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Maternal Depression and Infant Temperament Characteristics

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Abstract

One hundred-thirty-nine women participated in this longitudinal study from the third trimester of pregnancy through 8-months postpartum. Women completed depression scales at several time points and rated their infant's characteristics and childcare stress at 2- and 6-months postpartum. Mothers' reports of infant temperament were significantly different for depressed and non-depressed mothers, with depressed mothers reporting more difficult infants at both measurement points. These differences remained after controlling for histories of maternal abuse or prenatal anxiety, which occurred more often in the depressed mothers. There were no significant differences in childcare stress or perceived support between the groups. Infant temperament and childcare stress did not change over time. Recommendations for practice include consistent ongoing evaluations of the "goodness of fit" within the dyad and exploring interventions for depressed mothers that provide guidance about interactions with their infants and the appropriateness of the infant behaviors.

Keywords

maternal; infant; temperament; depression; stress; parenting

Postpartum depression has the potential for long lasting effects for both the mother and the infant. No one schema for describing the etiology and presentation for postpartum depression has been identified. What is known is that many different risk factors have been found to be at least moderately correlated with the presentation of postpartum depression (Beck, 2006). Included in these are a history of depression (preconception or prenatal), high stress level, high anxiety, and little or no social support. Although no single factor can be attributed to predicating postpartum depression, the combination of factors does seem very important in understanding both the short and long term outcomes as well as what strategies might be best for intervention.

Caring for a newborn can be a joyous event that comes with new responsibilities and burdens often related to juggling the needs of the child with the personal needs of the mother and family. Most mothers assimilate these new responsibilities with the other tasks of daily living. As the assimilation occurs, synchronicity in the mother-infant relationship develops (Coplan O'Neil, & Arbeau, 2005; Pauli-Pott, Mertesacker, & Beckmann, 2000; Rothbart, & Bates, 1998). Synchronicity in this relationship supports optimal growth and development for the child (Jacobson & Melvin, 1995; Rothbart, & Bates, 1998). However, for the mother with postpartum

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Note: This research was conducted in accordance with APA ethical standards in the treatment of the study sample.

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depression, care of a newborn might be overwhelming, leading to increased stress, anxiety, and increasing feelings of isolation.

Studies over several decades suggest several characteristics associated with maternal mood may have a relationship to the perception of infant characteristics. Field's (1985) early work with a matched sample of 12 women with pregnancy problems and 12 without problems found that the depressed mothers felt they had less positive infant interactions than those who were not depressed. Several investigations since that time revealed maternal characteristics, including prenatal stress, anxiety, personality structure, and depression, appear to define maternal perception of infant mood and behavior (Table 1). Pauli-Pott and associates (2000) reported in a study of 101 mothers and their 4-month-old infants that there was no relationship between maternal depression and independent observer ratings of infant emotionality. These findings suggest that maternal mood states alter the mother's perception of her infant's characteristics.

The presence of maternal depression does affect the synchronicity in the mother's, father's, and infant's relationships (Edhborg, Matthiesen, Lundh, & Widstrom, 2005; Edhborg, Seimyr, Lundh, & Widstrom, 2000). Moreover, the reciprocal interaction between maternal perception and infant behavior also has an effect on the relationship (Pauli-Pott et al., 2000; Sugawara et al., 1999). Recent investigations report that negative emotional reactions from depressed mothers elicit infant reactions of fear and withdrawal as recorded by independent observation (Pauli-Pott, Mertsacker, & Beckman, 2004). These negative feelings alter the maternal perception of childrearing stress, further confound the developing dyadic relationship, and provide more reason for the mother to dislike the temperament of the infant (Möhler, Parzer, Brunner, Wiebel, & Resch, 2006). An infant who is active and demanding can seem more difficult for the mother who is also struggling with postpartum depression, potentially escalating the depressive symptoms and the occurrence of more negative outcomes. These depressive feelings in the mother can lead to long-term emotional and cognitive impairment for the infant (Beck, 2001; 1995).

Infant temperament has been defined as the infant's behavioral style. It is how they behave in relationship to the environment and caregiving they receive (Thomas & Chess, 1977). How the child's temperament is exhibited and perceived affects the developing relationship between the infant and mother. When there is synchrony within this dyad there is said to be "Goodness of Fit." When synchrony is lacking, the infant is perceived as difficult and/or demanding by the mother (Coplan O'Neil, & Arbeau, 2005) and the asynchrony of the relationship predisposes the infant to long term negative outcomes. As the primary caretaker, maternal perceptions of infant temperament are important. Maternal perceptions and beliefs about the attributes of the infant affect how they care for their infant and the symbiotic relationship that will support the child's cognitive development (Jacobson & Melvin, 1995). Thus, infant temperament has been measured by asking mothers about their perception of their infant's characteristics and behaviors. How do they perceive the infant? Is the infant calm or demanding? How easily is the infant consoled or is he/she inconsolable? Understanding the mother's perceptions about her infant's behaviors provides insight into the appropriateness of her expectations. Yet an overriding question is whether the mother's perceptions of her infant and her childrearing stress are stable over time. Thus, the purpose of this study was to: a) determine whether there were differences in infant temperament ratings or child care stress of self-selected women who were depressed during the third trimester of pregnancy or during months 2 and 6 postpartum with non-depressed women and b) explore changes in mother's perceptions of infant temperament and child care stress over time. The data reported here are from a longitudinal study of childbearing health of abused and nonabused women (authors' names removed for blind review).

1 Method

Participants

English-speaking women (N = 139) in their third trimester of pregnancy were recruited from care provider's offices in the Pacific Northwest. Inclusion criteria included being at least 18 years of age, having the ability to read and write in English, and a willingness to participate through mail or telephone surveys during the postpartum period in a study about postpartum depression. It was necessary to include a choice to participants for the preferred method of postpartum data collection because a number of women had abuse experiences; the woman's ability to choose the data collection method that maintained her privacy also helped to maintain her safety. There were no exclusion criteria. The study was approved by the institutional review boards for the university and the hospital. A certificate of confidentiality was issued by the National Institutes of Health. All women signed the consent form prior to the initial data collection.

1.2 Procedure

Subjects were a convenience sample recruited using tear-off cards in the obstetrician's office waiting area. The card advertised a study about postpartum depression and requested interested participants to reply. A research assistant met potential subjects in the prenatal offices or at a mutually agreeable location. After informed consent was obtained, women completed the initial questionnaires for depression and abuse and identified the method they preferred to use for contact during the postpartum period. Women also provided alternative contacts that could be used, if needed, to reach them after birth. These alternative contacts were only used in the event of disconnected telephone numbers or return of undeliverable/no forwarding address mail. After the mother gave birth, a research assistant obtained data from her labor and delivery medical records. Postpartum measures for depressive symptoms and infant characteristics were gathered by telephone and mail. The attrition rate averaged 7% over the data collection period. This low attrition rate can be attributed to two tactics, (1) mothers received small incentives for each data point that they participated in and, (2) dyads could continue in the research project even if they had missed a data point along the way. Most participants had at least one missing data point where a data collection appointment was missed over the course of the project. The overall schedule for data collection appears in Table 2, data collection for each assessment tool is described below.

1.3 Assessments

The 10-item Edinburgh Postnatal Depression Scale (EPDS) is a self-report questionnaire. Total scale scores range from 0 – 30, with scores exceeding 12 indicative of depression. Typical questions on the EPDS are "I have been able to laugh and see the funny side of things" and "I have felt so unhappy that I have been crying". Sensitivity of 86% and specificity of 78% have been reported in studies of postpartum women (Beck & Gable, 2001; Murray & Carothers, 1990) and reliability estimates of .77 to .87 have been reported (Records & Rice, 2005). The EPDS was completed by mothers at 2 and 6 months after birth.

The 75-item Childbearing Health Questionnaire (CHQ) guided abstraction of data from medical records and provided basic information about health during childbearing (Records & Rice, 2004). Physical illnesses, prior pregnancy problems, medical interventions during labor, and infant birth weight and Apgar data are collected. An internal consistency estimate of .84 was obtained using Kuder Richardson (Records & Rice, 2004). The CHQ was completed after the mother and her newborn were discharged from the hospital.

The 20-item Centers for Epidemiologic Studies Depressed Mood Scale (CES-D) has subjects to respond to questions assessing the verbal/cognitive and affective dimensions of depression

on a 4-point Likert scale (0 = low; 3 = high). Subjects respond to questions such as “I could not get going” and “I felt sad” in relation to how they felt in the previous week. Total scale scores range from 0 – 60, with scores ≥ 16 indicative of major depression (Radloff, 1977). Reliability and validity estimates support its use in community and clinical settings (Corcoran & Fisher, 2000; Radloff, 1977). The CES-D was completed during the third trimester of pregnancy, following the recommendations of Mosack and Shore (2006), rather than using the EPDS to measure prenatal depression symptomatology. Mosack and Shore reported a strong correlation between these two measures when administered during the prenatal period ($r = .80$, $p < .01$) but recommended that the EPDS not be used during pregnancy after it failed to identify any of their pregnant sample ($N = 98$) as depressed.

The Predictors of Postpartum Depression Inventory – Revised (PDPI-R) is a series of interview questions that assess 10 to 13 predictors of postpartum depression (PPD, Beck, 2002). Used during the prenatal period, mothers respond to 10 questions such as “Have you been depressed during pregnancy” and “Are you satisfied with your marriage or living arrangement”. In the postpartum period, three additional questions for infant temperament, child care stress, and baby blues are added, including “Is your infant experiencing any health problems” and “Would you consider your baby irritable or fussy”. Scoring directions are now available and the instrument has good reliability and validity (Beck, Records, & Rice, 2006). In general, questions elicit “yes” or “no” responses which are scored with a “0” or “1”. Scores for each of the 10 prenatal or 13 postpartum predictors are obtained by adding item scores; total scale scores are obtained by summing predictor scores. Higher scores indicate a greater likelihood of problems with PPD.

2 Results

2.1 Description of the sample

The average age of the mothers was 27 years ($SD = 5.2$) and the majority (66%) were married and self-identified as Caucasian (89%). One half of the sample was primigravid ($n = 37$) or having their second child ($n = 33$). Forty-eight percent ($n = 65$) reported that the pregnancy was unplanned and only 6% indicated the pregnancy was unwanted ($n = 9$). When reporting their emotional response to the pregnancy, the majority of women identified that they and their partners were happy about the pregnancy (women = 96%; partner = 86%). The majority of the women had vaginal deliveries (80%) and intended to breastfeed their infants. Of the group who received cesarean sections, the primary reason noted in medical records was ‘repeat’ (52%). Mean Apgar scores for the newborns were 7.58 at 1-minute ($SD = 1.17$, range = 1 – 9) and 8.81 at 5-minutes ($SD = 0.76$, range = 2 – 10). The average birth weight of the newborns was 3439 grams ($SD = 486$). The mean gestational age of the infants was 38.79 ($SD = 1.91$). Ninety-five percent ($n = 131$) of the infants were between 37 and 42 weeks gestation. Only 1 infant had to be hospitalized in the neonatal intensive care unit for health concerns related to prematurity.

2.2 Self-report measures

Thirty-eight percent of the sample scored ≥ 16 on the CES-D upon entry into the study, indicating a high prevalence of depressive symptoms during the current pregnancy. Of the multigravidae in this group, 17% also reported depression during a previous pregnancy. At 2-months postpartum, 15% ($n = 22$, missing = 25) of the mothers scored higher than the EPDS proposed cut-off of 12. At 6-months after birth, 11% ($n = 12$, missing = 36) of mothers scored above the EPDS cut score of 12.

2.3 Differences between groups

Subjects were divided into depressed and non-depressed groups based on their CES-D score during the 3rd trimester of pregnancy. The demographic variables were similar for the depressed and non-depressed mothers at entry into the study, with the exception of lifetime physical abuse and prenatal anxiety. Women scoring as depressed ($CES-D \geq 16$) were significantly more likely to report lifetime violence ($M = .38, SD = .49$) as compared with their non-depressed peers ($M = .18, SD = .39$), $t(134) = -2.75, p = .012$. These women were also more likely to report prenatal anxiety ($M = .63, SD = .49$; $M = .33, SD = .47$, respectively), $t(133) = -3.64, p = .000$ when compared to their non-depressed counterparts. Thus, statistical control for abuse and prenatal anxiety prior to conducting comparative analyses was used. Depression data displayed a non-normal distribution so various non-parametric comparison tests were implemented in SAS.

Infant temperament was reported as significantly different ($p < .05$) for mothers depressed during the postpartum period as compared with non-depressed mothers, with depressed mothers reporting more difficult infants at 2- and 6-months of age (Table 3). Mothers who were depressed during the 3rd trimester of pregnancy rated their infant's temperament similarly at 2- and 6-months after birth ($M = .86, SD = 1.17$; $M = 1.00, SD = 1.30$, respectively). Mothers' reports of childcare stress were not significantly different at either measurement period. Additionally, no differences in family support were noted between the groups.

While differences were found in the ratings of infant temperament at 2- and 6-months after birth, examination of changes in the dependent variables over time was disappointing. There were no significant changes in mothers' reports of infant temperament from 2- to 6-months postpartum for the depressed or the non-depressed groups (Table 4). Additionally, childcare stress did not significantly change over time for either group.

Discussion

The prevalence of postpartum depression has been reported to be from 10 to over 50% depending on the population demographics and screening instrument selected. Some researchers cite findings where minority mothers are more likely to be depressed (Beeghly et al., 2003; Zayas, Cunningham, McKee, & Jankowski, 2002). Our sample of predominately Caucasian mothers had a high prevalence rate of 38%. Birth histories were not remarkable in the sample and the higher rate of depression cannot be attributed to infant illnesses and subsequent maternal anxiety. This higher prevalence might be explained by the fact that these mothers self-selected into a study that was advertised to be about postpartum depression. We might hypothesize that these women were seeking information or help with depression.

Consistent with the findings from prior studies (Table 1), the results suggest that depressed mothers have poorer ratings of their infant temperament than non-depressed mothers; these differences were apparent at both 2- and 6-months after birth. Möhler et al. (2006) explains this finding as one where maternal mood affects the mother's perceptual accuracy when evaluating her infant's mood states and this altered perceptual accuracy, as well as altered evaluation, appear to be persistent over time. Moreover, this difference between depressed and non-depressed mother's perceptions is apparent in the findings whether the mothers were depressed during the prenatal or postpartum periods (Leerkes & Crockenberg, 2003).

These data do not show an improvement over time from 2- to 6-months after birth in mother's ratings of their infant temperament, consistent with Möhler et al. (2006). This finding may indicate that depressed mothers need help in their transition to the motherhood role and in developing synchronicity with their infants. By becoming more familiar with their infants, mothers may be more able to adapt to their mothering role even though depression symptoms

may persist. Interventions are needed because long-term depressive symptoms and poorer perception of infant temperament have the potential to affect infant and child cognitive development (Beck, 2001; 1995).

This study used a 3-item measure of infant temperament. It is possible that this brief assessment of mothers' perceptions is not the best method to fully measure the domain of content for infant temperament and this could have contributed to our lack of significant change over time. Further research is needed that prospectively evaluates the PDPI-R infant variables. For example, the PDPI-R used one item to assess infant sleep problems and did not identify the specific type of problem. More information about the sleep problems experienced, perhaps gained through interview using the PDPI-R as the guide, may result in critical information useful for research and practice.

Newborn nurses and other healthcare providers are in the ideal position to assess maternal mood without using long or complex questionnaires. The U.S. Preventative Task Force (2006) suggests that effective questioning, using probes such as "Over the past 2 weeks, have you felt down, depressed, or hopeless?" and "Over the past 2 weeks, have you felt little interest or pleasure in doing things?" may identify needed referrals, support groups, or needs for positive affirmations. Our findings are based on only a few questions about infant temperament and yet, mother's perceptions were easily described without more cumbersome tools or screening.

Nurses and other healthcare providers can teach mothers techniques that may improve maternal mood and thereby facilitate relationships with their newborns. Infant massage is one such technique. Feijo et al. (2006) conducted a randomized controlled trial with 40 mothers of preterm infants and found that mothers who performed a 4-minute infant massage had lower depression and anxiety scores than mothers in the control group. Further research may reveal if this 'dose' of massage is effective when provided by mothers of term infants in home settings over time.

Previous research describes the fragmented, and in some cases, asynchronous sleep of mother-baby dyads (Thomas & Foreman, 2005). Thomas and Foreman report the longest sleep maternal sleep period was 3.6 hours. Nurses can encourage new mothers to be attentive to their total amount of sleep time. Nurses may be able to help the new mother to problem-solve regarding the infant's sleep wake cycle and explore a schedule that fits the household routines best. In future research studies, the use of alternate caregivers during a scheduled maternal sleep time might be a successful strategy to employ as a lack of sleep can contribute to a decreased quality of maternal health over time for women with a vulnerability to stress.

The findings from this study alert health care providers to the difficulties new mothers face when simultaneously experiencing depression. Mothers with depression after birth may need help from their care providers to facilitate the development of synchronicity. One strategy for facilitating synchronicity for depressed mothers may be to help these women identify the positive characteristics of their infants. Nurses and other healthcare providers are in the ideal position to help mothers identify these positive characteristics, to affirm normal growth and development of the infant, and to reassure mothers as to the time-limited nature of behaviors in the early newborn period. Mothers may not receive the positive feedback they need to realistically evaluate their infants' progress. Nurses in the inpatient and outpatient settings can evaluate the goodness of fit between the mother and infant. Positive reinforcement and/or further guidance about the dyadic interactions and the appropriateness of the infant's behaviors can be provided to improve the mother-infant relationship.

The significant differences in prenatal anxiety and physical abuse between the depressed and non-depressed groups may have long-term implications for newborn growth and cognitive

development. Depressed mothers have been found to provide care differently, or interact differently, with their newborn infants who may delay achievement of developmental milestones. Long-term implications for the child include problem solving difficulties at school age that may or may not be mitigated by the presence of a healthy father (Kahn, Brandt, & Whitaker, 2004).

4 Conclusions

Perceived differences in infant temperament appear to be related to the presence of depression and are not altered by the presence of family support or childcare stress. There were significant differences between the two groups of mothers' ratings of infant temperament at 2- and 6-months of age, with depressed mothers rating their infants as more difficult than non-depressed mothers. Mothers' reports of childcare stress did not differ between the depressed and non-depressed groups. There were no significant changes in infant temperament ratings or childcare stress over time. Practice innovations are needed to improve detection of maternal depression during the postpartum period and simultaneous maternal assessment of perceived infant temperament. Expecting that these assessments become part of the well-child visit may not be appropriate; other strategies may need to be considered (Chaudron et al., 2007). Mothers require interventions that will facilitate goodness of fit with their newborns. Such intervention would better support these mother/infant dyads and potentially lessen their risks for negative long-term outcomes. Further research is needed to explore whether the relationships experienced between mother and infants are similar in different ethnic groups and what interventions might be implemented to support mothers and infants during the early postpartum period when mothers are trying to adapt to the new responsibilities a new baby in the family brings.

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Table 1
Review of Relevant Literature on Depression and Infant Temperament

| Authors | Year | Sample | Concepts of Interest | Results |
|---|------|--|--|---|
| Edhborg, Seimyr, Lundh, & Widstrom | 2000 | Healthy Swedish-speaking parents at the Karolinska University Hospital Maternity Clinic in Stockholm were approached in the maternity ward on the day of delivery or on the second day following delivery with final evaluations of 223 mothers and fathers at 1 year | Maternal depression, infant characteristics | Depressed mothers and their partners felt children were more temperamental than non-depressed couples |
| Edhborg, Lundh, Seimyr, & Widstrom | 2001 | During a 6-month period, 1992-1993, Swedish- women visiting six Maternal Health Centres (MHC) in the Stockholm area were recruited after a month rating on the EDPS. Mother-child dyads (N=248) were followed for 15-18 months after birth. | Maternal depression and observation of interactions | Children of high EPDS scorers showed less attention skills in a free play situation and were more likely to be classified as having either an insecure attachment to their mothers or a secure attachment that showed restricted joy. |
| Pauli-Pott, Mertesacker, Bade, Bauer, & Beckman | 2000 | 101 mothers and their healthy 4-month-olds were recruited from public hospitals. The sample consisted of 42.6% (43) girls and 57.4% (58) boys. Average maternal age was 28.8 years; 62% had high school or college education. | Depression, infant negative emotionality, maternal reactivity, marital support | No association between maternal depression or infant emotionality |
| McMahon, Barnett, Kowalenko, Tennant, & Don | 2001 | 128 mothers in socially supportive residential care and 58 mothers in a demographically matched control group from private practices. Mother infant dyads were followed for 15 months after birth with diagnostic interviews at 4 and 12 months & symptom checklists at 4, 12, and 15 months after birth | Major depression, anxiety, marital adjustment, infant temperament | Mothers who lived in residential care home scored higher on State-Trait Anxiety and reported their infants were significantly more irritable as compared to the matched control groups of mothers who were living on their own |
| Leerkes & Crockenberg | 2003 | Ninety primiparous mothers, mean age was 29 years, mean education level of 15 years, and mean income of \$60,000. Majority were Caucasian (93%) and married or living with partner (99%). Recruited at birthing classes during last trimester and followed for 6- months after birth | Prenatal depression, infant temperament, postnatal depression questionnaires. At 5 months postpartum, mothers rated infant temperament and completed a depression scale. At 6 months, mothers and infants were videotaped. | Agreement between maternal reports and behavioral observations were higher when mothers reported their own needs were addressed during childhood |
| Austin, Hadzi-Pavlovic, Leader, Saint, & Parker | 2005 | Women in the third trimester of pregnancy returned self-report questionnaires; infant temperament was evaluated at 4 and 6 months by maternal and paternal report | Maternal prenatal and postpartum anxiety, maternal postpartum depression, and infant temperament | Maternal trait anxiety was predictive of "difficult" infant temperament, independent of depression and sociodemographic or obstetric risk factors |
| Pauli-Pott, Mertesacker, & Beckman | 2005 | 101 healthy first born infants and mothers assessed at 4-, 8- and 12-months using surveys, participant observation, and laboratory assessment | Depression, anxiety, social support, sensitivity to infant, infant temperament | Negative emotions were associated with withdrawal/fear in the irritable infants. |
| Coplan, O'Neil, & Arbeau | 2005 | 60 Canadian women who self selected and responded to questionnaires in the third trimester and 3-months postpartum | State anxiety, infant temperament | Prenatal anxiety predicted less positive infant affect. Postnatal anxiety was related to infant distress and reactivity |
| Edhborg, Matthesen, Lundh & Widstrom | 2005 | 106 Swedish mothers and fathers, 60% married, 62% college education. Responded to mailed surveys at 1-5 days and 2-months after birth. 30% of mothers reported prior depression | Postpartum bonding, postpartum depression, infant characteristics | Symptoms on EPDS between both parents were related. Fathers with depression perceived their children as more dull and unpredictable than the non-depressed fathers |
| Pearce & Ayers | 2005 | 51 women recruited during pregnancy from hospital and community prenatal clinics; self-selected. Completed surveys at 10-days after birth. 71% married, 76% | Maternal depression, maternal anxiety, infant temperament | Symptoms of anxiety and depression during pregnancy were unrelated to the expectations of the mother-baby bond |

| Authors | Year | Sample | Concepts of Interest | Results |
|----------------------|------|---|--|--|
| Ayissi & Hubin-Gayle | 2006 | Caucasian, 21% had high school education, 23% had a college degree, 14% were professionals. 67 French primiparous mother-infant dyads recruited from maternity unit. 76% working, 37% married, 53% living with partner. Mean age was 25 years. Completed survey and infant observation at 6-months after birth. | Depression, infant irritability | The percentage of irritable infants was higher in the depressed group and than the non-depressed group |
| Möhler, et al. | 2006 | 101 European singleton mother-infant pairs, age-33 yrs., 81% married, 56% had college and 20% had high school. Completed prenatal surveys and observations of infant responses. | Infant reactivity, stress during pregnancy, life events, pregnancy health, maternal personality. | Maternal prenatal stress was related to infant affective reactivity |
| Boyd, Zayas, & McKee | 2006 | 89 self-identified African-American (56%) and Hispanic (42%) mother-infant dyads at 3-months after birth, mean age was 24.6 years, mean education level of 12.3 years. 60% were single, 15% were married, 20% cohabitating. | Maternal depression, life events, mother-infant interaction, breastfeeding. Survey instruments and observations. | Infant behaviors did not differ by maternal depression status |

Table 2
Instruments Administered and Variables Measured by Data Collection Period

| Instrument | Variables Measured | Score Range | Prenatal - 3 rd Trimester | 2 Months Postpartum | 6 Months Postpartum |
|---------------------------|--|--|--------------------------------------|---------------------|---------------------|
| PDP1-R | Infant Temperament Child Care Stress | (0 - 3) (0 - 3) | | X X | X X |
| CES-D Edinburgh CHQ | Prenatal Anxiety Prenatal Depression Postpartum Depression Demographics Physical Abuse | Yes/No (0 - 60) (0 - 30) Yes/No | X X X X | X X | X X |

Table 3
 Infant Temperament Differences for Depressed and Non-Depressed Mothers

| Depression Status * | | N | Infant Temperament (range of scores = 0-3) M (SD) | p ** |
|---------------------|-----|----|--|------------------|
| 2 Months | Yes | 22 | .86 (1.17) | .02 ^a |
| Postpartum | No | 92 | .39 (.85) | |
| 6 Months | Yes | 21 | 1.00 (1.30) | .02 ^b |
| Postpartum | No | 93 | .37 (.79) | |

* Note. indicates measurement of depression symptoms using the EPDS and a cut score of 12; women scoring ≥ 12 were categorized as depressed at either 2 or 6 months postpartum or both.

** indicates significance level using the following tests:

^a Wilcoxon = .02; Kruskal-Wallis = .02; Median = .02; Van der Waerden = .02; Savage = .02.

^b Wilcoxon = .02; Kruskal-Wallis = .02; Median = .04; Van der Waerden = .01; Savage = .00.

Table 4
Changes in Infant Temperament Ratings from 2- to 6-months

| Source | df | F | η^2 | Sig. |
|-------------------------------|----|------|----------|------|
| Between Subjects | | | | |
| EPDS 2 Month | 1 | 4.85 | .05 | .03 |
| EPDS 6 Month | 1 | .029 | .00 | .86 |
| Physical Abuse | 1 | .85 | .01 | .35 |
| Anxiety | 1 | .06 | .00 | .80 |
| Within Group Depression Error | 83 | | | |
| Within Subjects | | | | |
| Change over Time | 1 | 4.33 | .05 | .04 |
| 2 month EPDS x Time | 1 | 1.02 | .01 | .31 |
| 6 month EPDS X Time | 1 | 1.65 | .02 | .20 |
| Physical Abuse x Time | 1 | .65 | .00 | .42 |
| Anxiety x time | 1 | .50 | .00 | .47 |
| Within Group Time Error | 83 | | | |