

## ABSTRACT

Title of Document: THE CONNECTION BETWEEN MATERNAL DEPRESSIVE SYMPTOMS AND MATERNAL INSENSITIVITY: THE MEDIATING OR MODERATING ROLE OF MATERNAL PERCEPTION OF THE INFANT.

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Maternal insensitivity is associated with many developmental outcomes. The link between maternal depressive symptoms and maternal insensitivity is well documented. In addition, the literature supports a link between (a) maternal depressive symptoms and maternal perception of the infant and (b) maternal perception of the infant and maternal insensitivity. However, the role of maternal perception of the infant as a potential mediator or moderator of the link between maternal depressive symptoms and maternal insensitivity has not been evaluated. 150 first time, economically stressed mothers with temperamentally irritable infants from the Washington DC Metropolitan area participated. No significant links between maternal depressive symptoms, maternal perception of the infant and maternal insensitivity emerged.

THE CONNECTION BETWEEN MATERNAL DEPRESSIVE SYMPTOMS AND  
MATERNAL INSENSITIVITY: THE MEDIATING OF MODERATING ROLE OF  
MATERNAL PERCEPTION OF THE INFANT

by

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## Table of Contents

Acknowledgments .....	ii
Table of Contents .....	iii
List of Tables .....	iv
List of Figures .....	v
Introduction .....	1
Method .....	7
Results .....	12
Discussion .....	17
Appendices	
A: IRB Approval .....	30
B: Brief Symptom Inventory Depression Subscale. ....	32
C: Neonatal Perception Inventory .....	33
D: Emotional Availability: Maternal sensitivity subscale.....	35
References .....	38

## List of Tables

Table 1	Participant characteristics.....	21
Table 2	Descriptive statistics for Maternal Depressive Symptoms, Maternal Perception of the Infant, and Maternal Insensitivity .....	22
Table 3	Correlations among Maternal Depressive Symptoms, Maternal Perception of the Infant, and Maternal Insensitivity.....	23
Table 4	Means, Standard Deviations, and F values for Maternal Depressive Symptoms and Maternal Insensitivity as a Function of Maternal Perception of the Infant.....	24
Table 5	Summary of Hierarchical Regression Analysis for Variables Predicting Maternal Insensitivity: Maternal Insensitivity and Maternal Perception of the Infant (Continuous).....	25
Table 6	Summary of Hierarchical Regression Analysis for Variables Predicting Maternal Insensitivity: Maternal Insensitivity and Maternal Perception of the Infant (Dichotomous).....	26

## List of Figures

Figure 1: Mediation.....	27
Figure 2: Alternative Mediation.....	28
Figure 3: Moderation .....	29

## Introduction

Maternal insensitivity has been associated with a wide range of negative influences on an infant's development (e.g. Biringen, Brown, Donaldson, Green, Kremarik, & Lovas, 2000; NICHD Early Child Care Research Network, 1999; Seifer, Schiller, & Sameroff, 1996; Valenzuela, 1997; Volling, McElwain, Notaro, & Herrera, 2002; Ziv, Aviezer, Gini, Sagi, & Koren-Karie, 2000). Insensitive mothers, on one hand, present their infants with inconsistent patterns of responsiveness, demonstrate a narrow affective range, and do not appear to enjoy interaction with their infants (Ziv et al., 2000). In keeping with the theorizing of Bowlby (1969), a meta-analysis of 66 studies demonstrated that maternal insensitivity is an important component in the development of infant attachment insecurity (DeWolff & IJzendor, 1997). Moreover, in a low-income urban population in Chile, maternal insensitivity has been significantly associated not only with insecure infant attachment, but also with low nutritional status and poor mastery behavior (Valenzuela, 1997). Furthermore, maternal insensitivity has also been shown to be predictive of language deficits made by normal hearing, hard-of-hearing, and deaf children (Pressman, Pipp-Sigal, Yoshinaga-Itano, & Deas, 1999). Because maternal insensitivity is related to many developmental outcomes, it is important to further investigate elements that are related to maternal insensitivity.

Substantial converging evidence has articulated the association between maternal depression and/or depressive symptoms and maternal insensitivity. Several reviews discuss the relation between maternal depression and maternal insensitivity in a variety of samples (see reviews by Lovejoy, Graczyk, O'Hare, & Neuman, 2000, and by Murray & Cooper, 2003). In one study, for instance, depressed mothers were unable to maintain the



degree of sensitive responsiveness necessary for optimal infant development (Seifer & Dickstein, 2000), and in another study depressed mothers were less affectively positive and engaged with their infants (Campbell, Cohn, & Meyers, 1995). In another study, chronically depressed mothers were shown to be less sensitive toward their infants than non-depressed or intermittently depressed women. Interestingly, in the same study, chronically depressed women became less sensitive between the 15 and 24-month assessments (NICHD Early Child Care Research Network, 1999). Moreover, Stanley, Murray, and Stein (2004) demonstrated, that depressed women showed more contingent negative responsiveness and were less affectively attuned to their infants when compared to non-depressed mothers in a low-risk representative community sample. In addition, Campbell et al. (1995) found that persistently depressed women were less positive towards their infant during face-to-face interactions. Furthermore, Easterbrooks, Biesecker, and Lyons-Ruth (2000) demonstrated that after an hour-long separation from their 7-year-olds, mothers who had reported being depressed when their infants were 18-months-old were less sensitive to their child during the reunion. Similarly, there is evidence that mothers who displayed depressive symptoms when their infant was one year old were correctly predicted to be insensitive when the child was 4 years old (Robinson & Spieker, 1996).

Despite the clear evidence of a link between maternal depression and maternal insensitivity, we know little about factors that may mediate or moderate the connection. There are two goals of this study. First, I investigated whether the typically occurring link between maternal depression and maternal insensitivity emerges in our sample of irritable infants within an economically stressed community sample. Second, I will

examined the role that maternal perception of the infant may play in the connection between maternal depression and maternal insensitivity. Previous research has demonstrated that links exist between maternal depression and maternal perception of the infant (Field, Estroff, Yando, del Valle, Malphurs, & Hart, 1996), and maternal perception of her infant and maternal insensitivity (Broussard, 1984), yet little study has been invested toward understanding the relations among all three variables. Little is known about what mediates or moderates the connection between maternal depression and maternal insensitivity. Therefore, in this study, I examined maternal perception of the infant as a potential mediator or moderator of the link between maternal depression and maternal insensitivity.

When considering the mediating role of maternal perception of the infant, it is important first to understand the connection between maternal depression and maternal perception of infants (see Figure 1, path a). Evidence of the connection between maternal depression and maternal perceptions of infants comes from a variety of sources, and this evidence has demonstrated that depressed mothers view their infants more negatively than other mothers. Whiffen (1989), for example, examined maternal depression and reports of infant temperament when infants were 1.5 months old and 24 months old. At both time points, maternal depression was associated with maternal perceptions of the child as having a difficult temperament. In another study, mothers who were evaluated as depressed perceived their infants as more vulnerable at 3 months (Field et al., 1996). In a study by Feldman and Reznick (1996) in which only three women were identified as depressed, a connection was established between reported maternal depression and maternal perception of the infant's intentionality (a measure of the mother's beliefs about

her infant's mental ability). In another study, Brody and Forehand (1986) notably argued that a relation exists between maternal depression and perceptions of a child's maladjustment.

It is also important when considering the mediating role maternal perception, to understand how maternal perception of the infant is linked to maternal sensitivity. Theorizing about this link was a core component of a review paper by Miller (1995) in which he argued that a parent's perception of his/her child is likely to influence parental behavior. Additionally, Dix and Grusec (1985) also have suggested that a parent's perception of his/her child's behavior is a major determinant of the parent's emotional responses (e.g., attentiveness) to that behavior. In a study of 37 mothers with infants between the age of 11 and 19 months, Biringen (1990) demonstrated that maternal perception of the infant's responsiveness to the mother was positively correlated with maternal sensitivity.

In another study of a hundred mothers and their 7-month-old infants during a "still face" episode, mothers with negative perceptions of their infants were less able to tolerate their infant's feeling of distress and were unable to respond empathically to this distress (Kelly, Vannostrand, Shiflett, & Chan, 1996). Furthermore, a mother's perception of her baby's attractiveness during a free play episode significantly predicted her responsiveness to the infant cues, which is an important component of maternal sensitivity. Field et al. (1996) observed that even among infants as young as three months of age, maternal perception of infant vulnerability was linked to an infant's exploratory behaviors. The authors argued that this is a result of the mother's "overprotecting" the infant, which subsequently reduced and discouraged the infant's

exploratory play. The “overprotecting” behavior of the mothers inhibits their ability to read their infant’s cues effectively and accurately, therefore reducing their sensitivity towards the infant. In summary, there is evidence that maternal depression is related to maternal perception of the infant and maternal insensitivity (see Figure 1, paths a and c), and that maternal perception of the infant is related to maternal sensitivity (see Figure 1, path b). It is important, therefore, to examine whether support exists for a mediational model in which maternal depression contributes to maternal perception of the infant, which in turn contributes to maternal sensitivity.

It is however possible to look at these three variables in another way, a mediational model in which maternal perception of the infant contributes to maternal depressive symptoms, which in turn contributes to maternal insensitivity (see Figure 2). This model is theoretically possible, considering a mother’s negative perception of her infant increases her depressive symptoms, which in turn increases her insensitivity towards her infant.

Due to the exploratory nature of this study it is important to look at the potential moderating role of maternal perception on the connection between maternal depression and maternal insensitivity (see Figure 3). Because maternal depression does not express itself uniformly and impacts a wide range of outcomes (NICHD Early Child Care Research Network, 1999), the impact that maternal depression has on maternal sensitivity can vary. It is possible that maternal depression will not be linked with maternal insensitivity if a mother has a positive perception of her infant. In this case, positive maternal perception of the infant serves as a protective factor for the infant from the effects of maternal depression. I suggest that it is possible that associations between

maternal depression and maternal insensitivity will be impacted by a mother's perception of her infant.

This study's main goal is to further understand the link between maternal depression and maternal insensitivity; it also provides insight into the workings of mother and infant relations among a stressed young sample of first time mothers.

The hypotheses of this study are as follows:

1. Mothers who report higher depressive symptoms will demonstrate greater insensitivity toward their infants, as demonstrated by negative affect, ineffective communications, and a lack of rhythmicity between the mother-infant dyad (see Figure 1, path c).
2. Mothers who report higher depressive symptoms will report greater negative perceptions of their infant (see Figure 1, path a).
3. Mothers who report a higher negative perception of their infant will show greater insensitivity when engaged with her infant (see Figure 1, path b).

This study also includes the following research questions:

1. Is the link between maternal depressive symptoms and maternal insensitivity mediated by maternal perception of the infant (See Figure 1)?
2. Is there an alternative model where by maternal depressive symptoms mediates the link between maternal perception of the infant and maternal insensitivity (see Figure 2)?
3. Is the link between maternal depressive symptoms and maternal insensitivity moderated by maternal perception of the infant (see Figure 3)?

## Method

### *Participants*

Participants were 150 mother-infant dyads who were part of a larger study. Mothers were recruited from hospitals in the Washington DC Metropolitan area. Mothers who meet the study criteria were invited to participate in the two-year longitudinal study. The initial study criteria were as follows: first time mothers who experienced a full term pregnancy with no complications, mothers of at least 18 years of age, and residents of low-SES/economically stressed households. Mothers who met these criteria and agreed to participate were visited at home, and their infants were assessed with the Neonatal Behavioral Assessment Scale (NBAS; Brazelton & Nugent, 1995). If the NBAS assessment indicated the infant was temperamentally irritable, then mother and infant were enrolled in the study.

The average age of the mothers was 24-years-old with 33% of the mothers between the age of 18 and 20. 47% of the mother-infant dyads were Black/African Americans, followed by Hispanics (19%), Caucasians (25%), Asians (4%), and Other/Mixed (5%). Of the mothers 10.4% reported having less than a high school diploma, 22.6% earned a high school diploma, 37.6% attending some college, and 21.2% graduated from college. In terms of marital status 35.5% of the women in the study were married, and 60.6% of the women lived with their romantic partners at the start of the study (average relationship length was reported as 3.5 years). Most of the mothers (74.9%) reported being in a family with an income of less than \$41,000 (See Table 1). Mothers were paid \$500 for their participation in the larger study. Permission to recruit

participants for this study was obtained from the University of Maryland's Institutional Review Board (See Appendix A).

### *Procedure*

Data reported in this study were gathered during two time points. First, the Neonatal Perception Inventory (NPI; Broussard, & Hartner, 1971) and Brief Symptom Inventory (BSI; Derogatis, 1993) was collected, as part of a more extensive questionnaire packet, at the mother's home when the infant was less than 1 month old. Second, maternal sensitivity (assessed using the Emotional Availability Scales (EA; Biringen, 2000) was observed during the mother's first visit to the laboratory at the University of Maryland, when the infant was 5 months old. During this laboratory visit, mothers and infants participated in a 10-minute videotaped free play episode. A blanket with toys was placed on the floor and mothers were instructed as follows: "You can just hangout and do whatever you feel like doing with your baby. I've put these toys here in case you want to use them, but you can do whatever you like in the room. This is to give your baby a rest break from these unusual activities. I'll be back in 10-minutes." The episode was videotaped with the mother's knowledge. These segments were designed to allow for a non-scripted interaction between the mother-infant dyad.

### *Measures*

*Brief Symptom Inventory Depression Subscale* (BSI-DS; Derogatis, 1993). This self-report measure contains 6 items with a 5-point severity scale from 0 (Not At All) to 4 (Extremely) indicating the degree to which the participant was disturbed by each item during the preceding month (See Appendix B). Sample items include some of the following: "feeling lonely," "feeling no interest in things," and "feeling hopeless about

the future.” Greater scores indicate greater symptomology. Scores were summed and averaged. Scores greater than 1.35 indicate clinically elevated levels of depression symptomology. An alpha of .86 was obtained for the BSI depression subscale.

*Neonatal Perception Inventory* (NPI; Broussard, & Hartner, 1971). This 12-item scale measures a mother’s perceptions of her newborn as compared to her concept of the average infant (See Appendix C). The mother rates an average baby and also rates her own baby on 6 behaviors (crying, spitting up, feeding, elimination, sleeping, and predictability). The items are rated on a 5-point scale, ranging from 1 (none) to 5 (a great deal). The mother rates the 6 behaviors in relation to her perception of the average baby; those 6 items are summed for the “average baby” score, with a possible range from 6 to 30. Then the mother rates the 6 behaviors in relation to her perceptions of her baby; those 6 items are summed for the “your baby” score, also with a possible range from 6 to 30.

The maternal perception score is calculated by subtracting the sum of “your baby” score from the “average baby” score (“average baby” – “your baby” = maternal perception of the infant score). Therefore, a negative maternal perception score would be obtained for a mother rating her baby as behaviorally difficult in comparison to the average baby. In contrast, a mother who rates her infant as being less behaviorally difficult than the average baby would obtain a positive maternal perception score. If the mother rates the average infant and her infant equally, the maternal perception score is zero. The possible range of maternal perception scores is from +24 to –24, with a greater positive score reflecting a more positive perception of the infant. An alpha of .81 was obtained for the NPI.



Maternal perception of the infant was be dealt with both as a continuous and as a dichotomous variable in the analyses. When treated as a dichotomous variable, the maternal perception of infant is converted into a negative (difference less than or equal to 0) and a positive (difference greater than or equal to 1) perception of the infant.

*Emotional Availability* (EA; Biringen, 2000). Maternal sensitivity was coded using a subscale from Biringen's (2000) Emotional Availability scale. Mothers and their infants were observed during a laboratory 10-minute free play at age 5 months. Coders, following coding guidelines developed by Biringen (2000), used a 9-point scale (See Appendix D). Sensitivity is a broad construct which includes several qualities such as clarity of perceptions, prompt responsiveness to infant, accessibility to infant, positive affect, and conflict regulation. How the mother picks up the emotional signals of the infant and emits her own emotion signals are also important. Higher sensitivity scores indicate a mother who is fluid and effective in her interactions with her infant.

Three coders (trained by Badia AlBanna) independently rated the 10-minute free play episode. Coders followed a two-step procedure. Coders first viewed the entire free play episode in order to obtain a general overview of the mother-infant dyad. Then they viewed the free play episode a second time, taking detailed notes on the mother-infant dyad. Coders were kept blind regarding any additional information about the mother-infant dyad. Inter-rater reliability was assessed throughout the coding period. All tapes were coded by two coders. Agreements (within one-point) were noted as reliable, and an average recorded as data. Disagreement (beyond a one point range) was discussed and consensus scores were determined for use in the analysis. Inter-observer reliability was

assessed for 20% of the free play episodes. To assess inter-coder reliability, ICC's were calculated. ICC's across pairs of coders ranged from .78 - .90 (mean = .83).

## Results

The presentation of the results is as follows. First, the descriptive statistics for maternal depressive symptoms, maternal perception of the infant, and maternal insensitivity will be presented. Next, the three study hypotheses, with a series of analyses examining the links between (a) maternal depressive symptoms and maternal insensitivity, (b) maternal depressive symptoms and maternal perception of the infant, and (c) maternal perception of infant and maternal insensitivity. Finally, the three research questions will be addressed.

### *Descriptive statistics*

The means, standard deviations, and ranges for the maternal depressive symptoms, maternal perception of the infant and maternal insensitivity are presented in Table 2. The mean for maternal depressive symptoms ( $M = .54$ ,  $SD = .72$ ) is in the non-elevated clinical symptomology range (according to the BSI manual, mothers reporting greater than a 1.35 are classified as having clinically elevated depressive symptomology). Although a wide range of maternal reports was observed, only 10% ( $n = 13$ ) of mothers reported depressive symptomology in the elevated range. The mean score for maternal perception of the infant ( $M = 2.16$ ,  $SD = 2.81$ ) indicates that mothers had a tendency to report a positive perception of the infant. When the scale is broken down into positive and negative groupings, 75% of the mothers reported a positive perception of their infant whereas 25% reported a negative perception.

The scores for maternal insensitivity also indicated a wide range of maternal behavior during the 10-minute free play episode. The literature shows that in low risk

samples sensitivity is usually approximately 7 (“generally sensitive”; Ziv et al., 2000), but in this sample, mothers were more insensitive ( $M = 5.63$ ,  $SD = 1.20$ ).

#### *Links among variables*

The correlation coefficients among the three variables (maternal depressive symptoms, maternal symptoms of the infant, and maternal insensitivity) are presented in Table 3. As can be seen, none of the correlations was significant. As an additional means of examining maternal perception of the infant, two t-tests were conducted to compare the positive and negative perception of the infant groups on maternal depressive symptoms and maternal insensitivity (Table 4). No significant differences between the positive and negative groups of maternal perception of the infant with maternal depressive symptoms [ $t(122) = .79$ ,  $p > .05$ ] and maternal insensitivity [ $t(102) = .92$ ,  $p > .05$ ] emerged.

#### *The Mediation Role of Maternal Perception of the Infant in the Link between Maternal Depressive Symptoms and Maternal Insensitivity*

A series of mediational analyses was conducted in order to examine the first research question: Does maternal perception of the infant mediate the link between maternal depressive symptoms and maternal insensitivity (see Figure 1)? A series of regression analyses was conducted according to Baron and Kenny’s (1986) well-known procedure. According to this procedure, evidence of mediation occurs when the following conditions are met:

- (a) Variations in levels of the independent variable significantly account for variations in presumed mediators (i.e. Path a), (b) variations in the mediator significantly account for variations in the dependent variable (i.e. Path b), and (c) when Paths a and b are controlled, a previously significant relation between the independent and dependent variables is no longer significant. (p. 1176)

Because maternal depressive symptoms were not significantly linked to maternal insensitivity (see Figure 1, path c), mediation was tested using a procedure outlined by Kenny, Kashay, and Bolger (1998). This variation of mediational analysis allows the examination of mediation even when the predictor variable is not linked to an outcome variable. According to Kenny et al. (1998), maternal depressive symptoms may not have a significant link to maternal insensitivity, however they could influence maternal perception of the infant, which in turn could affect maternal insensitivity. Therefore the links of (a) maternal depressive symptoms and maternal perception of the infant (see Figure 1, path a) and (b) maternal perception of the infant and maternal insensitivity (see Figure 1, path b) were tested.

Using the method described above, the first step in establishing mediation was to examine whether a link exists between maternal depressive symptoms and maternal perception of the infant (path a). A regression analysis revealed that no such link existed,  $\beta_{\text{depressive symptoms}} = .012, p > .05$ . Additionally, path a was tested with a logistical regression in order to investigate the dichotomous nature of maternal perception of the infant. Again, no significant link was observed between maternal depressive symptoms and maternal perception of the infant.

Due to the non-significant links between maternal depressive symptoms and maternal insensitivity (path c) and maternal depressive symptoms and maternal perception of the infant (path a), maternal perception of the infant is determined not mediate a connection between maternal depressive symptoms and maternal insensitivity.

*The Mediational Role of Maternal Depressive Symptoms in the Link between Maternal Perception of the Infant and Maternal Insensitivity*

A series of mediational analysis was conducted in order to examine the second research question: Does maternal depressive symptoms mediate the link between maternal perception of the infant and maternal insensitivity (see Figure 2)? The logic for the analyses was the same as described above. However, this time I was testing the role of maternal depressive symptoms as a mediator of the link between maternal perception of the infant and maternal insensitivity. Again maternal perception of the infant was not significantly linked ( $\beta_{\text{perception of the infant}} = -.032, p > .05$ ) to maternal insensitivity.

Using the Kenny et al. (1998) method, the next step was to examine whether a significant link existed between maternal perception of the infant (the independent variable) and maternal depressive symptoms (the proposed mediator). A regression analysis revealed that no such link existed,  $\beta_{\text{perception of the infant}} = .001, p > .05$ .

Once again, due to the non-significant links between maternal perception of the infant and maternal insensitivity (see Figure 2, path c) and between maternal perception of the infant and maternal depressive symptoms (see Figure 2, path a), the extent of maternal depressive symptoms has been determined not to mediate a link between maternal perception of the infant and maternal insensitivity.

#### *The Moderational Role of Maternal Perception of the Infant*

Next, the third research question was examined: Is the link between maternal depressive symptoms and maternal insensitivity moderated by maternal perception of the infant (see Figure 3)? In order to examine the moderating role of maternal perception of the infant on the link between maternal depressive symptoms and maternal insensitivity, a hierarchical regression was done. The continuous independent and potential moderating variables were first centered. The first block for the regression equation

included the centered independent and potential moderating variables, and the second block contained the interaction term. The interaction terms were non-significant for both the regression including the continuous maternal perception variable,  $\beta_{\text{perception (cont.)}} = -.01, p > .05$  (Table 5) and the regression including dichotomous maternal perception of variable,  $\beta_{\text{perception (dich.)}} = -.07, p > .05$  (Table 6).

## Discussion

This study was designed to investigate the role that maternal perception of infant plays in the link between maternal depressive symptoms and maternal insensitivity. In contrast to my expectations, none of the hypothesized links emerged. In attempting to understand these results, I discuss why each of these links may not have emerged.

The lack of a significant link between maternal depressive symptoms and maternal insensitivity (Figure 1, path c) is particularly puzzling given that so much literature and evidence support this link in a wide range of samples (see reviews by Lovejoy, Graczyk, O'Hare, & Neuman, 2000, and by Murray & Cooper, 2003). What could account for the lack of connection in this sample? Using the BSI depression subscale raw score cut-off of greater than 1.35 as an indicator of elevated levels of depressive symptomatology, only approximately 10% ( $n = 13$ ) of the sample reported elevated levels of depressive symptomatology. This finding of approximately 10% of the mothers in this range is lower than expected given reports that approximately 11% of the all mothers are clinically depressed, and reports that among women living in poverty, the estimation is as high as 30 to 50% (Albright & Tamis-LeMonda, 2002; Leadbeater & Linares, 1992). Further investigation is required to understand why there is this relatively low level of depressive symptoms in this sample. Additionally, among the mothers who reported experiencing elevated levels of depressive symptomatology, only one of these mothers was rated as insensitive (insensitivity score of 2); the remaining 12 mothers were rated in the 5-6 range of insensitivity, meaning that these mothers were inconsistently sensitive (see Appendix D). However, is that not one of the women who reported elevated levels of depressive symptomatology was rated equal to or higher than a 7



(indicating generally sensitive). However, the mothers who did receive a 7 or greater for sensitivity all reported a particularly low BSI depression score. Due to the fewer than expected mothers reporting depressive symptoms in this sample along with the finding that few of the mothers were insensitive, I was unable to obtain the expected link between maternal depressive symptoms and maternal insensitivity (Figure 1, path c).

The next question is why no significant link emerges between maternal depressive symptoms and maternal perception of the infant (Figure 1, path a). Similar issues arise in the attempt to understand this lack of findings. Of the mothers who reported clinically elevated depressive symptomology, only three expressed a negative perception of their infant. Interestingly, the mothers who reported the greatest depressive symptomology also expressed the most negative perception of their infant. An important factor, affecting the lack of a result between maternal depressive symptoms and maternal perception of their infant is lack of variability in the mothers' responses surrounding their perceptions of their infant. The majority of the mothers (approximately 60%) reported having a slightly positive perception of the infant (within the 1-4 range). Even though maternal perception of the infant was not linked to either maternal depressive symptoms or maternal insensitivity in the sample. The proposition that maternal perception of the infant is a factor in the link between maternal depression and maternal insensitivity is plausible due to evidence in the literature that a link exists between maternal depressive symptoms and maternal perception of the infant (Feldman & Reznick, 1996; Field et al., 1996; Whiffen, 1989) and maternal perception of their infant and maternal insensitivity (Biringen, 1990; Dix & Grusec, 1985; Kelly, Vannostrand, Shiflett, & Chan, 1996). However, in this sample the evidence does not support a mediational relationship.

The lack of evidence of maternal perception of the infant playing a mediational role in the link between maternal depressive symptoms and maternal insensitivity leads to the conclusion that it is possible that the variables interact in a different configuration. This was tested with the alternative mediational model (Figure 2), which tested the possibility that maternal perception of the infant could impact maternal depressive symptoms, which in turn could affect maternal insensitivity. In such a model, a mother's negative perception of her infant, for example, might cause her to feel elevated levels of depression, which in turn could increase her insensitivity towards her infant. However, no empirical support emerged for this mediational model. It is plausible that is due to the same issues of a low number of women reporting clinically elevated levels of depressive symptomology and lack of variability reported for the maternal perception of their infant.

The moderational model (see Figure 3) proved to be non-significant as well, indicating that maternal perception of the infant does not play a protective role in the relation between maternal depressive symptoms and maternal insensitivity. Again, many of the limitations in the data set may affect this moderation result.

The women who enrolled in this study represent an economically stressed community sample. Of the mothers in this study 64.7% reported working, with jobs ranging from doctor to retail. Additionally, the women in this study were able to make a 2-year commitment, to the larger study from which this data was obtained, demonstrates an ability to function effectively. These women, while at an increased risk from a low-risk sample, due to the increased economic stress and having "more difficult" infants, are not a classically high-risk sample. This status of the women as neither high nor low-risk is possible reason for why the results of this study do not match the expected results.

From this sample, it appears that maternal perception of the infant plays neither a mediated or moderational role in the link between maternal depressive symptoms and maternal insensitivity. For future investigations of these issues, it would be important to select a sample containing more women expressing clinically elevated depressive symptomology. In addition, I would be interested in using an additional tool for assessing maternal perception of the infant, in conjunction with or in replacement of the current measure. Unfortunately, the results of this study did not illuminate the nature of the mother-infant relationship. Regardless, this remains a critical and important connection to understand, due to the infant's exceeding dependence on the mother for nurturance, stimulation, and support.

Table 1

*Participant Characteristics*

	Mean	Descriptive
Age	24 years old	33% between the age of 18-20
Race	--	47% Black/African Americans 25% Caucasians 19% Hispanics 4% Asians 5% Other/Mixed
Education	--	10% less than high school diploma 23% high school diploma 38% some college 21% graduated from college
Romantic Partners	--	36% married 25% living with romantic partner but not married
Family Income	--	75% reported family earnings less than \$41,000

Table 2

*Descriptive statistics for Maternal Depressive Symptoms, Maternal Perception of the Infant, and Maternal Insensitivity*

Variable	N	M	SD	Range
Maternal Depressive Symptoms	132	.538	.729	.00 – 3.33
Maternal Perception of the Infant	127	2.16	2.81	-4.00 – 12.00
Maternal Insensitivity	121	5.63	1.20	1 – 8.00

Table 3

*Correlations among Maternal Depressive Symptoms, Maternal Perception of the Infant, and Maternal Insensitivity*

Variable	1	2	3
1. Maternal Depressive Symptoms	--	.049 ( <i>n</i> = 124)	-.089 ( <i>n</i> = 109)
2. Maternal Perception of the Infant		--	-.093 ( <i>n</i> = 104)
3. Maternal Insensitivity			--

Table 4

*Means, Standard Deviations, and F values for Maternal Depressive Symptoms and Maternal Insensitivity as a Function of Maternal Perception of the Infant*

Variable	Maternal Perception of the Infant						F
	Positive			Negative			
	n	M	(SD)	n	M	(SD)	
Maternal Depressive Symptoms	94	.53	(.72)	30	.57	(.79)	.15
Maternal Insensitivity	79	5.64	(1.12)	25	5.62	(1.60)	1.93

Table 5

*Summary of Hierarchical Regression Analysis for Variables Predicting Maternal Insensitivity: Maternal Insensitivity and Maternal Perception of the Infant (Continuous)*

Variable	Model 1			Model 2		
	B	SE	$\beta$	B	SE	$\beta$
Maternal Depressive Symptoms (MDS)	-.15	.17	-.09	-.14	.17	-.09
Maternal Perception of the Infant (MPI)	-.04	.04	-.09	-.04	.04	-.09
MDS x MPI				-.004	.04	-.01
R <sup>2</sup>		.016			.016	
F for change in R <sup>2</sup>		.444			.927	

*Note:* Maternal depressive symptoms and maternal perception of the infant were centered at their means.



Table 6

*Summary of Hierarchical Regression Analysis for Variables Predicting Maternal Insensitivity: Maternal Insensitivity and Maternal Perception of the Infant (Dichotomous)*

Variable	Model 1			Model 2		
	B	SE	$\beta$	B	SE	$\beta$
Maternal Depressive Symptoms (MDS)	-.15	.17	-.09	-.09	.19	-.06
Maternal Perception of the Infant (MPI)	-.006	.14	.004	.003	.14	.002
MDS x MPI				-.11	.19	-.07
R <sup>2</sup>		.008			.004	
F for change in R <sup>2</sup>		.677			.552	

*Note:* Maternal depressive symptoms and maternal perception of the infant were centered at their means.

Figure 1: Mediation

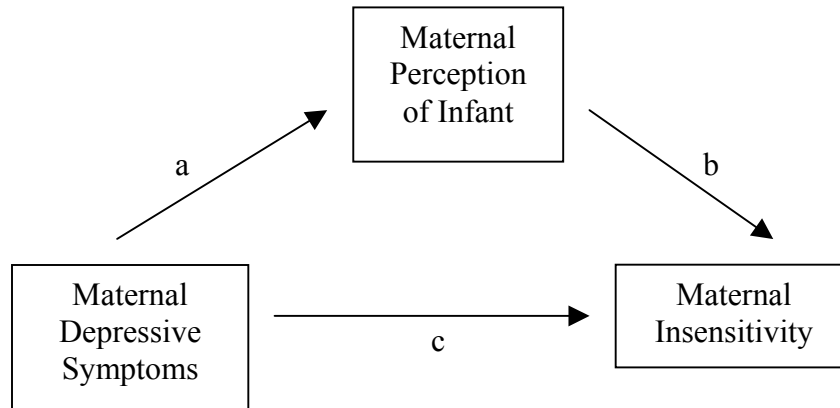


Figure 1. Maternal perception as a mediator of the link between maternal depressive symptoms and maternal insensitivity.

Figure 2: Alternative Mediation

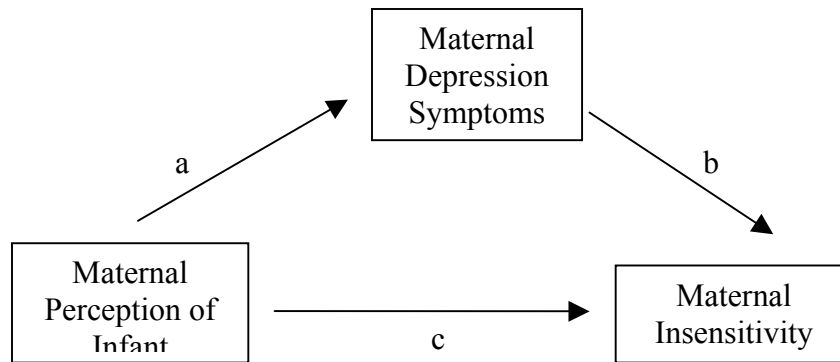


Figure 2. Maternal depressive symptoms as a mediator of the link between maternal perception of the infant and maternal insensitivity.

Figure 3: Moderation

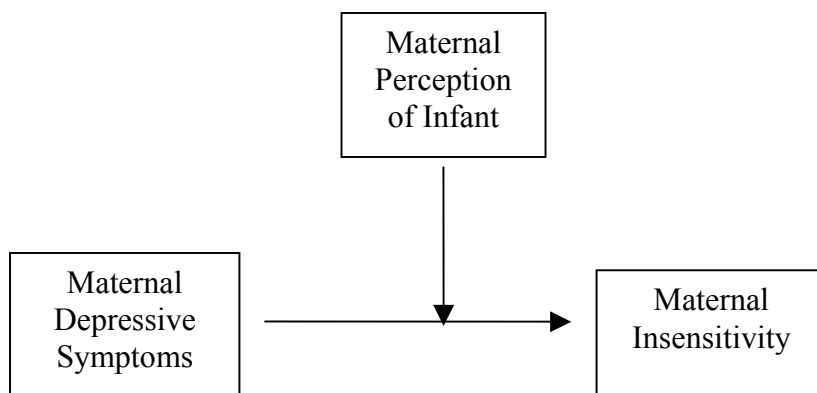


Figure 3. Maternal perception as a moderator of the link between maternal depressive symptoms and maternal sensitivity.

## Appendix A: IRB Approval



UNIVERSITY OF  
MARYLAND

INSTITUTIONAL REVIEW BOARD

2100 Lee Building  
College Park, Maryland 20742-5121  
301.405.4212 TEL 301.314.1475 FAX

To: Dr. Jude Cassidy, Matt Dykas  
Badia Albanna, Kristina Boldebeck, Sarah Halcrow  
Department of Psychology

From: Roslyn Edson, M.S., CIP *PRE*  
IRB Manager  
University of Maryland, College Park

Re: IRB Number 00556  
Project Title: "At-Risk Irritable Infant"

Approval Date: May 12, 2005

Expiration Date: May 12, 2006

Type of Application: Renewal

Type of Research: Non-exempt

Type of Review  
For Application: Full Board

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The University of Maryland, College Park Institutional Review Board (IRB) approved your IRB application. The research was approved in accordance with 45 CFR 46, the Federal Policy for the Protection of Human Subjects, and the University's IRB policies and procedures. Please reference the above-cited IRB application number in any future communications with our office regarding this research.

**Recruitment/Consent:** For research requiring written informed consent, the IRB-approved and stamped informed consent document is enclosed. The IRB approval expiration date has been stamped on the informed consent document. Please keep copies of the consent forms used for this research for three years after the completion of the research.

**Continuing Review:** If you want to continue to collect data from human subjects or analyze data from human subjects after the expiration date for this approval, you must submit a renewal application to the IRB Office at least 30 days before the approval expiration date.

**Modifications:** Any changes to the approved protocol must be approved by the IRB before the change is implemented except when a change is necessary to eliminate apparent immediate hazards to the subjects. If you want to modify the approved protocol, please submit an IRB addendum application to the IRB Office. *(continued)*

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**Unanticipated Problems Involving Risks:** You must promptly report any unanticipated problems involving risks to subjects or others to the IRB Manager at 301-405-0678 or redson@umresearch.umd.edu.

**Student Researchers:** Unless otherwise requested, this IRB approval document was sent to the Principal Investigator (PI). The PI should pass on the approval document or a copy to the student researchers. This IRB approval document may be a requirement for student researchers applying for graduation. The IRB may not be able to provide copies of the approval documents if several years have passed since the date of the original approval.

**Additional Information:** Please contact the IRB Office at 301-405-4212 if you have any IRB-related questions or concerns.

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## Appendix B: Brief Symptom Inventory Depression Subscale

**YOUR THOUGHTS AND FEELINGS IN THE PAST 7 DAYS**

Below is a list of problems people sometimes have. Please read each one carefully, and circle the number that best describes HOW MUCH THAT PROBLEM HAS DISTRESSED OR BOTHERED YOU DURING THE PAST 7 DAYS, INCLUDING TODAY. Circle only one number for each problem.

	<b>How Much Were You Distressed By:</b>	<i>Not At All</i>	<i>A Little Bit</i>	<i>Moderately</i>	<i>Quite a Bit</i>	<i>Extremely</i>
9.	Thoughts of ending you life	0	1	2	3	4
16.	Feeling lonely	0	1	2	3	4
17.	Feeling blue	0	1	2	3	4
18.	Feeling no interest in things	0	1	2	3	4
35.	Feeling hopeless about the future	0	1	2	3	4
50.	Feeling of worthlessness	0	1	2	3	4

## Appendix C: Neonatal Perception Inventory

**AVERAGE BABY**

Please take a moment to think about babies again. Although this is your first baby, you probably have some ideas of what most little babies are like. Please check the blank you think best describes the AVERAGE baby.

1. How much crying do you think the average baby does?

\_\_\_\_\_ a great deal      \_\_\_\_\_ a good bit      \_\_\_\_\_ moderate amount      \_\_\_\_\_ very little      \_\_\_\_\_ none

2. How much trouble do you think the average baby has in feeding?

\_\_\_\_\_ a great deal      \_\_\_\_\_ a good bit      \_\_\_\_\_ moderate amount      \_\_\_\_\_ very little      \_\_\_\_\_ none

3. How much spitting up or vomiting do you think the average baby does?

\_\_\_\_\_ a great deal      \_\_\_\_\_ a good bit      \_\_\_\_\_ moderate amount      \_\_\_\_\_ very little      \_\_\_\_\_ none

4. How much difficulty do you think the average baby has in sleeping?

\_\_\_\_\_ a great deal      \_\_\_\_\_ a good bit      \_\_\_\_\_ moderate amount      \_\_\_\_\_ very little      \_\_\_\_\_ none

5. How much difficulty does the average baby have with bowel movements?

\_\_\_\_\_ a great deal      \_\_\_\_\_ a good bit      \_\_\_\_\_ moderate amount      \_\_\_\_\_ very little      \_\_\_\_\_ none

6. How much trouble do you think the average baby has in settling down to a predictable pattern of eating and sleeping?

\_\_\_\_\_ a great deal      \_\_\_\_\_ a good bit      \_\_\_\_\_ moderate amount      \_\_\_\_\_ very little      \_\_\_\_\_ none



### YOUR BABY

While it is not possible to know for certain what your baby will be like, you probably have some ideas of what your baby will be like. Please check the blank that you think best describes what YOUR baby will be like.

1. How much crying do you think your baby will do?

\_\_\_\_\_ a great deal      \_\_\_\_\_ a good bit      \_\_\_\_\_ moderate amount      \_\_\_\_\_ very little      \_\_\_\_\_ none

2. How much trouble do you think your baby will have feeding?

\_\_\_\_\_ a great deal      \_\_\_\_\_ a good bit      \_\_\_\_\_ moderate amount      \_\_\_\_\_ very little      \_\_\_\_\_ none

3. How much spitting up or vomiting do you think your baby will do?

\_\_\_\_\_ a great deal      \_\_\_\_\_ a good bit      \_\_\_\_\_ moderate amount      \_\_\_\_\_ very little      \_\_\_\_\_ none

4. How much difficulty do you think your baby will have sleeping?

\_\_\_\_\_ a great deal      \_\_\_\_\_ a good bit      \_\_\_\_\_ moderate amount      \_\_\_\_\_ very little      \_\_\_\_\_ none

5. How much difficulty do you expect your baby to have with bowel movements?

\_\_\_\_\_ a great deal      \_\_\_\_\_ a good bit      \_\_\_\_\_ moderate amount      \_\_\_\_\_ very little      \_\_\_\_\_ none

6. How much trouble do you think that your baby will have settling down to a predictable pattern of eating and sleeping?

\_\_\_\_\_ a great deal      \_\_\_\_\_ a good bit      \_\_\_\_\_ moderate amount      \_\_\_\_\_ very little      \_\_\_\_\_ none

Appendix D: Emotional Availability: Maternal Sensitivity subscale  
Obtained from Biringen, Robinson, and Emde (2000)

Ainsworth (Ainsworth et al., 1978) developed the original sensitivity scale for home observations and inspired our work in this area. Our scale is similar to the Ainsworth sensitivity scale in that it is highly global and emphasizes behavioral style rather than discrete behaviors. Although parental accuracy in reading infant signals and appropriate responsiveness to such signals and communications characterized the Ainsworth view of sensitivity, our view is much more inclusive and not based predominantly on the parent's ability to be responsive. Other components include: affect, awareness of timing, variety and creativity in play, and flexibility in negotiating conflict situation. See full version of the scale for more details.

The sensitivity scale rates parents on a scale of 9 (highly sensitive) to 1 (highly insensitive), according to the following criteria:

**9 HIGHLY SENSITIVE** *Emotional communication between parent and infant is for the most part positive, appropriate, and creative. The highly sensitive parent displays much **genuine, authentic, and congruent** interest, pleasure and amusement with the infant (as opposed to performing these behaviors), as demonstrated by warm smiles and giggles, interested eye contact, and comforting and playful physical contact. Parental facial expressions and tone of voice are pleasant and there are no sudden or marked shifts in emotional tone. In fact, both the parent and child show clear enjoyment and delight with each other. The parent accurately reads the child's signals, even subtle ones that may not be clear to an outsider, and reacts appropriately. S/he has a well-developed sense of timing and rhythmicity during interactions with transitions between activities appearing smooth rather than abrupt and enforced. Parental behavior appears flexible and adaptable, according to the demands of particular situations. When parent and child are physically separated, they are likely to maintain emotional connectedness at a distance, at the very least by the parent occasionally calling the child's name or looking in on him or her. Thus, verbal and visual communications between parent and child are ongoing and constant or overwhelming. Statements to and regarding the child are affirmative and accepting, rather than sarcastic, critical, or highly prohibitive. The amount of interaction is fairly high. Play interactions are creative and joyful for both parent and child. The parent further responds with short latency to distress signals, attempting to soothe and to explore reasons for such communications. Conflict situations do not lead to long breakdowns in their relationship; instead, they too are handled smoothly and effectively. Overall, the observer sees a very "special" quality in these interactions, and delights in the dance-like of this interaction. This is the most optimal rating.*

**7 GENERALLY SENSITIVE** *This parent is very similar to a "9," except that there is a less spectacular quality to these parent-child exchanges. This rating refers to a "good enough" parent. Typically, very positive interactions get rated down to a "7" for some of the following reasons: the parent did not interact in a creative manner, although s/he was effectively connected to the infant and interactions were harmonious and enjoyable; or the parent's affect and behavioral style were extremely well suited to this infant, creating a generally lively and engaging climate, but at brief moments, s/he displayed subtle*

preoccupation with his/her own thoughts, as if processing another agenda; or the like. However, the differences between a “9” and a “7” are small.

5 INCONSISTENTLY SENSITIVE *The parent is sensitive in some ways, but the observer finds it difficult to give this relationship a clean bill of health. Parental inconsistency in behavior may be one tell-tale sign (including signs of inconsistency discussed at the end of the section on sensitivity).* For example, the parent may fluctuate from being creative and joyful during play times to being preoccupied with other concerns, or other questionable (though not clearly negative/insensitive) behaviors. This characteristic is particularly significant, given that parents usually want to look their best for a videotaped session. This, some parents may ‘leak’ inconsistencies of behavior; it may simply be too stressful to for some to maintain will-modulated positivity for long.

Such variability may be observed on different days at different times in the same session. 3 SOMEWHAT INSENSITIVE *Insensitivity is typically displayed in one of two general ways, one being an active/harsh style (overly active and overbearing) and the other being a passive/depressed/ affectively flat (noninteractive and silent) style. Still, there are positives here.* Both styles suggest unresponsiveness to infant communications and lack many of the features of sensitive interactions described earlier. The active/harsh/volatile style involves facial expressions of disgust and anger and harsh/abrasive/condescending tone of voice. The passive/depressed/affectively flat style involves facial expressions that are depressed and disinterested, and a vocal temp that is slow, lethargic, simple unenthusiastic. Alto often seen is a businesslike, mater-of-fact style that combines features of both abrasiveness and passivity. The observer may note situations in which there are sudden shifts in mood without gestural or verbal indicators. In other words, the subtle gestural system is not well used, resulting in affect regulation that is not well modulated. Such shifts are likely to be more extreme or upsetting to the child or for the observer to watch than is the case for a ‘5’.

Despite the fact that this parent lacks many crucial features of a sensitive behavioral style, he or she is nonetheless a competent parent in some ways. For example, a very bland affect may be balanced by a desire to engage in playful interactions. *Although such interactions may lack a clear funlike, synchronous quality, they indicate that this parent has some notions about what is important for child-rearing.*

1 HIGHLY INSENSITIVE *This parent displays few areas of strength in interaction with his/her child.* The 1 rating, like a ‘2’, is uncommonly used in normal or unselected samples and denotes extreme insensitivity to the child’s communications and little apparent knowledge of crucial child-rearing techniques. In at-risk populations, however, such lower are more commonly used. The highly insensitive parent is low on almost all qualities discussed in the introduction. Affective negativity (in the form of either active harshness or passive disinterest/depression) is more extreme, as are many of other qualities. Basically, a ‘1’ is a more extreme version of the sort of insensitivity described for a ‘3’.

### **Rating hovering around 5 elaborated: inconsistent or apparent sensitivity**

Three different types of inconsistencies in interaction are often missed. Such interactions are often viewed by investigators as highly sensitive, when in fact they should be viewed

as “apparently sensitive”, or the mid-range (Biringen, 1998). The first two types refer to inconsistencies inherent in the parent’s behavior.

(1) The first type is inconsistency between declarative knowledge and motional/affective procedures. The inconsistency typically takes the form of a parent whose knowledge about how to be sensitive is sufficient for him or her almost to appear that way. At the declarative level, this parent tries different things to keep the child’s attention, appears positively attentive, and often may be very accommodating. What belies this surface sensitivity is *affect* – which might be bland, flat, sugary sweet, pretentious, labile, anxious, hyperexaggerated, or hyperexcitable.

(2) The second type of inconsistency that resides within the parent occurs when the parent is warm but fails to do what is ultimately good for the affective development of the child. Although this behavior is much more optimal than a cool, detached stance toward one’s child, warmth is not synonymous with sensitivity. It is a component of it. Affective warmth is necessary for a high rating but it is not sufficient to get a high rating. Parental warmth may be coupled with other qualities such as (a) infantilization (i.e. treating the child as much younger than he or she really is or doing things for the child that the child can do for himself/herself) or (b) other subtle forms or strategies to control the behavior of the child. These combined qualities of parental warmth with controlling or infantilizing strategies may lead to parent-child *fusion or enmeshment*.

(3) The third type of inconsistent sensitivity refers to inconsistency within the parent-child dyad. Because a highly sensitive parent has a keen sense of what optimal parent-child interactions *feel* like for the interactants, sustained unresponsiveness by the child would be emotionally received by the parent and alternative strategies would be pursued. *Thus, a highly sensitive parent would not engage in an interactional style is one-sided.*

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