

Intergenerational Transmission of Trauma: Exploring Mother–Infant Prenatal Attachment

Kami L. Schwerdtfeger

*Marriage and Family Therapy Program, Department of Applied Professional Studies,
Texas Tech University*

Briana S. Nelson Goff

*Marriage and Family Therapy Program, School of Family Studies and Human Services,
Kansas State University, Manhattan, KS*

Early childhood attachment and bonding and the intergenerational transmission of trauma are two key areas to address to understand the connection between parental trauma and the parent–child relationship. The purpose of the current study was to explore the relationship between trauma and past parental attachment behaviors of 41 expectant mothers and the subsequent development of attachment and bonding with their unborn child. Results of the current study suggest that trauma history, in general, does not negatively impact expectant mothers' current prenatal attachment with their unborn child. However, interpersonal trauma history does appear to have negative effects on prenatal attachment. These results point to the importance of understanding the role of interpersonal trauma exposure on prenatal attachment.

The psychological stress related to traumatic incidents often can be so disabling and distressing that one's ability to cope with the situation is overwhelmed, leaving the victim with feelings of helplessness, vulnerability, and loss of safety. The nature of interpersonal trauma (e.g., rape, sexual abuse, criminal assaults) occurs within a relational context and often involves deliberate threat or injury, which distinguishes it from traumas that are nonpersonal in nature (e.g., natural disasters or accidents). The literature suggests that interpersonal traumas are more likely to result in posttraumatic stress disorder (PTSD; American Psychiatric Association [APA], 2000) than other types of traumatic events (Breslau et al., 1998; Green, 1998; Kilpatrick & Resnick, 1992). Interpersonal traumas may be particularly

distressing for survivors, resulting in more severe psychological consequences. Interpersonal trauma survivors may experience a particularly vulnerable period when they experience other stress or changes in their lives. Pregnancy is one type of life change that has received little research in the field of traumatic stress.

Trauma and Pregnancy

Recognizing the widespread impact trauma may have on the survivor, it is not surprising that PTSD symptomatology has been identified as a specific risk factor for negative psychological and physical outcomes among expectant mothers (Robertson, Grace, Wallington, & Stewart, 2004).

Correspondence concerning this article should be addressed to: Briana S. Nelson Goff, Marriage and Family Therapy Program, School of Family Studies and Human Services, 238 Campus Creek Complex, Kansas State University, Manhattan, KS 66506-1403. E-mail: bnelson@ksu.edu.

However, research that includes pregnant participants is limited, possibly because additional protections for conducting research with pregnant women are required by the Office for Human Research Protections (U.S. Department of Health and Human Services, 2005). The additional potential risk that could occur when directly assessing the psychological effects of trauma on pregnant women is a risk some institutional review boards (IRBs) may avoid (see Schwerdtfeger, 2004, for a description of the ethical issues of conducting trauma research with pregnant women).

In one of the few studies to date investigating the prevalence, risk factors, and treatment of PTSD among pregnant women, Loveland Cook et al. (2004) reported that 7.7% of the 744 pregnant women surveyed met diagnostic criteria for PTSD (APA, 1994). Comorbid disorders were common among their participants, with results suggesting that women with PTSD were five times more likely to have a major depressive episode and three times more likely to have a generalized anxiety disorder. Loveland Cook et al. reported that the major risk factor for PTSD among pregnant women included a history of maternal separation from children for 6 or more months and exposure to multiple traumas. In a qualitative study of 15 pregnant women diagnosed with PTSD, Seng, Low, Sparbel, and Killion (2004) examined participants' responses describing PTSD symptoms during pregnancy. Core symptoms of PTSD, substance abuse, somatization, dissociation, suicidality, and eating disorders were described in the interviews.

The exposure of pregnant women to psychological trauma presents unique research and theoretical questions, particularly related to the impact the traumatic event may have (e.g., if it occurs during the pregnancy) or the impact PTSD or other symptoms (e.g., resulting from a previous traumatic event) may have on the developing child. Two theoretical explanations describe the potential effects a mother's previous trauma could have on her unborn child: intergenerational transmission of trauma and parental attachment.

Intergenerational transmission of trauma. One potential explanation for the vulnerability of pregnant women

with a trauma history is the theory of intergenerational transmission of trauma, which hypothesizes that trauma and its impact will be passed between generations. Post-traumatic stress disorder symptoms may negatively affect a trauma survivor's ability to maintain relationships with family members. The research in this area suggests that traumatized adults may be emotionally or functionally (or both) unavailable for their infant, increasing the likelihood of enhanced symptomatology within the child (Walker, 1999). Parents with a trauma history may "pass on" their trauma symptoms or reactions to their children, either through the children's direct exposure to the parents' symptoms or through the parents' potentially traumatizing (e.g., abusive) behavior. Additionally, depression, anxiety, psychosomatic problems, aggression, guilt, and related issues may be common in the children of trauma survivors (Felsen, 1998). These findings suggest the complexity of understanding the effects of trauma that may impact family members across generations.

The phenomenon of intergenerational transmission of trauma during infancy has been well documented in clinical reports within the infant mental health field. Fraiberg, Adelson, and Shapiro's (1975) groundbreaking work, *Ghosts in the Nursery*, described how past traumatic experiences may compromise a parent's ability to offer adequate physical and emotional caregiving. Fraiberg and colleagues suggested that specific vulnerabilities, such as the trauma of domestic violence or abandonment, may limit a mother's ability to understand and respond sensitively to her infant, resulting in the repetition of her own painful past. Disturbances in the caregiver-child relationship have been associated with the maternal perception of the "child-as-threat" (Schechter et al., 2004, p. 321). This may be related to the frightened and frightening behaviors that may often be exhibited by the traumatized caregiver (Lyons-Ruth & Block, 1996; Main & Hesse, 1990; Schechter, Brunelli, Cunningham, Brown, & Baca, 2002; Steele, Steele, & Fonagy, 1996).

More recently, research has begun to explore the biological risk factors associated with maternal trauma exposure and PTSD during pregnancy. Research focusing on biological factors has found reduced cortisol levels among adults

with PTSD (Yehuda, 2002). Although neurobiological research focusing on infants and children is less advanced, findings from a recent study of mothers and infants suggest a connection between maternal trauma exposure and PTSD symptomatology during pregnancy and an infant's low cortisol levels (Yehuda et al., 2005).

Parental attachment. A central element in understanding the development and effects of PTSD in young children may lie in the infant–caregiver relationship. As described within Bowlby's (1969) theory of attachment, the initial relationship that exists between the infant and caregiver serves as the foundation for an infant's mental health. Research in the area of attachment has concluded that adult patterns are empirically correlated with infant patterns (e.g., a dismissing parent tends to have an avoidant infant). Ricks (1985) documented that mothers' self-reported memories of parental acceptance and encouragement for independence during childhood predicted their infant's attachment security. Further, Steele et al. (1996) found that the quality of attachment that expectant mothers and fathers reported with their own parents, when measured during the third trimester of pregnancy, predicted the development of attachment between each expectant parent and the infant when the infant was one year of age.

The current literature suggests a link between early attachment and the intergenerational transmission of trauma symptoms. Recent research exploring the intergenerational effect of PTSD and trauma exposure specifically suggests a relationship between maternal trauma exposure and trauma symptoms and maternal representations assessed prenatally. Research has shown that these early maternal mental representations of the caregiver relationship have an effect on a mother's experience of the relationship with her infant, which ultimately influences how she may interact with and become attached to her child (Aber, Belsky, Slade, & Crnic, 1999; Ammaniti, 1991; Benoit, Parker, & Zeanah, 1997; Huth-Bocks, Levendosky, & Bogat, 2002; Huth-Bocks, Levendosky, Bogat, & von Eye, 2004).

Recognizing this developing connection, researchers and clinicians need to assess parental trauma history, particularly around the time of the infant's birth, to understand and prevent the potential transmission of trauma symptoms between parents and infants. Although limited, current literature has revealed links between maternal traumatic stress during the prenatal period and long-term impact on the unborn child. Much research is still needed to explore and explain the processes through which these links occur.

The purpose of the current study was to explore the unique relationship between the trauma history and symptomatology of expectant mothers and the subsequent development of attachment and bonding to their unborn child. The study represents a preliminary effort to understand the possible intergenerational transmission of trauma by examining the impact of past trauma, PTSD symptomatology, and past parental attachment behaviors on an expectant mother's development of attachment and bonding toward her unborn child.

Based on the current literature, the hypotheses tested in this study were as follows:

1. Past trauma history and past parental attachment behaviors of parents or caregivers will predict expectant mothers' current trauma symptoms.
2. Past trauma history and past parental attachment behaviors of parents or caregivers will predict expectant mothers' current prenatal attachment development with the unborn child.
3. Expectant mothers who report a history of interpersonal trauma will report higher trauma symptoms and lower prenatal attachment and bonding development with their unborn child than expectant mothers who report no history of interpersonal trauma.
4. Expectant mothers who report a history of interpersonal trauma will report lower parental caring and higher parental overprotection from their parents or caregivers than expectant mothers who report no history of interpersonal trauma.

METHOD

Participants

The sample for the current study was assembled over a 3-month period. Research participants were pregnant women seeking prenatal health care at a county health department in the Midwest. This clinic served primarily lower socioeconomic status individuals and families. Criteria for inclusion were that the expectant mother be at least 18 years of age and in the second or third trimester of pregnancy. Of 51 potential participants recruited, a total volunteer sample of 41 women completed the study (response rate = 80%), 9 declined participation in the study, and one was not eligible to participate due to not meeting the minimum age requirement. Typical reasons for refusal included time and schedule restraints. No participants chose to end the research protocol before completion.

Demographic data revealed that the average age of participants was 22.9 ($SD = 3.77$), with a range of 18 to 33 years. Of the 41 participants, 48.8% ($n = 20$) were dating or single, 22% ($n = 9$) were married, 22% ($n = 9$) were living with a significant other, and 7.3% ($n = 3$) were divorced. Participants were predominantly White ($n = 22$, 53.7%) or African American ($n = 10$, 24.4%). Total annual gross family income for participants ranged from below \$9,999 to \$59,999, with a majority below \$19,999 ($n = 31$, 75.6%). In reporting their highest educational level completed, 78.1% ($n = 32$) reported having at least a high school degree, while 36.6% ($n = 15$) were currently unemployed, 26.8% ($n = 11$) were employed full-time, and 17.1% ($n = 7$) were employed part-time. Participants ranged from 12 to 41 weeks in their pregnancies. Nineteen (46.3%) participants reported that it was their first pregnancy. A majority of participants reported that the current pregnancy was unplanned ($n = 35$, 85.4%).

Measures

Traumatic Events Questionnaire. Within the current study, trauma experience was measured using the Traumatic Events Questionnaire (TEQ; Vrana & Lauterbach,

1994). The TEQ assesses experiences with nine specific types of traumatic events (accidents, natural disasters, crime, child abuse, rape, adult abusive experiences, witnessing the death/mutilation of someone, being in a dangerous/life threatening situation, receiving news of the unexpected or sudden death of a loved one) reported in the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised (DSM-III-R; APA, 1987)* and the empirical literature as having the potential to elicit posttraumatic stress disorder symptoms. In addition, two residual categories were included, allowing respondents to report any other very traumatic event not listed and other events that they consider most traumatic. For the current study, only the specific event questions were included; follow-up questions for each affirmative answer, which are in the original TEQ version, were not included. To obtain a trauma exposure score, the total number of events the participant reported experiencing was summed.

Trauma Symptom Checklist-40. The Trauma Symptom Checklist-40 (TSC-40; Briere, 1996) is a 40-item self-report research measure assessing symptomatology of adults resulting from childhood or adult traumatic experiences. The instrument consists of six subscales: anxiety, depression, dissociation, sexual abuse trauma index, sexual problems, and sleep disturbance. Sample symptoms from the subscales included tension, sadness, low sex drive, feeling that things are unreal, and insomnia. Responses to each symptom item were rated on a 4-point Likert scale indicating the frequency of occurrence ranging from 0 (*never*) to 3 (*often*). Reliability of the TSC-40 was adequate, with alphas for the full scale averaging .89 to .91, and subscale alphas ranging from .66 to .77 (Briere, 1996). For the current study, an alpha of .89 resulted for the full scale TSC-40.

Parental Bonding Instrument. The Parental Bonding Instrument (PBI; Parker, Tupling, & Brown, 1979) is a 25-item instrument that assesses the quality of the parent-child relationship during childhood. Designed to measure parental behaviors and attitudes from the perspective of the adult child, the PBI scale consists of two subscales: caring

and overprotection. The caring subscale examines the dimension of care/involvement versus indifference or rejection, whereas, the overprotection subscale examines the dimension of control/intrusion versus encouragement of independence. Measures were designed to be completed separately for both mother and father. Responses were scored on a 4-point Likert scale, ranging from 0 (*very like*) to 3 (*very unlike*). Maximum scores were 36 for the care (expression of affection) subscale and 39 for the overprotection (encouragement or suppression of the child's exploration of the environment) subscale. Using the subscale scores, parents may be effectively assigned to one of four quadrants (i.e., optimal parenting = high care and low overprotection; affectionate constraint = high care and high overprotection; affectionless control = low care and high overprotection; and neglectful parenting = low care and low overprotection). Assignment to high or low categories are based on the following cut-off scores: for mothers, a care score of 27.0 and an overprotection score of 13.5; for fathers, a care score of 24.0 and an overprotection score of 12.5. For both mothers and fathers, higher scores on the care subscale and lower scores on the overprotection subscale are considered optimal.

Several studies have been performed to determine the reliability of the PBI, resulting in Pearson correlation coefficients ranging from .76 to .88 for the care dimension and .63 to .74 for the overprotection dimension. The PBI has been shown to have satisfactory construct and convergent validity (Parker, 1983). The PBI was included in this study to gain an understanding of specific parental behaviors and attitudes displayed by the parents or caregivers of each participant. The PBI had adequate reliability within the current study with alphas of .96 on the care subscale for fathers and mothers and .77 and .82 for fathers' and mothers' overprotection subscale, respectively.

Maternal Antenatal Attachment Scale. Cranley (1981) defined prenatal attachment as "the extent to which women engage in behaviors that represent affiliation and interaction with their unborn child" (p. 282). For the purpose of this study, prenatal attachment was defined as "the unique,

affectionate relationship that develops between a woman and her fetus" (Muller, 1993, p. 11). Expectant mother's self-report on prenatal attachment scales has been found to predict subsequent attachment behaviors once the child is born (Benoit et al., 1997; Condon & Corkindale, 1997). Thus, prenatal attachment is considered an indicator for potential transmission of trauma symptomatology between the mother and her child.

To assess prenatal attachment, the Maternal Antenatal Attachment Scale (MAAS; Condon, 1993) was administered. The MAAS is a questionnaire designed to assess the mother's attachment with the unborn child during pregnancy. The measure consists of 19 items evaluating the quality of attachment and time spent in attachment mode on a 5-point Likert scale, with phrase variability between items. Specific items assess maternal attitudes and emotions regarding the unborn child, mental representations of the unborn child, as well as maternal report of comforting (e.g., stroking belly) and nurturing behaviors (e.g., eating well). Reliability of the MAAS was adequate, with an alpha of .82. For the current study, Cronbach's alpha of .69 resulted for the MAAS.

RESULTS

In reporting trauma history on the TEQ, 23 (56.1%) participants indicated having experienced interpersonal trauma, including childhood sexual abuse ($n = 13$, 31.7%), childhood physical abuse ($n = 10$, 24.4%), adult sexual victimization ($n = 6$, 14.6%), adult domestic violence ($n = 16$, 39%), or victimization in a violent crime ($n = 9$, 22%). Noninterpersonal traumas were reported by 18 (43.9%) participants, which included being in or witnessing a serious accident ($n = 11$, 26.8%); experiencing a natural disaster ($n = 8$, 19.5%); witnessing the serious injury, mutilation, or violent death of someone ($n = 11$, 26.8%); receiving news of the unexpected death of someone close to them ($n = 24$, 58.5%); and being in serious danger of losing one's life or being seriously injured ($n = 8$, 19.5%). Eight participants reported having experienced a traumatic event that was not listed on the TEQ (e.g., unexpected loss of a sibling or parent,

death or torture of a pet/animal, parent incarceration). No participants reported experiencing military related traumas.

Chi-square analyses were conducted to compare respondents who reported a history of interpersonal with those who did not report a history of interpersonal trauma. When participants were classified into interpersonal and no interpersonal trauma groups, the two subgroups maintained demographic characteristics similar to the full sample. Employment status was the only significant difference in demographics between the two groups, $\chi^2(6, N=41) = 13.27, p < .05$, which was assessed by seven employment categories: employed fulltime, employed part-time, unemployed, unemployed due to disability, fulltime student, part-time student, or fulltime homemaker. Participants in the interpersonal trauma group were significantly more likely to report being unemployed not due to disabili-

ty ($n = 13, 56.5\%$), than participants in the no interpersonal trauma group ($n = 2, 11.1\%$), whereas participants in the no interpersonal trauma group ($n = 12, 66.7\%$) were more likely to report full- or part-time employment. In regard to noninterpersonal traumatic events reported, witnessing a violent death, $\chi^2(1, N=41) = 7.40, p < .01$, and being in danger of losing one's own life, $\chi^2(1, N=41) = 3.98, p < .05$, represented the only significant differences between the two groups. Interpersonal trauma respondents were significantly more likely to report experiencing these noninterpersonal traumas than were respondents in the noninterpersonal trauma group. Finally, a significant difference was found between groups in the total number of traumatic events, $t(40) = 30.52, p < .001$, with the interpersonal trauma group reporting more total traumatic events. Traumatic events reported by group are presented in Figure 1.

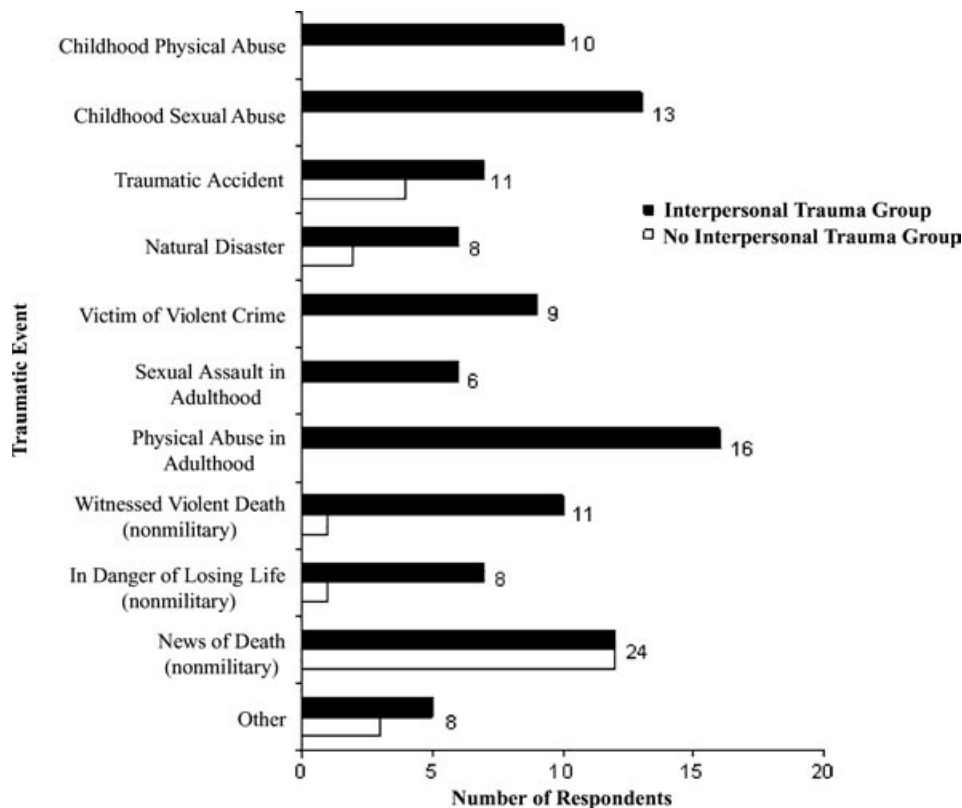


Figure 1. Specific traumas reported on the Traumatic Events Questionnaire (TEQ) by interpersonal trauma respondents ($n = 23$) and no interpersonal trauma respondents ($n = 18$). *Note.* Line numbers indicate combined group totals.

Correlation Analyses

It was expected that mothers' past trauma history and the quality of the past parental attachment behaviors of parents or caregivers would be significantly related to expectant mothers' current trauma symptoms and current prenatal attachment with the unborn child. The total number of traumatic events correlated significantly with trauma symptoms, $r(41) = .51, p < .01$, as well as with scores on the two past parental attachment behaviors subscales for fathers, $r(36) = -.53, p < .01$ for care, and $r(36) = .41, p < .01$ for overprotection. However, there was not a significant correlation between the total number of traumatic events and the mother parental attachment behaviors subscales, or between the total traumatic events and current prenatal attachment and bonding. Mother overprotection scores were significantly correlated with trauma symptoms, $r(41) = .33, p < .05$, and father care scores were correlated with the participants' prenatal attachment with their unborn child, $r(36) = .32, p < .05$. Correlations among study variables are presented in Table 1.

Factors Predicting Current Trauma Symptoms and Prenatal Attachment

Hierarchical regression analyses were conducted separately to determine whether past trauma history and the quality

Table 2. Summary of Regression Analysis for Variables Predicting Current Trauma Symptoms ($N = 41$)

| Variable | <i>B</i> | <i>SE B</i> | β |
|----------|----------|-------------|---------|
| Step 1 | | | |
| TEQ | 3.06 | 0.84 | 0.51*** |
| Step 2 | | | |
| TEQ | 2.73 | 1.02 | 0.45** |
| PBI-MC | 0.27 | 0.25 | 0.20 |
| PBI-MO | 0.73 | 0.32 | 0.42* |
| PBI-FC | -0.16 | 0.25 | -0.13 |
| PBI-FO | -0.13 | 0.34 | -0.07 |

Note. $R = .51, R^2_{adj} = .24, \Delta R^2 = .26$ for Step 1, $F(1, 39) = 13.40^{***}$; $R = .60, R^2_{adj} = .27, \Delta R^2 = .10$ for Step 2, $F(5, 35) = 3.90^{**}$. TEQ = Traumatic Events Questionnaire; PBI = Parental Bonding Instrument; PBI-MC = PBI mother care subscale; PBI-MO = PBI mother overprotection subscale; PBI-FC = PBI father care subscale; PBI-FO = PBI father overprotection subscale.

* $p < .05$. ** $p < .01$. *** $p < .001$.

of the past parental attachment behaviors of parents or caregivers would predict expectant mothers' current trauma symptoms and current prenatal attachment development with the unborn child. First, the total number of traumatic events was entered as the first step, followed by the past parental attachment behavior subscales (mother care and overprotection and father care and overprotection) to test whether they predicted current trauma symptoms. Results of this regression analysis are presented in Table 2.

Of the five predictors tested, past trauma history and mother overprotection significantly predicted the current

Table 1. Descriptive Statistics and Correlations Among Study Measures ($N = 41$)

| Variable | TEQ | TSC-40 | PBI-FC | PBI-FO | PBI-MC | PBI-MO | MAAS |
|-----------|--------|--------|--------|--------|--------|--------|-------|
| TEQ | — | | | | | | |
| TSC-40 | .51** | — | | | | | |
| PBI-FC | -.53** | -.27 | — | | | | |
| PBI-FO | .41** | .23 | -.59** | — | | | |
| PBI-MC | -.20 | -.15 | -.05 | .08 | — | | |
| PBI-MO | .13 | .33* | .16 | .04 | -.60** | — | |
| MAAS | -.26 | -.27 | .32* | -.20 | -.01 | .04 | — |
| <i>M</i> | 3.02 | 21.10 | 20.25 | 17.25 | 27.15 | 16.59 | 74.07 |
| <i>SD</i> | 2.36 | 14.27 | 12.06 | 8.03 | 10.22 | 8.12 | 6.47 |
| Range | 0–9 | 0–59 | 0–36 | 4–33 | 4–36 | 3–36 | 54–84 |

Note. TEQ = Traumatic Events Questionnaire; TSC-40 = Trauma Symptom Checklist-40; PBI = Parental Bonding Instrument; PBI-FC = PBI father care subscale; PBI-FO = PBI father overprotection subscale; PBI-MC = PBI mother care subscale; PBI-MO = PBI mother overprotection subscale; MAAS = Maternal Antenatal Attachment Scale.

* $p < .05$, two-tailed. ** $p < .01$, two-tailed.

Table 3. Descriptive Statistics of Study Measures by Interpersonal Trauma Group

| Variable | No interpersonal trauma (<i>n</i> = 18) | | | Interpersonal trauma (<i>n</i> = 23) | | | <i>t</i> | <i>d</i> |
|----------|--|-----------|-------|---------------------------------------|-----------|-------|----------|----------|
| | <i>M</i> | <i>SD</i> | Range | <i>M</i> | <i>SD</i> | Range | | |
| TSC-40 | 14.39 | 9.29 | 0–28 | 26.35 | 15.44 | 5–59 | 8.39** | 0.91 |
| PBI-FC | 26.33 | 7.77 | 10–36 | 15.49 | 11.44 | 0–34 | 11.86*** | –0.20 |
| PBI-FO | 13.50 | 5.19 | 4–20 | 20.18 | 7.83 | 4–33 | 9.75** | 0.18 |
| PBI-MC | 30.06 | 8.03 | 10–36 | 24.87 | 11.29 | 4–34 | 2.71 | –0.10 |
| PBI-MO | 14.28 | 7.08 | 3–27 | 18.39 | 8.55 | 7–36 | 2.71 | 0.10 |
| MAAS | 76.44 | 4.91 | 68–84 | 72.22 | 7.03 | 54–84 | 4.70* | –0.13 |

Note. TSC-40 = Trauma Symptom Checklist-40; PBI = Parental Bonding Instrument; PBI-FC = PBI father care subscale; PBI-FO = PBI father overprotection subscale; PBI-MC = PBI mother care subscale; PBI-MO = PBI mother overprotection subscale; MAAS = Maternal Antenatal Attachment Scale.

* $p < .05$. ** $p < .01$. *** $p < .001$.

trauma symptoms of participants, $R^2 = .36$, $R^2_{\text{adj}} = .27$, $F(5, 35) = 3.90$, $p < .01$. However, mother caregiver caring behaviors and father caregiver caring and overprotection behaviors did not significantly predict participants' current trauma symptoms.¹ The greater number of trauma experiences reported and more overprotective behaviors of mother caregivers accounted for 27% of the participants' trauma symptom scores, providing partial support for Hypothesis 1.

For the second regression analysis, the total number of traumatic events was entered as the first step, followed by the past parental attachment behaviors subscales (mother care and overprotection and father care and overprotection) to test whether they predicted current prenatal attachment and bonding with the unborn child. Past trauma history, the quality of the relationship during childhood with mother caregivers, and the quality of the relationship during childhood with father caregivers were not significant predictors of current attachment to the unborn child, $R^2 = .11$, $R^2_{\text{adj}} = -.01$, $F(5, 35) = .90$, *ns*; thus, Hypothesis 2 was not supported.

¹ A supplemental regression analysis was conducted in which predictors found to be nonsignificant were removed. Results for the regression model predicting current trauma symptoms from total traumatic events and mother overprotection were similar to the primary regression analysis, therefore, the full regression analysis is reported here.

Interpersonal Trauma Group Differences

Two separate multivariate analyses of variance (MANOVAs) were conducted to determine group differences on the dependent variables based on participants' self report of interpersonal trauma. Descriptive statistics for the interpersonal and no interpersonal trauma groups are provided in Table 3.

To test Hypothesis 3, the first MANOVA included current trauma symptoms and current prenatal attachment as the dependent variables. Univariate analysis of variance revealed significant differences between the groups for the TSC-40, $F(1, 39) = 8.39$, $p < .01$, and the MAAS, $F(1, 39) = 4.70$, $p < .05$. Thus, participants with a history of interpersonal trauma reported significantly higher trauma symptoms and lower prenatal attachment than those who reported no history of interpersonal trauma, which indicates support for Hypothesis 3.

To test Hypothesis 4, the second MANOVA included the four PBI subscales (father care, father overprotection, mother care, and mother overprotection) as the dependent variables. Univariate analysis of variance revealed significant differences between the groups for the father PBI care, $F(1, 39) = 11.86$, $p < .001$, and overprotection subscales, $F(1, 39) = 9.75$, $p < .01$. No significant differences were found between groups for scores on the mother PBI care, $F(1, 39) = 2.71$, $p = .11$, and overprotection subscales, $F(1, 39) = 2.71$, $p = .11$. Participants with a

history of interpersonal trauma reported lower scores on caring and higher scores on overprotection for fathers, but no difference for mothers; therefore, Hypothesis 4 was only partially supported.

DISCUSSION

The current study is one of the first to focus on the impact of trauma exposure and symptoms on expectant mothers' development of prenatal attachment to the unborn child. Specifically, this study employed a unique sample of pregnant women, which has not been widely included in trauma research. Additionally, the ethnic diversity of the sample and the high response rate of recruited participants (80.4%) were also important strengths. The broad focus of the research to include both current individual symptoms and experiences, as well as family history variables, provides important information on the impact of previous trauma on expectant mothers' attachment to their child. Two primary results arose from the data. First, the total number of traumatic events and mother overprotection accounted for 27% of the variance in current trauma symptoms. Second, interpersonal trauma history appears to negatively affect current prenatal attachment.

Although it was hypothesized that past trauma history and past parental attachment behaviors of parents or caregivers during childhood would predict expectant mothers' current trauma symptoms, past trauma history and mother overprotection were the only significant predictors, providing partial support for Hypothesis 1. Mother care behaviors, father care behaviors, and father overprotection behaviors were not significant predictors of current trauma symptoms. In addition, Hypothesis 2 was not supported, as a significant predictive relationship between expectant mothers' past trauma experiences, past parental attachment behaviors during childhood, and current prenatal attachment with the unborn child was not found.

There may be several reasons for these results. First, although all participants had experienced some type of trauma in their past and several participants had experienced multiple traumatic events, the level of current trauma symptoms was relatively low, with an overall mean

of 21.1. Thus, participants were not experiencing severe or elevated trauma-related symptoms. In comparison, in a study among childhood sexual abuse survivors, Gold and Cardena (1998) reported an average score of 54.42 on the TSC-40. Gold, Milan, Mayall, and Johnson (1994) reported higher TSC-40 averages in their study of 654 female undergraduate students, with average scores of 70.4 for participants who reported a history of child sexual abuse, 73.5 among participants with a reported history of adult sexual assault, and 77.4 for participants who reported a history of both childhood sexual abuse and adult sexual assault. A participant sample exhibiting higher trauma symptoms might report more negative effects on their current attachment to their unborn child, particularly those with severe PTSD or similar psychiatric symptomatology (Loveland Cook et al., 2004; Seng et al., 2004).

Second, all participants in the current study were seeking care from the same prenatal medical clinic, which focused on promoting good health of women during pregnancy by implementing a comprehensive approach to prenatal care. As a part of the prenatal care process through this clinic, all participants had been assigned an individual social worker who served to monitor and assess mental health and social support, as well as to provide education and resources throughout the pregnancy. Additionally, expectant mothers with medically high-risk pregnancies were screened out of the program and referred to more specialized prenatal care centers. The therapeutic elements of the prenatal care provided to all participants may have been a factor in breaking the potential cycle of intergenerational transmission of disrupted attachment and trauma. Therefore, the current findings may be unique to this specific sample of seemingly resilient women.

Additional results from this study do suggest that the nature of interpersonal trauma experience has a unique impact on expectant mothers. When comparing expectant mothers who reported a history of interpersonal trauma with expectant mothers with no reported interpersonal trauma history, significant differences were found in regard to current trauma-related symptoms, current prenatal attachment, and past father caregiver parental behaviors. The interpersonal trauma group reported more impairment in

these areas, providing support for Hypothesis 3 and partial support for Hypothesis 4. However, no significant differences were found between the groups concerning past mother caregiver parental behaviors. Most notable to the current study was the significant difference in prenatal attachment between the interpersonal trauma groups.

Several possible explanations can be made for the interpersonal trauma findings. The current study results concur with previous literature on the negative repercussions of interpersonal trauma (Breslau et al., 1998; Green, 1998; Kilpatrick & Resnick, 1992); however, the population sampled in this study provides an area of new information in the literature. Regarding father caregiving behaviors, a child's exposure to trauma may alter the parental bonding behaviors of father caregivers, or alternatively, that the father caregivers' parental behaviors of low care and high over-protection increase the likelihood of experiencing trauma. However, the statistically significant results should be interpreted with caution due to the low effect size (Cohen, 1969, 1992) results for both father caregiver subscales. Further research should address the specific aspects that may be unique to father caregivers.

Many interpersonal traumas occur in the context of an attachment relationship with parents, caregivers, spouses, or siblings; therefore, it is not surprising that future attachment relationships would be affected. The role of attachment is to provide protection and care; however, interpersonal trauma is likely to impinge adversely on an individual's patterns of attachment throughout his or her life, including future parental attachments. Thus, results from the current study provide further information that supports previous parental attachment research (Aber et al., 1999; Ammaniti, 1991; Benoit et al., 1997; Huth-Bocks et al., 2002; Huth-Bocks et al., 2004). Expectant mothers with a history of interpersonal (i.e., attachment-based) trauma reported significantly lower prenatal attachment development with their unborn child than did expectant mothers who reported no interpersonal trauma history. Thus, interpersonal trauma history may be a unique factor in future attachment relationships; however, the particular mechanisms by which these attachment effects occur require further study.

A number of limitations to the current study are worthy of discussion. First, only 41 participants completed the study measures. Although, the research was designed as an exploratory study and the sample was ethnically diverse, the small sample size limits the ability to generalize the findings. In addition, the sample was relatively homogeneous in respect to income, education level, and geographic location. Although the sample included a range in length of gestation, it is important to note that women may have a very different sense of attachment to their unborn child early compared to later in their pregnancy. Gaining information from a more diverse sample may attain further understanding of how trauma impacts expectant mothers from a variety of backgrounds, including possible demographic characteristics, such as the role of employment status or other variables that may differ between interpersonal trauma groups. Finally, the high correlation between PBI subscales also suggests that the results should be interpreted with caution as it could influence the regression results within a sample of this size.

Within the current study, a broad definition of trauma was used to assess trauma history, which included being the direct victim of a traumatic event (e.g., childhood sexual abuse) or indirectly being impacted by traumatic events (e.g., learning about the death of someone close). In addition, there was a range in the total number of traumatic experiences the participants reported, although the total number of events was not as critical in this study as the type of traumatic experiences (e.g., interpersonal traumas).

The differences found between the interpersonal trauma group and the no interpersonal trauma group suggest that the specific impact may vary according to the nature of the trauma. However, the statistically significant results within the current study should be interpreted with caution due to the small effect sizes (Cohen, 1969, 1992) for the predictors. Future research should focus on the unique impact of various types of traumatic events, specifically gaining more information about the clinical significance of interpersonal trauma experiences on expectant mothers.

Future work also may help in understanding the role current trauma symptomatology plays within current prenatal attachment in expectant mothers. In the study,

although participants reported a high number of past trauma experiences, trauma symptom scores on the TSC-40 were low, which may not provide a clear picture of the symptoms or distress pregnant women with elevated PTSD symptoms may be experiencing. Future research focusing on a sample of expectant mothers with higher current trauma symptoms is needed to understand the impact of current trauma symptoms on prenatal attachment.

Finally, an important limitation to the current study involved the use of the MAAS as a self-report measure of prenatal attachment development in expectant mothers. In research of attachment, both in young children (Berlin, 2005; Solomon & George, 1999) and adults (Crowell, Fraley, & Shaver, 1999), issues regarding the measurement of attachment (e.g., behavioral observation, narrative, interview, self-report) are pervasive. Even greater uncertainty surrounds the assessment of prenatal attachment as it focuses on the fantasized attachment relationship with the unborn child, rather than an observable parent-child relationship. In addition, the lack of norms, categories, or cut-off scores for the MAAS provides no sense of the expected distribution, limiting the interpretation of the clinical significance of the current findings. Thus, future research should involve additional self-report measures, interviews, and observations of prenatal attachment in a broader, more diverse sample of women.

Exploring mother-infant prenatal attachment is an important focus in understanding the intergenerational consequences of trauma. The current study provided an investigation of the impact past attachment and trauma can have on expectant mothers' attachment to their unborn child. The results suggest that although trauma history, in general, does not appear to negatively impact expectant mothers' current prenatal attachment with the unborn child, the nature of interpersonal trauma experiences do have a significant relationship to prenatal attachment. Although further research in this area is needed to confirm and expand the current findings, this study has important implications for researchers and clinicians interested in better understanding the systemic impact of trauma across generations. To break the cycle of the intergenerational transmission of trauma, attention needs to be paid to the critical role

expectant mothers play in preventing the negative effects of trauma on infant and child victims.

REFERENCES

- Aber, J. L., Belsky, J., Slade, A., & Crnic, K. (1999). Stability and change in mothers' representations of their relationship with their toddlers. *Developmental Psychology*, 35, 1038–1047.
- American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., rev.). Washington, DC: Author.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.
- Ammaniti, M. (1991). Maternal representations during pregnancy and early infant-mother interactions. *Infant Mental Health Journal*, 12, 246–255.
- Benoit, D., Parker, K. C., & Zeanah, C. H. (1997). Mothers' representations of their infants assessed prenatally: Stability and association with infants' attachment classifications. *Journal of Child Psychology and Psychiatry*, 38, 307–313.
- Berlin, L. J. (2005). Interventions to enhance early attachments: The state of the field today. In L. J. Berlin, Y. Ziv, L. Amaya-Jackson, & M. T. Greenberg (Eds.), *Enhancing early attachments: Theory, research, intervention, and policy* (pp. 3–33). New York: Guilford Press.
- Bowlby, J. (1969). *Attachment and loss: Vol 1. Attachment*. New York: Basic Books.
- Breslau, N., Kessler, R. C., Chilcoat, H. D., Schultz, L. R., Davis, G. C., & Andreski, P. (1998). Trauma and posttraumatic stress disorder in the community: The 1996 Detroit area survey of trauma. *Archives of General Psychiatry*, 55, 626–632.
- Briere, J. (1996). Psychometric review of the Trauma Symptom Checklist-40. In B. H. Stamm (Ed.), *Measurement of stress, trauma, and adaptation*. Lutherville, MD: Sidran.
- Cohen, J. (1969). *Statistical power analysis for the behavioral sciences*. San Diego: Academic Press.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112, 155–159.
- Condon, J. T. (1993). The assessment of antenatal emotional attachment: Development of a questionnaire instrument. *British Journal of Medical Psychology*, 66, 167–183.

- Condon, J. T., & Corkindale, C. (1997). The correlates of antenatal attachment in pregnant women. *British Journal of Medical Psychology*, 70, 359–372.
- Cranley, M. S. (1981). Development of a tool for the measurement of maternal attachment during pregnancy. *Nursing Research*, 30, 281–284.
- Crowell, J. A., Fraley, R. C., & Shaver, P. R. (1999). Measurement of individual differences in adolescent and adult attachment. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 434–465). New York: Guilford Press.
- Felsen, I. (1998). Transgenerational transmission of effects of the Holocaust: The North American research perspective. In Y. Danieli (Ed.), *International handbook of multigenerational legacies of trauma. The Plenum series on stress and coping* (pp. 43–68). New York: Plenum.
- Fraiberg, S., Adelson, E., & Shapiro, V. (1975). Ghosts in the nursery: A psychoanalytic approach to the problems of impaired infant–mother relationships. *Journal of the American Academy of Child Psychiatry*, 14, 387–421.
- Gold, J. W., & Cardena, E. (1998). Convergent validity of three posttraumatic symptom inventories among adult sexual abuse survivors. *Journal of Traumatic Stress*, 11, 173–180.
- Gold, S. R., Milan, L. D., Mayall, A., & Johnson, A. E. (1994). A cross-validation study of the Trauma Symptom Checklist: The role of mediating variables. *Journal of Interpersonal Violence*, 9, 12–26.
- Green, B. L. (1998). Psychological responses to disasters: Conceptualization and identification of high-risk survivors. *Psychiatry and Clinical Neurosciences*, 52, 567–573.
- Huth-Bocks, A. C., Levendosky, A. A., & Bogat, G. A. (2002). The effects of domestic violence during pregnancy on maternal and infant health. *Violence and Victims*, 17, 169–185.
- Huth-Bocks, A. C., Levendosky, A. A., Bogat, G. A., & von Eye, A. (2004). The impact of maternal characteristics and contextual variables on infant–mother attachment. *Child Development*, 75, 480–496.
- Kilpatrick, D. G., & Resnick, H. S. (1992). Posttraumatic stress disorder associated with exposure to criminal victimization in clinical and community populations. In J. R. T. Davidson & E. B. Foa (Eds.), *Posttraumatic stress disorder: DSM-IV and beyond* (pp. 113–143). Washington, DC: American Psychiatric Press.
- Loveland Cook, C. A., Flick, L. H., Homan, S. M., Campbell, C., McSweeney, M., & Gallagher, M. E. (2004). Posttraumatic stress disorder in pregnancy: Prevalence, risk factors, and treatment. *Obstetrics & Gynecology*, 103, 710–717.
- Lyons-Ruth, K., & Block, D. (1996). The disturbed caregiving system: Relations among childhood trauma, maternal caregiving, and infant affect and attachment. *Infant Mental Health Journal*, 17, 257–275.
- Main, M., & Hesse, E. (1990). Parents' unresolved traumatic experiences are related to infant disorganized attachment status: Is frightened and/or frightening parental behavior the linking mechanism? In M. T. Greenberg, D. Cicchetti, & E. M. Cummings (Eds.), *Attachment in the preschool years: Theory, research, and intervention* (pp. 161–182). Chicago: University of Chicago.
- Muller, M. (1993). Development of the prenatal attachment inventory. *Western Journal of Nursing Research*, 15, 199–215.
- Parker, G. (1983). *Parental overprotection: A risk factor in psychosocial development*. New York: Grune & Stratton.
- Parker, G., Tupling, H., & Brown, L. B. (1979). A parental bonding instrument. *British Journal of Medical Psychology*, 52, 1–10.
- Ricks, M. H. (1985). The social transmission of parental behavior: Attachment across generations. *Monographs of the Society for Research in Child Development*, 50, 211–227.
- Robertson, E., Grace, S., Wallington, T., & Stewart, D. E. (2004). Antenatal risk factors for postpartum depression: A synthesis of recent literature. *General Hospital Psychiatry*, 26, 289–295.
- Schechter, D. S., Brunelli, S. A., Cunningham, N., Brown, J. B., & Baca, P. (2002). Mother–daughter relationships and child sexual abuse: A pilot study of 35 dyads. *Bulletin of the Menninger Clinic*, 66, 39–60.
- Schechter, D. S., Zeanah, C. H., Myers, M. M., Brunelli, S. A., Liebowitz, M. R., Marshall, R. D., et al. (2004). Psychobiological dysregulation in violence-exposed mothers: Salivary cortisol of mothers with very young children pre- and post-separation stress. *Bulletin of the Menninger Clinic*, 68, 319–336.
- Schwerdtfeger, K. L. (2004). *Intergenerational transmission of trauma: Exploring mother–infant prenatal attachment*. Unpublished master's thesis, Kansas State University, Manhattan, KS.
- Seng, J. S., Low, L. K., Sparbel, K. J. H., & Killion, C. (2004). Abuse-related post-traumatic stress during the childbearing year. *Issues and Innovations in Nursing Practice*, 46, 604–613.
- Solomon, J., & George, C. (1999). The measurement of attachment security in infancy and childhood. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 287–316). New York: Guilford Press.

- Steele, H., Steele, M., & Fonagy, P. (1996). Associations among attachment classifications of mothers, fathers, and their infants. *Child Development*, 67, 541–555.
- U.S. Department of Health and Human Services' Office for Human Research Protections. (2005, June 23). Code of Federal Regulations, Title 45. Public Welfare, Department of Health and Human Services, Part 46 Protection of Human Subjects. Retrieved August 1, 2005, from <http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.htm>
- Vrana, S., & Lauterbach, D. (1994). Prevalence of traumatic events and post-traumatic psychological symptoms in a nonclinical sample of college students. *Journal of Traumatic Stress*, 7, 289–302.
- Walker, M. (1999). The inter-generational transmission of trauma: The effects of abuse on the survivor's relationship with their children and on the children themselves. *European Journal of Psychotherapy, Counseling and Health*, 2, 281–296.
- Yehuda, R. (2002). Current status of cortisol findings in post-traumatic stress disorder. *Psychiatric Clinic of North America*, 25, 341–368.
- Yehuda, R., Engel, S. M., Brand, S. R., Seckl, J., Marcus, S. M., & Berkowitz, G. S. (2005). Transgenerational effects of posttraumatic stress disorder in babies of mothers exposed to the World Trade Center attacks during pregnancy. *Journal of Clinical Endocrinology & Metabolism*, 90, 4115–4118.

Copyright of *Journal of Traumatic Stress* is the property of John Wiley & Sons, Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.