs-Gowan, Carter, Bosson-Heenan, Guyer, & Horowitz, 2006; Mesman & Koot, 2001). Moreover, early childhood may be an advantageous point for prevention efforts (Hirshfeld-Becker & Biederman, 2002; Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2005).

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Essential for these efforts is identification of factors contributing to internalizing behaviors. Parental characteristics, particularly parental symptomatology (i.e., anxiety, depression; Biederman et al., 2001) have received great attention as potential influences alongside other empirically supported influences, such as children's inhibited temperament and the parent-child attachment relationship (Zahn-Waxler, Klimes-Dougan, & Slattery, 2000). Fundamentally, what may be influential is a shared temperamental motivation to avoid potential threat or punishment, conceptualized as the Behavioral Inhibition System (BIS). Moderate heritability estimates of temperament (Emde et al., 1992; Robinson, Kagan, Reznick, & Corley, 1992) suggest not only genetic but also environmental influence on this shared trait.

Parenting predicts children's cognitive, social, and behavioral outcomes (Lambourn, Mounts, Steinberg, & Dornbusch, 1991). Overprotective parenting, specifically, occurs frequently with children displaying internalizing problems (Rubin, Burgess, & Hastings, 2002). The extent to which parental BIS sensitivity relates to child's internalizing behaviors, and whether overprotection accounts for some or all of this relation, remains understudied but informs the conceptualization of intergenerational transmission of risk. Thus, the present study examined maternal BIS sensitivity and early childhood internalizing difficulties.

1.1 Parental personality and childhood internalizing problems

Gray's (1970; 1987) Reinforcement Sensitivity Theory (the neuropsychology of motivation, learning, and emotions) attributes differences in personality and motivational tendencies to sensitivities in three systems: the behavioral activation system (BAS), the fight, flight system (FFS), and the behavioral inhibition system (BIS). With the recently revised theory (Gray & McNaughton, 2000), the BAS functions as a reward system, mediating responses to all appetitive stimuli (Corr, 2004; Gray & McNaughton, 2000). The now renamed, fight, flight and freezing system (FFFS) is considered a component of the threat response system and mediates the emotion of fear, motivating escape and avoidance behaviors (Corr, 2004). Finally, the BIS underlies the emotion of anxiety and is viewed as a conflict detection and resolution device (Smillie, Pickering, & Jackson, 2006). In this conceptualization, the BIS aids a person in determining approach or avoidance behaviors by attending to potential dangers of the behavior. Consequently, an individual with high BIS sensitivity is hypervigilant to potential punishment, thus leading to avoidance. Indeed, high BIS has been related to internalizing problems such as anxiety and depression in adults (Campbell-Sills, Liverant, & Brown, 2004; Johnson, Turner, & Iwata, 2003; Kasch, Rottenberg, Arnow, & Gotlib, 2002) and children (Muris, Meesters, de Kanter, & Timmerman, 2005).

Although consistent evidence supports both the association between parent internalizing symptomatology and children's risk for similar problems (e.g., Biederman et al., 2001) and the heritability of personality traits (Keller, Coventry, Heath, & Martin, 2005; Krueger, Markon, & Bouchard, 2003; Stein, Jang, & Livesley, 2002), the relation between parental BIS and child internalizing remains unclear. Likely, high parental BIS, regardless of whether parents manifest internalizing problems, confers risk for internalizing behaviors in children. We aimed to establish this association.

1.2 Parenting and childhood internalizing problems

The etiology of childhood internalizing problems is complex; in addition to potential genetic mechanisms, parenting has also been implied. Overprotection involves controlling behaviors and excessive comforting that limit children's experiences and independence in coping with stress (Maccoby & Masters, 1970; Parker, Tupling, & Brown, 1979; Rubin et al., 2002). Overprotection has been linked to children's temperamental risk for internalizing problems (e.g., inhibited temperament, shyness), observed anxious behavior, and internalizing

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symptoms and disorders (e.g., Barrett, Rapee, Dadds, & Ryan, 1996; McShane & Hastings, 2009; Parker, 1979; Whaley, Pinto, & Sigman, 1999).

This may occur for several reasons. Chorpita and Barlow (1998) hypothesized that parental overprotective control prevents the child from exploration and novel experiences, consequently inhibiting the development of mastery over the environment and independent coping skills to manage challenges (Bayer et al., 2006). Subsequently, children maintain the perception of novel or complex situations as beyond their coping capacity and rely on strategies of avoidance, withdrawal, and dependence upon caregivers. Overprotective parents may also model anxious responses (i.e., intolerance of uncertainty) that children acquire (Gerull & Rapee, 2002) as they learn that problems are threatening and unsolvable (Wood, McLeod, Sigman, Hwang, & Chu, 2003). Thus, parental overprotection may engender children's internalizing problems through various means.

1.3 Overprotective parenting, parental BIS and child internalizing problems

Implications for children's maladjustment have sparked interest into parental characteristics that relate to overprotective behavior. Parents with high BIS sensitivity may overprotect to avoid new situations they themselves find threatening. They may enact overprotection out of concern that something objectively negative could happen (Zelenski & Larsen, 2002) or to avoid a subjectively negative consequence, like their children's distress, which parents high in BIS may find unpleasant or punishing within the context of their relationship. Indeed, overprotection maintains a highly close parent-child bond (McShane & Hastings, 2009), which may be achieved by preventing distress responses.

The few studies examining parental BIS and overprotection suggest a positive relation. In a factor analysis of maternal characteristics and parenting behaviors, BIS and overprotection (and neuroticism) loaded on the same factor (Coplan, Arbeau, & Armer, 2008). In a study of elementary school children, Coplan, Reichel, and Rowan (2009) found that mothers reporting high neuroticism, which, like BIS, relates to anxiety, also reported more overprotection, especially when children displayed more shyness, an internalizing behavior. Likely, a positive relation between parental BIS and overprotection exists.

The literature reviewed suggests that parental BIS relates to both children's internalizing problems and overprotection, and overprotection relates to children's internalizing problems. We therefore propose that maternal overprotection mediates the relation between BIS and child internalizing behavior. This framework remains unexamined, but several related areas of research support the investigation of more complex models among these variables.

In a college student sample, Kimbrel, Nelson-Gray, and Mitchel (2007) found that both retrospective reports of overprotection and self-reported BIS predicted current internalizing problems. Furthermore, BIS partially mediated the effect of maternal overprotection on internalizing. Although maternal BIS was not examined, maternal overprotection may contribute to core characteristics, such as BIS sensitivity, that relate to internalizing problems. Given limitations associated with retrospective reports, studies examining overprotection concurrent with children's internalizing problems would more specifically clarify relations among these variables. A composite of BIS sensitivity, overprotection, and neuroticism related to internalizing problems for shy kindergarteners (Coplan et al., 2008). Although this study did not examine the specific roles of BIS and overprotection, it does suggest that these variables were associated and related to internalizing problems.

One important consideration for these relations is the role of parental anxious and depressive symptomatology. From a theoretical perspective, there is a high conceptual overlap between BIS and internalizing symptoms (for a review, see Bijttebier, Beck, Claes, & Vandereycken,

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2009). Moreover, given that the majority of research on children's internalizing problems examining shared parent and child characteristics focuses on parental symptoms, it was important to include them to determine any unique relation of maternal BIS to child internalizing problems.

1.4 The Present Study

Understanding parental characteristics and behaviors related to children's internalizing behaviors allows for better prediction of children's outcomes and aids in developing preventative measures. Therefore, the present study first aimed to establish parental BIS sensitivity's relation to children's internalizing behaviors, hypothesizing a positive relation. Second, we aimed to test a mediational model involving overprotection, hypothesizing that there would be a significant indirect effect of parental BIS on child internalizing through overprotection but that a direct relation between BIS and child internalizing problems would remain.

2. Methods

2.1 Participants

Participants included 117 mothers of toddlers, who enrolled in a larger study assessing contributions of toddler temperament and parenting to anxiety development. Twenty-six mothers had significant missing data but did not differ from mothers with complete data on primary variables (ts < 1.86, ps $> .05$). We thus focused on this reduced sample ($n = 91$). Participants were recruited from published birth announcements ($n = 82$) and meetings of the Women, Infants, and Children program ($n = 9$). Mothers and toddlers ($M_{age} = 24.74$ months, $SD_{age} = 0.70$ months; 37 female) were European American (90%, 85%, respectively), African American (2%, 5%), Asian American (6%, 8%). Two mothers (2%) described themselves and one mother described her toddler (1%) as "other" racial/ethnic background. One mother described her toddler (1%) as biracial with parents of different minority racial/ethnic backgrounds. Families tended to be middle-class, although the range of socioeconomic status (SES) was represented (Hollingshead Index: $M = 51.02$, $SD = 10.78$, $range = 17 - 66$).

2.2 Procedure

Interested mothers were sent a packet with a consent form and a battery of questionnaires assessing demographic information, maternal personality and motivational styles, depressive and anxious symptoms, parenting behavior, and toddlers' socioemotional difficulties. Mothers were asked to return the packet to the laboratory when participating in another assessment of the larger study or by mail in a pre-addressed, pre-stamped envelope. After the laboratory visit, mothers were asked to complete a second battery of questionnaires assessing symptomatology. Ninety-one mothers (78%) completed it and were compensated for their participation.

2.3 Measures

2.3.1 Maternal Behavioral Inhibition System Sensitivity—Mothers completed the Behavioral Inhibition / Behavioral Activation Scales (BIS/BAS Scales; Carver & White, 1994), which assesses motivations from the behavioral inhibition (e.g., avoidance, anxiety) and behavioral activation (e.g., approach, hope) systems. Carver and White (1994) established the BIS/BAS scales as a reliable measure of the underlying physiological constructs that motivate these behaviors with convergent and discriminant validity. The current study utilized the BIS scale, which assesses sensitivity to impending punishment and the experience of anxiety in such situations (7 items; $\alpha = .76$; e.g., "I feel pretty worried or

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upset when I think or know someone is angry at me"). Unlike the revised RST, this measure combines BIS and FFFS sensitivities. All items are answered on a 1 (*very true for me*) to 4 (*very false for me*) scale but were reversed so higher scores indicated higher BIS sensitivity. The mean of items yielded *maternal BIS sensitivity*.

2.3.2 Maternal Symptomatology—Mothers completed the Center for Epidemiological Studies – Depression scale (CES-D; Radloff, 1977), a 20-item measure used to assess depressive symptoms in the general population. Mothers rated how often they experienced various depressive symptoms (e.g., "I felt depressed") over the past 6 months on a 0 (*rarely to none of the time*) to 3 (*most or all of the time*) scale. A mean of the 20 items yielded an overall *depressive symptom* score (α = .80).

Mothers also completed the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998), a self-report measure of worries and anxious reactions surrounding social interactions. Mothers responded to 20 items (α = .93; e.g., "I find myself worrying that I won't know what to say in social situations") on a 0 (*not at all characteristic of me*) to 4 (*extremely characteristic of me*) scale. The SIAS is psychometrically sound (alphas range from .88 to .93 across populations) with concurrent validity established in comparison to social phobia (Mattick & Clarke, 1998). The mean of items comprised *anxiety symptoms*.

2.3.3 Overprotective Parenting—Mothers reported on their overprotective behavior with the New Friends Vignettes (NFV; McShane & Hastings, 2009). The NFV provides mothers with two hypothetical vignettes in which they are asked to imagine their toddlers displaying shy/reticent behavior with unfamiliar peers. Mothers are then asked whether they would display particular responses and can respond, "No," "Maybe," or "Yes" (scored 0, 1, and 2, respectively). The current study focuses on items indicating overprotective actions (6 items; α = .72; e.g., "I would say, 'Would you rather go back home and play with me?'", "I would kneel down to his/her height and give my son/daughter a cuddle."). The NFV has demonstrated good psychometric properties, including convergent validity with mothers' observed behaviors (McShane and Hastings, 2009). The mean of items yielded the final score of *overprotective behavior*.

2.3.4 Toddler Internalizing Behaviors—Mothers completed the Infant-Toddler Social and Emotional Assessment – Revised (ITSEA; Carter & Briggs-Gowan, 2000), a 193-item questionnaire that asked mothers to rate normal feelings and behaviors as well as adjustment problems (0 = *not true or rarely true*; 1 = *somewhat or sometimes true*; 2 = *very true or often true*) they have observed in their toddlers in the last month. The current study used the Internalizing domain, which comprises 32 items (α = .79) from four subscales: general anxiety (12 items), separation anxiety (6 items), depression/withdrawal (9 items), and inhibition to novelty (5 items). The ITSEA is a reliable and valid measure of early problem behaviors, relating to independent evaluators' ratings of child behavior problems (Carter, Briggs-Gowan, Jones, & Little, 2003).

3. Results

3.1 Preliminary Analyses

Descriptive statistics and bivariate correlations are presented in Table 1. All variables reasonably adhered to a normal distribution (skew and kurtosis < |1.0|). No variables differed by toddler gender (*t*s < 1.60, *p*s > .10). Notably, maternal BIS related to both protective parenting and child internalizing behaviors. SES, maternal depressive symptoms, and maternal anxiety symptoms all related to child internalizing behaviors; these variables were therefore included as covariates in subsequent analyses.

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3.2 Relation of BIS to Child Internalizing Behaviors

Multiple regression analysis tested the hypothesis that maternal BIS relates to child internalizing problems above and beyond other factors. SES, maternal depressive symptoms, maternal anxiety symptoms, and maternal BIS were entered simultaneously as predictors with child internalizing behaviors as the dependent variable ($R^2 = .23$, $F[4,86] = 6.25$, $p < .001$). Results indicated that BIS maintained a significant relation to child internalizing problems above and beyond covariates ($b = 0.11$, $SE(b) = 0.04$, $t[86] = 2.55$, $p < .05$).

3.3 Mediation Analyses

Multiple regression mediation analyses assessed whether maternal overprotective parenting accounted for the relation between maternal BIS and child internalizing behaviors according to current guidelines in the literature (Baron & Kenny, 1986; Preacher & Hayes, 2004). SES, maternal depressive symptoms, and maternal anxiety symptoms were included as covariates for all steps. Results are summarized in Figure 1.

First, in a model in which the covariates and maternal BIS were entered as predictors of maternal overprotection ($R^2 = .12$, $F[4,86] = 2.88$, $p < .05$), BIS significantly related to overprotection (Path A in Baron and Kenny's [1986] terminology). Preceding analyses provided evidence that BIS related to child internalizing behaviors (Path C). Protective parenting was then added as a predictor to this model ($\Delta R^2 = .04$, $p < .05$; $F[5,85] = 5.97$, $p < .001$); it related to child internalizing behaviors above and beyond BIS and the covariates (Path B). With protective parenting in the model, the relation between maternal BIS and child internalizing behaviors (Path C') dropped to marginal significance. Protective parenting therefore accounted, in part, for the relation between maternal BIS and toddler internalizing behavior.

Given recent recommendations that Sobel's test may be biased in samples that are not large due to non-normality of the indirect effect (Preacher & Hayes, 2004), we used bootstrapping techniques to test the indirect effect of BIS on toddler internalizing behavior through overprotection. This yielded a bias-corrected confidence interval around the indirect effect (0.03, $SE = 0.02$) that did not contain zero (95% CI [0.01, 0.07]), providing further evidence that overprotective parenting mediated the relation between maternal BIS and child internalizing behavior.

4. Discussion

This study provided some of the first support for relations among parental BIS sensitivity, overprotective parenting behavior, and young children's internalizing psychopathology. Although the link between heightened BIS sensitivity and anxiety symptoms within individuals is well established (Campbell-Sills et al., 2004; Johnson et al., 2003; Kimbrel et al., 2007) there has been little attention to testing the association between parental BIS sensitivity and child internalizing symptoms or possible mechanisms underlying this relation. Presently, higher maternal BIS sensitivity related to toddlers' internalizing behaviors. Importantly, we examined this relation above and beyond SES and maternal depressive and anxious symptomatology, which also often relate to children's internalizing problems. Although constructs were measured concurrently, our results provide initial support for the continued investigation of maternal BIS sensitivity as an influence on the development of the child's internalizing problems.

We also examined the relation between overprotective parenting and both BIS sensitivity and child internalizing behaviors. First, BIS sensitivity related to overprotection, demonstrating that mothers who reported higher BIS sensitivity also tended to report engaging in overprotective parenting. In addition, a significant association existed between

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overprotection and toddler internalizing behaviors. These findings corroborate extant theoretical literature (Gray & MacNaughton, 2000) and previous research examining the relation between parenting and child psychopathology (Barrett et al., 1996; Chorpita & Barlow, 1998; Whaley et al., 1999), supporting the relevance of parenting behaviors to child internalizing problems.

Finally, we tested a theoretically-grounded mediational model wherein overprotective parenting operated as a mechanism underlying the association between BIS sensitivity and toddler internalizing behaviors. Consistent with hypotheses, overprotection accounted for part of the relationship between maternal BIS sensitivity and child internalizing behaviors. As a temperament/personality variable, maternal BIS sensitivity may motivate a certain type of parenting (overprotection), which might then contribute to the development of child internalizing behaviors. Specifically, heightened BIS sensitivity and resultant negative emotional reactivity (Carver, 2001) may influence a parent to respond to the child in ways that subsequently lead to maladaptive coping, as evidenced by internalizing behaviors. Along with increased sensitivity to punishment and negative reactivity, parents with increased BIS likely avoid situations that would possibly lead to difficulties for the child. This behavior prevents the child from experiencing or learning that not all novel or difficult situations are problematic, ultimately leading to maladaptive coping with challenges and thus internalizing problems.

Because only partial mediation occurred, maternal BIS sensitivity maintained a small direct effect on children's internalizing problems. This relation may represent a shared genetic vulnerability between mothers and toddlers that does not depend on the childrearing environment. These results suggest multiple pathways of influence of maternal BIS sensitivity on children's outcomes.

Although the results add to the extant literature, several limitations warrant consideration. We relied on mothers' reports of variables, so results may reflect bias in reporting behavior or shared method variance. Curiously, maternal BIS sensitivity did not relate to anxiety or depression symptoms. It is possible that these constructs would emerge as related if measured through different methodologies. In addition, in the present study, sensitivity of the BIS and FFFS were not separately assessed. Revised RST (Gray & McNaughton, 2000) details the conceptual differences between the BIS and FFFS, so research should begin assessing these different systems as distinct constructs. However, without a psychometrically sound measure that assesses these different systems, and because of difficulty in discerning differences between anxiety and fear, the BIS scale (combining FFFS and BIS functioning) was presently used. Furthermore, this research focused on mothers, which excludes paternal influence in shaping children's behavior. The importance of fathers in children's development and adjustment should be studied further. Finally, mothers reported moderate internalizing symptoms in their toddlers, reducing the generalizability of the current results to toddlers with extreme problems.

Despite limitations, our findings contribute to the extant literature on the correlates of and possible developmental influences on child internalizing behaviors. Results suggest that mothers with high BIS sensitivity are more likely to parent using overprotective behaviors. As illustrated by the mediation model, mothers with high BIS sensitivity may have a predisposition to assure their child will avoid any harm or challenging situations.

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- We examine maternal BIS sensitivity and toddler internalizing behaviors.
- Maternal overprotection was also examined.
- Maternal BIS related positively to toddler internalizing behaviors.
- Maternal overprotection served as a partial mediator of this relation.
- Maternal BIS related directly and indirectly to toddler internalizing behaviors.

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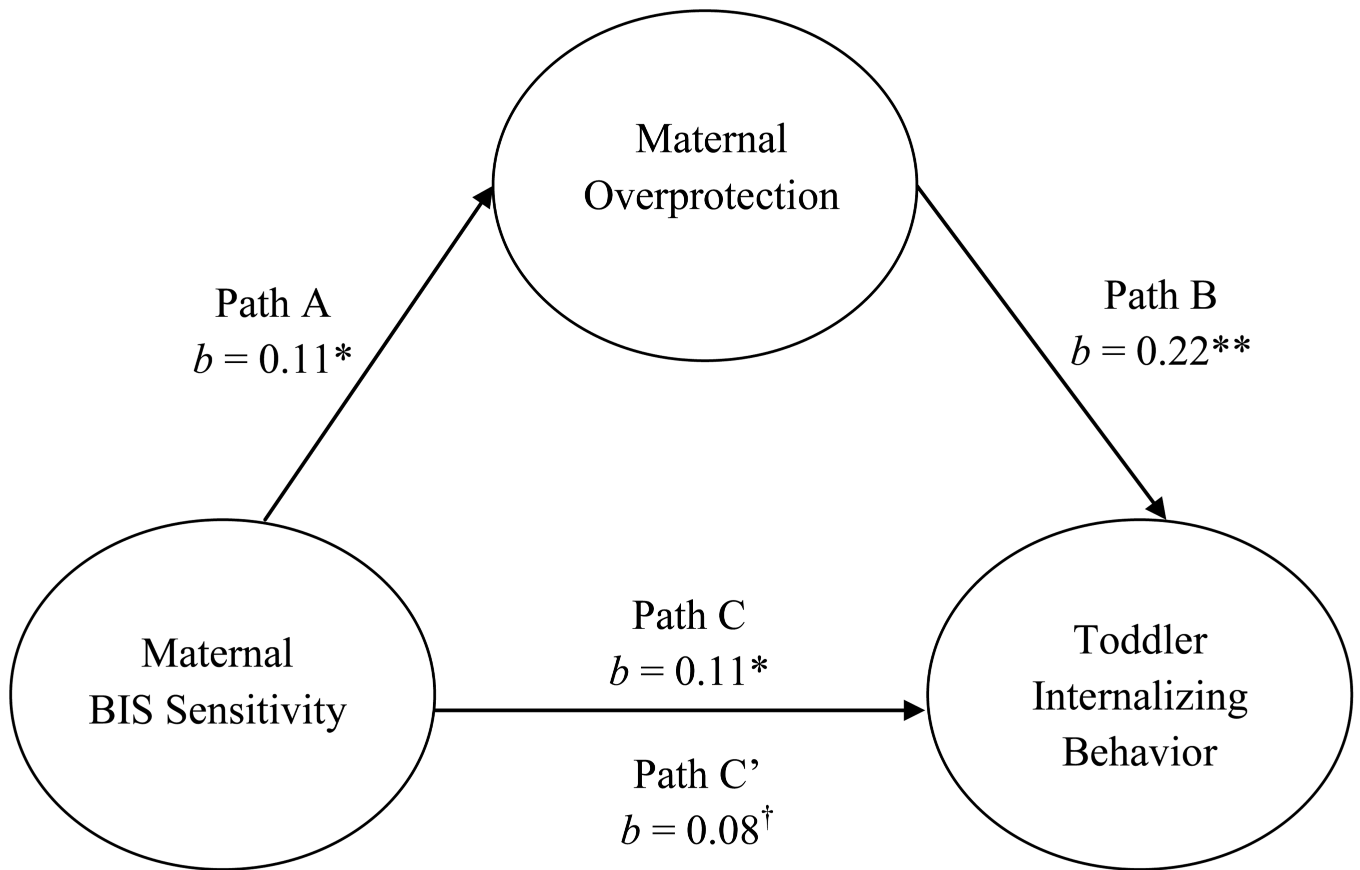

Figure 1.
Summary of multiple regression analyses for mediation. †p<.10, *p<.05, **p<.01.

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Table 1

Descriptive Statistics and Bivariate Relations for Study Variables

Variable	*Mean*	*SD*	*Range*	2	3	4	5	6
1. Maternal BIS	2.98	0.52	1.14 – 4.00	.32**	.26*	.07	−.06	.14
2. Overprotection	1.12	0.35	0.33 – 1.83	--	.30**	−.09	.05	.06
3. Child internalizing problems	0.53	0.22	0.00 – 1.00		--	−.27*	.20†	.31**
4. SES	51.02	10.78	17.00 – 66.00			--	−.27	−.02
5. Maternal depressive symptoms	0.46	0.30	0.00 – 1.35				--	.47**
6. Maternal anxious symptoms	0.96	0.62	0.00 – 2.80					--

Note. Maternal BIS was reversed from its original scoring so that higher scores indicated higher BIS sensitivity. SES was measured as the Hollingshead Index. For all analyses, $n = 91$.

† $p<.10$,

* $p<.05$,

** $p<.01$.