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Maternal Reflective Functioning among Mothers with Childhood Maltreatment Histories: Links to Sensitive Parenting and Infant Attachment Security

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Abstract

This study examined relationships among maternal reflective functioning, parenting, infant attachment, and demographic risk in a relatively large ($N=83$) socioeconomically diverse sample of women with and without a history of childhood maltreatment and their infants. Most prior research on parental reflective functioning has utilized small homogenous samples. Reflective functioning was assessed with the Parent Development Interview, parenting was coded from videotaped mother-child interactions, and infant attachment was evaluated in Ainsworth's Strange Situation by independent teams of reliable coders masked to maternal history. Reflective functioning was associated with parenting sensitivity and secure attachment, and inversely associated with demographic risk and parenting negativity; however, it was not associated with maternal maltreatment history or PTSD. Parenting sensitivity mediated the relationship between reflective functioning and infant attachment, controlling for demographic risk. Findings are discussed in the context of prior research on reflective functioning and the importance of targeting reflective functioning in interventions.

Keywords

reflective functioning; parenting sensitivity; infant attachment security; maternal history of childhood maltreatment; demographic risk

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Review of the Literature

Since 2005, a series of studies have examined the relationship between reflective functioning (RF), parenting, and attachment. Findings from this research generally suggest that these three variables are interrelated; however, these studies are limited by the relatively small homogenous samples and have not investigated the impact of demographic or psychosocial risk on these relationships. Although these studies have demonstrated that both demographic (e.g., income and maternal education) and psychosocial (e.g., maternal mental health and trauma exposure) risks impact parenting and attachment, these risk variables are often confounded. Further, very little is known about the relationship between these risks and maternal RF. The present study fills an important gap in the literature by examining the relationships among risks, RF, parenting, and attachment in a socioeconomically diverse sample of women and their infants.

Parental Reflective Functioning, Parent-Child Interactions, and Attachment Security

Parental RF refers to parents capacity to reflect upon their own and their child's mental states (i.e., thoughts, feelings, desires, beliefs, and intentions) and link them to their own and their child's behavior (Fonagy, Gergely, Jurist & Target, 2002; Rosenblum, McDonough, Sameroff, & Muzik, 2008). This capacity allows parents to anticipate and respond in a sensitive and appropriate manner to their child's cues, especially in times of heightened affect, by stepping back from their own affective experience and reflecting on their child's internal experience (Fonagy, Steele, Moran, Steele, & Higgitt, 1991; Slade, Grienberger, Bernbach, Levy & Locker, 2005). Parents who are characterized as having low RF seem unaware of their own or their child's thoughts or feelings and deny emotional experiences associated with parenting. Highly reflective parents, on the other hand, are aware of their own and others' emotions, understand how their mental states impact their own and others' behavior, and understand the complexities of mental states. For example, they realize that their own and others' intentions, feelings and goals are not always clear, can be purposefully hidden, and can change as a function of time or development (see Slade, 2005). Although understudied, several research groups have demonstrated that parents' level of RF is relatively stable over time but can be altered with intervention (Aber, Belsky, Slade & Crnic, 1999; Steele & Steele, 2008; Suchman, DeCoste, Castiglioni, McMahon, Rounsaville & Mayes, 2010; Taubner, Horz, fischer-Kern, Doering, Buchheim & Zimmerman, 2012).

In 1991, Fonagy and colleagues reported that both maternal and paternal RF, measured prenatally with the Adult Attachment Interview, was associated with infant attachment security. RF measured with the Parent Development Interview has also been associated with parenting, maternal representations of the child, and infant attachment security. For example, in a sample of 40 highly educated middle class women, lower maternal RF was associated with disrupted maternal affective communication with her infant, as assessed with the Atypical Maternal Behavior Instrument for Assessment and Classification (AMBIANCE, Lyons-Ruth, Bronfman, & Parsons, 1999), and infant insecure attachment (Grienberger, Kelly & Slade, 2005).

Further, the relationship between maternal RF and infant attachment security was mediated by parenting (Grienberger et al., 2005). In different analyses with this same sample of women, Slade et al. (2005) reported that RF was associated with maternal attachment classification and that the relationship between maternal representation of attachment and infant attachment security was mediated by RF.

Studies of RF in higher risk samples are relatively rare, and most have reported mixed findings with regard to the relationship between RF and parenting. Schechter and colleagues (2008) studied a clinical sample of 41 mothers and their young children to better understand the mechanism by which maternal depression and PTSD impacted parenting. Mothers in this sample had a history of interpersonal violent trauma and were also at high demographic risk. In this sample, RF was not associated with atypical maternal behavior (as measured by the AMBIANCE) or with maternal Post Traumatic Stress Disorder (PTSD); however, RF was linked to maternal representations of her child (Schechter et al., 2005) and maternal responsiveness to intervention (Schechter et al., 2006). The authors hypothesize that RF may not be correlated with maternal behavior in clinical samples with significant psychopathology and call for future research examining the associations between trauma, RF and parenting in women with and without PTSD.

Research teams are also studying maternal RF in samples of women in substance abuse treatment. These groups report a relationship between maternal RF and parenting. For example, in an intervention pilot study with substance abusing mothers ($N=8$), Suchman, DeCoste, Castiglioni, Legow, and Mayes (2008) reported that improvements in RF were associated with improvements in parenting. Unfortunately, this study did not report correlations between RF and measures of maternal mental health. In a larger intervention sample ($N=47$), this group found that, among mothers who completed an attachment-based parenting program, improvements in RF corresponded to improvements in parenting (Suchman et al., 2010). In the same sample, the authors reported that self-focused RF was associated with maternal sensitivity to infant cues and to social-emotional and cognitive growth fostering, as assessed using the Nursing Child Assessment Scales for Teaching (NCAST, Barnard & Bee, 1984). They also reported that RF was not associated with maternal education, but was positively associated with maternal depression (Suchman, DeCoste, Leigh, & Borelli, 2010).

In a Finnish sample of substance abusing pregnant women in residential treatment, Pajulo et al. (2012) reported that higher RF was associated with higher levels of maternal education ($N=28$). In this study, however, RF was not associated with parent-child interaction or maternal psychiatric symptoms.

In summary, this review of prior literature confirms that RF has been studied in various populations including samples of women that are at-risk due to mental illness or substance abuse. However, this work is limited by small samples, and few studies have explicitly tested associations among several risk factors including demographic risks (e.g., education and income), psychosocial risks (e.g., maternal history of maltreatment, depression, and PTSD) and RF. Taking these risks into consideration is important in studies of RF because of their links to parenting and child social-emotional outcomes.

Risk, Parenting, and Attachment

Both maternal demographic and psychosocial risks are associated with parenting and infant attachment. Demographic risk factors such as single parenting and insufficient financial capital are linked to poorer parenting and maladaptive child behavioral outcomes, and these associations are stronger as risk factors accumulate (Appleyard, Egeland, vanDulmen, & Sroufe, 2004; Sameroff, 1998). As the level of contextual risk increases, the likelihood that infants or children will develop a disorganized attachment also increases (Cyr, Euser, Bakermans-Kranenburg, & van IJzendoorn, 2010; van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). Demographic risks such as economic disadvantage are also associated with increased risk for maternal trauma, PTSD and depression (Belle & Doucet, 2003; Chung et al., 2004; Young, Tolman, Witkowski & Kaplan, 2004). These psychosocial risks are further associated with compromised parenting and child social-emotional outcomes (Lyons, Ruth, Easterbrooks, & Bibelli, 1997).

Women's exposure to maltreatment in childhood is a significant psychosocial risk factor linked to later difficulties regulating one's emotions, impaired perspective taking, adult psychopathology, including perinatal depression and PTSD, and compromised parenting (Cicchetti & Valentino, 2006; Heim, Shugart, Craighead, & Nemeroff, 2010; Lyons-Ruth & Block, 1996; Hillyard & Wolfe, 2002; Koren-Karie, Oppenheim, & Getzler-Yosef, 2004; McCauley, Kern, Kolodner, et al., 1997; Rowan & Foy, 1993). Both traumatic stress and depression can interfere with a mother's ability to provide safe and sensitive parenting for her child (Levendosky & Graham-Bermann, 2001) and to be consistently affectively attuned to her child (DiGiuseppe, Raymond, Linscott, Jean & Jiton, 1996).

The Present Study

The present study aims to examine the associations among demographic and psychosocial risks, RF, parenting, and infant attachment in a larger longitudinal sample of women recruited from the community who had childhood maltreatment histories. Two specific aims were evaluated, as follows:

The first aim was to confirm established relationships between RF, parenting, and attachment and to further evaluate whether psychosocial and demographic risks are associated with these variables. We expected that a higher level of parental RF would be related to higher ratings of parenting sensitivity and lower ratings of parenting negativity, as observed during free play and clean up tasks, and to secure infant attachment assessed at 16 months postpartum. We also expected that RF, parenting, and attachment security variables would be intercorrelated. We further anticipated that lower demographic or psychosocial risk status would be associated with higher RF, lower parenting negativity, higher parenting sensitivity, and a higher prevalence of attachment security at 16 months.

The second aim was based on findings from the first aim, and evaluated whether parenting qualities (sensitivity and negativity) were significant mediators of the association between maternal RF and infant attachment security, controlling for the specific types of risk evaluated in aim 1. We hypothesized that a higher level of parental RF would be associated with secure infant attachment via its links with higher parenting sensitivity, and that a lower

level of RF would be associated with insecure infant attachment via its links with higher parenting negativity.

Methods

Study Description

Analyses in the current study were based on data collected for 83 mother-infant dyads who participated in the 16-month visit in a larger longitudinal study, the Maternal Anxiety in the Childbearing Years project (MACY; PI: Maria Muzik), and who had complete data on all study variables relevant to this manuscript. The purpose of the MACY project was to assess the impact of mothers' childhood history of maltreatment on their postpartum mental health, parenting beliefs and behaviors, the parent-child relationship, and their children's socio-emotional and biological outcomes from 4 to 18 months postpartum.

Women were recruited for the MACY study in one of two ways: (1) as a postpartum follow-up to a study on the prenatal effects of PTSD on childbearing, in which mothers were recruited at initiation of prenatal care for their first child at 14-28 weeks gestation from three large metropolitan hospitals in the Midwest (see Seng, Low, Sperlich, Ronis, & Liberzon, 2009, for further details), or (2) from the community within the same area, via recruitment flyers requesting participation from mothers with difficult childhood experiences. Flyers were posted in antenatal and primary care clinics, informal and state-funded resource centers for pregnant and postpartum women (e.g., WIC, Maternal-Infant Health Programs), baby clothing and toy stores, and perinatal community mental health clinics. Women who responded to the flyer via telephone were screened for history of childhood maltreatment using the Childhood Trauma Questionnaire (Bernstein & Fink, 1998). To be eligible for recruitment, participants had to be fluent in English and at least 18 years old at intake. Exclusion criteria included maternal current (past month) use of illegal or non-prescription drugs, maternal history of bipolar or psychotic mental illness, child premature birth (<37 weeks gestation at delivery), child developmental disability, or maternal or child severe physical illness (e.g., epilepsy), as assessed via maternal report at 4 months postpartum. No women in the recruited sample were psychiatrically referred.

Data in the MACY project were collected via telephone at 4 months postpartum, in the home at 7 months postpartum, and in a University play lab at 16 months postpartum. Analyses in the present study focused primarily on data collected at the 7- and 16-month visits. At the 7-month home visit, mothers provided demographic information. At the 16-month laboratory visit, several questionnaires tapping into child, maternal, and familial functioning were completed, and mothers were also administered a shortened version of the Parent Development Interview (PDI-R2-S, Slade, Aber, Bresgi, Berger, & Kaplan, 2004), a semi-structured interview designed to evaluate parents' level of RF. In addition, at the 16-month visit, mother-infant dyads were videotaped during Ainsworth's Strange Situation paradigm (SSP; Ainsworth et al., 1978), and during two interactive contexts varying in level of challenge for the dyad: a mother-infant free play session and a clean-up task, which were later scored for dimensions of positive and negative parenting. Following each visit, mothers received \$50 and children received a small toy to thank them

for their participation. The University Institutional Review Board approved the study, and all recruited women provided written consent for their and their infant's participation.

Sample Retention

A total of 268 women were initially enrolled for the 4-month postpartum phone survey. Of these 268 women, 91 participated in the 16-month laboratory visit and were videotaped in the SSP and the free play and clean up tasks. A total of 83 women had complete PDI, parenting quality, and SSP data at the 16-month visit, and this is the sample on which analyses were based in the current study. The 83 mother-infant dyads with complete data did not differ significantly from the participants in the larger 16-month sample ($n=91$) on demographic or mental health variables (all p 's $> .05$).

Current Study Sample Characteristics

Table 1 provides descriptive statistics for the demographic and mental health characteristics of the current sample ($N=83$). Mothers in this sample were diverse in sociodemographic risk status. On average, they were 30.04 years old at the time of intake into the study (range = 20-45 years). Nearly one-fifth of the sample reported an annual income of less than \$29,000; 50.6% reported incomes between \$50,000 and \$95,000 and 26.6% reported an income of more than \$95,000. Nearly three-quarters (73.4%) of the mothers in the study were Caucasian, 13.9% were African American, and 12.6% were from another racial/ethnic group: Latino (2.5%), Asian, (5.1%), multi-racial (2.5%), or other (2.5%). More than half were college graduates (66.8%), and most (78.3%) were either married or living with the child's birth father.

Measures

Demographics and Demographic Risk—During the 7-month home visit, mothers reported on demographic characteristics, including their age, education, income, race/ethnicity, and marital status, and their infant's sex. Because demographic risk indicators in this sample were significantly intercorrelated (all p 's $< .001$), a 4-point cumulative demographic risk variable (Demographic Risk) was created for analytic purposes, following Appleyard et al., (2004) and Sameroff (1998). This was accomplished by dichotomizing four demographic risk variables and summing them. One point was assigned for each of the following: single parent, young maternal age (less than 21 years), low education (less than a high school diploma or GED), and low annual income (less than \$20,000). Possible scores on this variable ranged from 0 to 4.

Psychosocial Risk Factors: Maltreatment History, Depression and PTSD—A history of childhood maltreatment was assessed using *The Childhood Trauma Questionnaire* (CTQ, Bernstein & Fink, 1998) via telephone interview at 4 months postpartum. This 28-item self-report questionnaire is rated on a 5-point Likert scale ranging from 1 (never true) to 5 (very often true). Scoring yields five items each, including Emotional Abuse (defined as “verbal assaults on a child's five scales with sense of worth or well-being or any humiliating or demeaning behavior directed toward a child by an adult or older”), Physical Abuse (defined as “bodily assaults on a child by an adult or older person that posed a risk of or resulted in injury”), Sexual Abuse (defined as “sexual contact or conduct between a child

younger than 18 years of age and an adult or older person”), Physical Neglect (defined as “the failure of caretakers to provide for a child's basic physical needs, including food, shelter, clothing, safety, and healthcare”) and Emotional Neglect (defined as “the failure of caretakers to meet children's basic emotional and psychological needs, including love, belonging, nurturance, and support”) as well as a three-item Minimization/Denial scale (Bernstein & Fink, 1998). Bernstein and Fink (1998) report good sensitivity and specificity for the CTQ: Using a cut score of 9 on the Emotional Abuse scale produced a sensitivity of 0.89 and a specificity of 0.86; a cut score of 8 on the Physical Abuse scale yielded a sensitivity of 0.88 and a specificity of 0.85; a cut score of 6 on the Sexual Abuse scale yielded a sensitivity of 0.83 and a specificity of 0.83; a cut score of 10 on the Emotional Neglect scale yielded a sensitivity of 0.89 and a specificity of 0.82; and a cut score of 8 on the Physical Neglect scale yielded a sensitivity of 0.79 and a specificity of 0.82 (Bernstein & Fink, 1998). Test-retest reliabilities range from 0.79 to 0.86, and alpha reliability coefficients range from 0.66 to 0.92 (Bernstein & Fink, 1998). Significant correlations were found among the CTQ and four measures of trauma sequelae (Bernstein & Fink, 1998), a structured interview for childhood trauma, and therapist ratings of childhood trauma (Bernstein et al., 2003), supporting the convergent validity of the CTQ.

Mothers' level of depressive symptomatology and depression diagnostic status were assessed at the 16-month visit with the *Postpartum Depression Screening Scale* (PPDS, Beck & Gable, 2002). This 35-item scale contains items that are rated from 1 (strongly disagree) to 5 (strongly agree), yielding a total score ranging from 35-175. A cutoff score greater than 80 reflects clinically significant depression, corresponding to major depressive disorder. The PPDS has a sensitivity of 0.78, specificity of 0.99 and positive predictive value of 0.93 compared with SCID depression diagnosis. Internal consistency coefficient alpha for the PPDS was greater than 0.97 (Beck & Gable, 2002).

Maternal PTSD symptoms and PTSD diagnosis were assessed at the 16-month visit using the National Women's Study PTSD Module (Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993), which is a version of the Diagnostic Interview Schedule (DIS) that was modified for use in the largest epidemiological study of PTSD specific to women that was conducted via the National Crime Victim Center. It was designed as a structured telephone diagnostic interview to be administered by lay interviewers. It was validated in a primarily clinical sample of 528 women during the DSM-IV PTSD Field Trial in comparison with the face-to-face, clinician-administered Structured Clinical Interview for DSM-III-R. The kappa coefficient for agreement between the two instruments was 0.77. The NWS-PTSD module attained a sensitivity of 0.99 and specificity of 0.79 compared with the SCID. The NWS-PTSD measures all 17 symptoms of PTSD for lifetime and current occurrence with follow-up items to assess greater than one-month duration of the syndrome of symptoms and impairment. It yields a dichotomous diagnosis and a continuous symptom count.

Parenting—Mothers' parenting sensitivity and negativity with the toddler were evaluated at the 16-month laboratory visit from videotapes of mother-infant interaction made during two successive contexts varying in level of challenge for the dyad: a 7-minute free play session and a 3-minute clean up task. Dyads were led into a laboratory playroom and shown a large plexiglass bin on the floor containing a standard set of age-appropriate toys. Mothers

were instructed to play with their child “as they normally would at home”, and then (at a signal from the experimenter) to have their child clean up the toys by putting them back into the bin. No other specific instructions were given.

Multiple dimensions of maternal behavior and affect were coded from the videotapes of mother-infant interaction in each interactive context using 5-point Likert scales from the MACY-Infant-Parent Coding System (MIPCS, Earls, Muzik, & Beeghly 2009). The MIPCS was designed for the MACY project and evaluates dimensions of parent, infant, and dyadic behavior relevant to attachment formation in the context of maternal trauma, as guided by attachment theory and related literature (e.g., Ainsworth, Blehar, Waters, & Wall, 1978; Crittenden, 1981; Lyons-Ruth, Zoll, Connell, & Grunebaum, 1986). With a few exceptions, the MIPCS scales were adapted from selected scales from several extant scoring systems (e.g., Clark, 1999; Egeland et al., 1995; Feldman, 1998). Maternal scales evaluated in the present study included Behavioral Sensitivity, Affective Sensitivity, Negativity, and Overcontrolling/Intrusiveness. Scoring was conducted by trained coders who masked to maternal trauma history and other study variables.

In the present study, a *Parenting Sensitivity* composite was computed by averaging the maternal Behavioral Sensitivity and Affective Sensitivity ratings made during the free play and clean up tasks (Cronbach's $\alpha = .95$). *Behavioral Sensitivity* taps into the mother's awareness of, ability to perceive and respond to even the most subtle infant cues. It is manifested in well-timed vocalizations, facial expressions and physical handling responses that reflect empathy with the child's needs and feelings. Mothers low in behavioral sensitivity make no or very little attempts to follow the child's lead, show no or very little awareness of her child's cues, and may be intrusive, withdrawn or emotionally unavailable. Mothers high in behavioral sensitivity almost always respond to their child's cues in a timely and supportive matter. *Affective Sensitivity* reflects the mother's attunement with and empathy for her child's subjective experience and is evidenced by the mother's comments about and sharing of the child's experience. Mothers who are low in affective sensitivity do not reflect or mirror their child's affective experience, whereas mothers high in affective sensitivity consistently exhibit understanding or empathy for her child's internal experience.

A *Parenting Negativity* composite was computed by averaging ratings on the maternal *Negativity* and *Overcontrolling/Intrusiveness* scales during the free play and clean up contexts (Cronbach's $\alpha = .87$). *Maternal Negativity* reflects the degree to which the mother expresses negativity/hostility to the child, or scolds, restricts, or prohibits the child during the play or clean up session through facial expressions of negative affect, negative vocalizations, or behaviors that restrain or discipline the child. These include, but are not limited to, threats (“I'm going to leave you here”); facial expressions of anger, contempt, or disgust; teasing and taunting; derogatory language (“you're stupid”), or verbal restrictions (“give me that”; “take that out of your mouth”). Mothers low on negativity show no or only brief, mild episodes of negativity, whereas mothers high on negativity show marked or persistent indices of negativity. The *Overcontrolling/Intrusiveness* scale assesses the extent to which the mother redirects or overrides the child when the child is already focused on a toy, activity or goal (excluding appropriate limit setting). Examples include the mother's pace being too fast for the child's attentional capacity or level of interest, redirecting the

child's attention away from an ongoing activity to one the mother prefers, manipulating the child's limbs to accomplish something, or overriding/interrupting the child's ongoing actions or vocalizations. .

In order to assess inter-coder reliability, coders independently double-scored a randomly selected subset (22%) of the videotapes. The intra-class correlation coefficients (ICCs) for each scale included in the composite variable were high, indicating very good agreement: *Behavioral Sensitivity* (free play ICC=.95, clean up ICC=.92); *Affective Sensitivity* (free play ICC=.95, clean up ICC=.91); *Negativity* (free play ICC=.96, clean up ICC=.85); and *Overcontrolling/Intrusiveness* (free play ICC=.94, clean up ICC=.91).

Reflective Functioning—Mothers' level of RF was assessed using the Parent Development Interview-Revised Short Form (PDI-R2-S, Slade et al., 2003) at the 16-month lab visit. The PDI-R2-S is a 30-item semi-structured interview that assesses the parent's ability to reflect on her own and her child's thoughts, feelings, beliefs, desires, and intentions. The PDI-R2-S is scored using the adapted version of the RF coding system (Slade et al., 2005) to determine overall levels of RF. The PDI-R2-S consists of permit and demand questions, the demand questions are those that demand a parent attempt to reflect on her own or her child's experience (i.e., when your child is upset, what does he do and how does that make you feel?).

Responses are scored on an 11-point scale (from -1 to 9), with higher scores indicating a higher level of RF. Responses to all demand questions are scored and then the interview as a whole is given a typicality score, which is used in the analyses. Indices of high RF are denoted by four different types of reflective capacity: (1) displaying an awareness of the nature of mental states, (2) explicitly attempting to tease out mental states underlying behavior, (3) recognizing developmental aspects of mental states, and (4) mental states in relation to the interviewer (Fonagy et al., 1998; Slade et al., 2005). More detailed information about the coding system is available in Slade (2005).

Rejection of RF (scores ranging from -1 to 0) are very rare and are characterized by incongruent responses that lack credibility or have inappropriate or bizarre attributions of RF. Low RF scores (1-2) denote the lack of ability to acknowledge and discuss mental states (thoughts, feelings, beliefs, intentions, and desires) in one's self or one's child. A score of 3 represents a parent's ability to acknowledge mental states; however the ability to link mental states to behavior is inconsistent. A score of 5 represents a parent's consistent ability to link mental states and behaviors. Parents at this level are considered average, and are able to understand that their infant's feelings underlie their behavior. Scores of 6 and above are considered high levels of RF, at these levels parents are giving a more complex, in-depth narrative of their own and their child's internal experience.

Two coders scored the PDI protocols. Prior to scoring, coders were trained by Arietta Slade, the author of the measure, to reliability using a gold standard set of transcripts. A total of 118 code-able PDIs were recorded, transcribed verbatim and coded. Over a third (36.9%) of the transcripts was double-coded. Both coders were masked to all other study variables, including risks, mothers' trauma history, dyadic interaction, and infant attachment

classification. Comparisons of the two sets of codes indicated a high degree of single measure inter-rater reliability for the overall PDI score. ($ICC = .76; p = .00$) Any disagreements were conferenced after interrater reliability had been determined. Consensus scores were used in the analyses.

Infant Attachment—Infants' attachment status was evaluated from videotapes of infant behavior during Ainsworth's Strange Situation paradigm (SSP; Ainsworth et al., 1978), which was administered in a laboratory playroom at the 16-month lab visit. The SSP includes eight successive episodes that were designed to exert an increasing level of mild stress on the parent-infant dyad, which is hypothesized to activate the attachment system (e.g., introduction to an unfamiliar room, overtures from an unfamiliar adult, followed by two separations from and reunions with the mother).

Infants' attachment behavior during the SSP was scored from videotapes by two trained, reliable coders masked to maternal maltreatment history and other study variables, including maternal RF and dyadic interactions. Scoring was accomplished using Ainsworth et al.'s (1978) system for evaluating the three traditional attachment classifications: insecure-avoidant (A), secure (B), and insecure-ambivalent (C), and using Main and Solomon's (1986) coding system for assessing disorganized/disoriented (D) attachment.

The two coders were initially trained to reliability in attachment scoring by Sroufe and others at the University of Minnesota. Prior to scoring attachment in the current sample, the two coders also established 95% agreement on the 4-way attachment classification system (ABCD) on a separate data set. To evaluate intercoder reliability in the current study, 19 randomly selected cases (20% of the sample) were independently double-coded. Intercoder reliability was excellent: Exact inter-coder agreement for the final ABCD classifications was 89%, average kappa = .83, $p < .001$. Disagreements were later conferenced.

Analysis Plan

Preliminary univariate analyses were conducted to calculate descriptive statistics for the primary study variables (parental RF, positive and negative parenting, cumulative demographic risk, psychosocial risks, and infant attachment classification) and to evaluate their distributional properties (see Tables 1 and 2).

To evaluate the first study aim, correlations were used to assess associations among parental RF, parenting, infant attachment status (dichotomized as secure/insecure), demographic risk, and psychosocial risks (i.e., severity of child maltreatment, depression symptoms and PTSD symptoms). One-way ANOVAs were then conducted to evaluate the association between the 4-way infant attachment classification variable and the other study variables (i.e., parenting, RF, and maternal demographic and psychosocial risks).

The second aim built on the findings from Aim 1. The goal was to evaluate whether parenting sensitivity was a significant mediator of the association between parental RF and infant attachment status (dichotomized as secure/insecure) after controlling for associated risks from aim 1. We tested the effects of RF on infant attachment via parenting sensitivity using PROCESS (Hayes, 2012), which allows for dichotomous dependent variables.

PROCESS estimates coefficients using maximum likelihood logistic regression and uses asymmetric bootstrap confidence intervals for inference. This is preferred over the Sobel test (Sobel, 1982) and Barron and Kenny's causal steps strategy method (Barron & Kenny, 1986) because it does not assume that the sampling distribution of the indirect effect is normal (Preacher & Hayes, 2008). Further bootstrapping is more appropriate for smaller samples; it is a nonparametric resampling procedure that involves repeatedly sampling from the data set and estimating the indirect effect. PROCESS is a macro that can be used with SPSS and SAS (Hayes, 2013). Mackinnon, Lockwood and Williams (2004) found that bootstrapping also provide more power while reducing Type I error.

Results

Descriptive Statistics

Descriptive statistics for the sample's characteristics and main maternal variables of interest (i.e., demographics, demographic risk, maternal psychosocial risks, parenting sensitivity and negativity, and RF) are presented in Table 1. Descriptive statistics for child characteristics and infant attachment status are presented in Table 2. Findings confirm that this is a unique heterogeneous sample with a range of demographic and psychosocial risks. For example, 38% of the mothers reported that they had experienced severe maltreatment as a child, 69.6% reported experiencing any type of maltreatment as a child, 13.3% met criteria for current Post Traumatic Stress Disorder (PTSD) and 24% met diagnostic criteria for current Major Depression. These percentages are higher than what is reported in the general population for PTSD (8.6% for women, Pietrzak, Goldstein, Southwick, & Grant, 2011) and depression (10%, Ertel, Rich-Edwards & Koenen, 2011). As expected, mothers with a history of childhood maltreatment had significantly more PTSD symptoms ($M = 3.96$) than mothers without maltreatment histories ($M = 1.14$); $t(78) = -3.38, p = .001$. Mothers with maltreatment histories also had significantly more depression symptoms ($M = 67.83$) than mothers without maltreatment histories ($M = 52.27$); $t(78) = -2.92, p < .01$. Women in the current sample also were heterogeneous with respect to sociodemographic characteristics, and on average had scores less than 1 on the Demographic Risk index (72.9% had no demographic risks).

Mothers also varied in level of RF. Maternal RF scores in the sample ranged from 1 to 8 ($M = 4.57$). The distribution of children's attachment classifications was similar to that reported in other middle class samples (see Belsky & Fearon, 2002; Van Ijzendoorn, et al., 1999), with 63.90% of children classified as securely attached and 14.5% classified as disorganized/disoriented.

Associations among RF, Parenting, Attachment, and Risks

Correlations among the primary study variables are presented in Table 3. As hypothesized, RF was significantly associated with higher parenting sensitivity and lower parenting negativity, but only parenting negativity was significantly associated with demographic risk. As expected, parents with more demographic risks demonstrated significantly higher negative parenting.

A few surprising findings with regard to RF also emerged. First, RF was positively correlated with mothers' concurrent depression symptoms, indicating that mothers with a higher level of RF endorsed more depression symptoms. Contrary to our expectations, RF was not significantly associated with mothers' childhood maltreatment experiences or concurrent PTSD symptoms, and parenting and child attachment status were not significantly associated with mothers' history of childhood maltreatment or concurrent depression or PTSD symptoms.

Descriptive statistics and one-way ANOVA results comparing mean differences on parenting, RF, and risks, as broken down by the 4-way infant attachment classification variable, are presented in Table 4. ANOVA results revealed that RF significantly differed across the 4 attachment groups. Post hoc Least Significant Difference (LSD) comparison tests indicated that children classified as secure had mothers with significantly higher RF scores compared to infants classified as avoidant or disorganized.

ANOVA results also indicated that, as hypothesized, parenting was significantly associated with attachment. Post hoc tests revealed that children classified as secure had parents who were significantly more sensitive and less negative than children classified as avoidant. In turn, children classified as disorganized had parents who were significantly less sensitive and significantly more negative than children classified as secure.

Results of Mediation Analyses

Based on the results of the analyses described above, the total, direct, and indirect effects of parental RF on infant attachment security (dichotomized as secure/insecure) through parenting were estimated using the PROCESS procedure for SPSS (Hayes, 2012), with 50,000 bootstrap samples for each parenting domain. PROCESS allows for dichotomous independent variables. Parenting sensitivity and negativity were evaluated in two separate models, as they were highly correlated (see Table 3). Demographic risk was included as a covariate in each model because it is significantly correlated with RF, parenting negativity, and infant attachment.

Our rationale for dichotomizing attachment as secure/insecure, rather than as organized/disorganized, was twofold. First, neither RF or parenting was significantly associated with organized/disorganized status. Second, the relatively large proportion of children classified as secure meant that the secure versus insecure grouping allowed for more evenly sized groups (secure = 53, insecure = 30).

Results of the mediational analyses revealed a significant indirect effect of parental RF on attachment security through parenting sensitivity (point estimate .12, 95% CI = .0117 to .3360) and, in a separate analysis, for parenting negativity (point estimate .16, 95% CI = .03 to .38).

Discussion

The goals of this study were to examine associations between RF and maternal demographic and psychosocial risks, parenting, and infant attachment security in a sample of women with

a childhood history of trauma, and to further test whether parental sensitivity is the mechanism by which RF influences child attachment security. Our results confirm the positive associations between RF, parenting sensitivity, and infant attachment security, even after controlling for demographic risk. These associations had previously been postulated by others (Fonagy et al., 1991; Slade, 2006; Steele & Steele, 2008; Suchman, et al., 2008; Suchman, DeCoste & Mayes, 2009). Our findings are also consistent with prior work showing that parenting sensitivity mediates the relationship between maternal RF and infant attachment security and that parenting negativity mediates the relationship between maternal RF and infant attachment insecurity (Grienberger et al., 2005).

Our work extends prior research in several ways. Most prior work has been conducted with small, low-risk, and relatively homogeneous samples, which may have limited generalizability and power. In contrast, our sample includes a demographically diverse group of women at risk for parenting difficulties based on their history of childhood maltreatment and/or postpartum psychopathology, specifically depression and PTSD (Cicchetti & Valentino, 2006; Hillyard & Wolfe, 2002; Koren-Karie, et al., 2004; Lyons-Ruth & Block, 1996; Moehler, Biringen, & Poutska, 2007), and controls for these risks. Moreover, the risk characteristics in our sample make our findings relevant for clinical application, including the development of parenting prevention and intervention programs.

In addition, our study utilizes a novel analytic strategy for mediational analyses, which is thought to be highly appropriate for small sample sizes (Hayes, 2012). Prior work on RF, parenting, and attachment has had limited ability to examine mediation, given that prior mediational analytic techniques were appropriate only for use with large samples (Preacher & Hayes, 2008).

Consistent with findings in prior studies, higher demographic risk was associated with poorer parenting and insecure infant attachment, including avoidant and disorganized classifications. Cyr and colleagues (2010) report similar findings, and suggest that demographic risk may be associated with a greater likelihood of infants' witnessing their parents' distress and parental helplessness, both of which may in turn activate their fear and attachment systems. Furthermore, high levels of demographic risk may exacerbate parenting stress, including daily hassles, and thereby reduce parents' ability to engage in sensitive interactions with their infants. In turn, these factors may transact and lead to the ultimate adverse consequence for the young child; namely, developing an insecure or disorganized attachment with the parent (Bakermans-Kranenburg, van IJzendoorn, & Kroonenberg, 2004; Cyr et al., 2010; Raikes & Thompson, 2005).

Similar findings for the negative effects of demographic risk on RF are reported by other investigators, as well. Sadler and colleagues (2013) found that mothers' average RF score in non-stressed samples was 6, whereas mothers' average score in poverty samples was 4. In intervention studies with clinically referred samples, average RF scores range from 2.4 to 3.3 (Pajulo, et al., 2012; Sadler et al. 2013; Schechter et al., 2008; Suchman, et al., 2010). These low scores may be due in part to mothers' low level of education and environmental adversity, which, in turn, may heighten mothers' tendency to use language in a more instrumental rather than reflective way (Sadler et al., 2013).

Some investigators suggest that the significant associations between parenting and RF that were originally reported in middle class samples are not as robust when evaluated in higher-risk, clinically referred samples (Pajulo, et al., 2012; Sadler et al., 2013; Schechter et al., 2008). Samples in the latter studies, however, all used small samples, and mothers in those studies had a narrow range of maternal RF scores, which may limit their ability to detect significant associations. In our study, mothers' RF scores were highly variable, ranging from 1 to 8, and those with a higher level of demographic risk, including a low level of education, had significantly lower RF scores.

It is notable that more than one-third of the women in this sample reported experiencing severe child maltreatment. Not surprisingly, this history was significantly associated with mothers' current PTSD and depression symptoms. Surprisingly, however, it was not associated with RF, parenting, or infant attachment security. Similarly, nearly one-quarter of the sample met criteria for depression, but depression was not associated with parenting or attachment security.

With regard to RF, these findings are not totally unexpected and are consistent with those reported by Schechter et al. (2005) and Pajulo et al., (2012). However, the relatively high rate of attachment security in our trauma sample and the lack of significant association between these psychosocial risks and parenting or attachment were unexpected. These findings may be partially explained by the unique nature of this non-psychiatrically referred sample of women whose childhood experiences and current mental health were not confounded with a higher level of demographic risk.

These findings are exciting and need to be examined further. They may suggest that, outside of the context of demographic risks, a history of childhood maltreatment and mental health concerns may not be strongly associated with parenting and child outcomes. Studies that investigate the intergenerational cycle of maltreatment have found that maltreatment is a toxic stressor that has a lasting impact on health and behavior that can impact future generations (Shonkoff & Garner, 2012). However, families who break the cycle have fewer financial problems, fewer stressful life events, decreased depression, and more social support (Dixon, Browne, Hamilton-Giachritsis, 2009; Jaffee, Bowes, Ouellett-Morin, Fisher, Moffitt, Merrick & Arseneault, 2013). Similarly, among mothers with psychiatric symptoms, those that have more financial and social resources (e.g., an intimate partner) may receive more emotional and functional support that allows them to engage in positive parenting with their children, which in turn, promotes children's attachment security. More research is needed to understand malleable factors that protect against these psychosocial risks.

Moreover, this study contributes to the discussion on the appropriate intervention targets for parent-child psychotherapies in at-risk as opposed to low-risk samples. More recently, findings in prior work called into question whether interventions designed to enhance maternal sensitivity and infant attachment among at-risk samples should focus on improving maternal RF or focus more directly on promoting sensitive parenting behaviors, and have called for more research on the relationship between RF and parenting in clinically referred, sociodemographically-strained samples (Suchman et al., 2010). Our findings support the theoretical and empirical work of others, which suggests that RF underlies a parent's ability

to provide sensitive care, and parenting sensitivity is the mechanism by which RF is associated with attachment (Grienberger et al., 2005; Slade, 2005; Suchman et al, 2010).

Our findings provide support for interventions focusing on RF as a way to improve parent sensitivity and infant attachment.

In contrast to Suchman's study of clinically-treatment seeking women, our study is unique in that its sample includes community, non-treatment-seeking women from a range of socioeconomic backgrounds, yet with enhanced risk status due to a recruitment strategy that oversampled for childhood maltreatment and risk for postpartum psychopathology. Although the level of demographic risk in our sample was associated with RF, parenting negativity, and maternal depression, the associations among parental RF, parenting sensitivity, and infant attachment security remained significant in the mediational analyses even after controlling for demographic risk. Further research on the interplay between demographic risk and RF in shaping parenting and child outcomes is warranted.

Our study has both strengths and limitations. Our recruitment strategy of over-selecting for childhood maltreatment histories and postpartum psychopathology is a strength in that it enhances our ability to detect at-risk parenting, but it also limits generalizability to more normative samples. Another limitation is that our study used a single factor for RF. Suchman and colleagues (2010) provided support for a two-factor model of RF, self-focused reflection and child-focused reflection. Their two-factor model should be replicated and examined further with regard to specific predictors of both types of reflection as well as parenting and child outcomes associated with each RF type.

Despite these limitations, our study adds to the existing literature on RF by investigating different types of risks and their associations with RF, parenting, and infant attachment in a unique sample of mothers. The extant research on parental RF is relatively new, and findings to date are based on only a few different samples of women. There is much psychometric and theoretical work still to be done with regard to parental RF. For instance, although our study utilized multiple methods, including maternal report, semi-structured interviews, and behavioral observations, it did not examine other maternal or infant characteristics that may influence maternal RF or parenting. Little is known about which maternal factors, other than adult attachment representations, are associated with RF. Future research should also examine more closely the role that maternal language skills, IQ, and educational attainments may play in RF and how it is coded, and the ways in which these factors may impact associations among RF, parenting, and infant attachment. Additionally, how RF is altered by infant characteristics such as difficult temperament or medical frailty also has not been studied. Furthermore, there is much work to be done, outside of intervention studies, on the stability of RF during the transition to parenthood and across early childhood, and virtually nothing has been published on fathers' reflective capacity and its effect on parenting and infant attachment. Finally, although this study was the first to examine RF in the context of demographic and psychosocial risks, its findings need to be replicated.

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Table 1

Descriptive Statistics for Maternal Study Variables

	%	<i>M</i>	<i>SD</i>
Age		30.04	5.56
Marital Status			
Single, never married	16.90		
Divorced	1.20		
Living with Birth Father	2.40		
Married	75.90		
Income	17.70		
\$0-\$24,999			
\$25,000-\$49,999	24.00		
\$50,000-\$74,999	10.80		
\$75,000-\$99,999	18.00		
\$100,000+	25.30		
Education			
Less than High School	1.30		
High School or GED	7.60		
Some College/AA or Voc	21.60		
Bachelors Degree	38.60		
Masters Degree	19.30		
Doctoral Degree	8.90		
Race/Ethnicity			
Caucasian	73.40		
African American	13.90		
Latino/Asian/Bi-Racial/Other	12.60		
Demographic Risk		0.43	0.84
Any Child Maltreatment	69.60		
Severe Child Maltreatment	38.00		
Total Child Traumatic Experiences		43.72	16.43
Depression			
Symptom Count		62.89	21.77
Diagnosis (yes)	24.00		
Post Traumatic Stress			
Symptom count		3.08	3.60
Diagnosis (yes)	13.30		
Parenting Sensitivity		3.67	0.64
Parenting Negativity		1.64	0.53
Reflective Functioning		4.57	1.47

Table 2

Descriptive Statistics for Child Study Variables

	%
Sex (male)	59.20
Race/Ethnicity	
Caucasian	63.90
African American	13.30
Latino/Asian/Bi-Racial/Other	18.90
Attachment	
Secure	63.90
Insecure	36.10

Table 3

Correlations among Study Variables

	1	2	3	4	5	6	7
1. Attachment (Secure vs. Insecure)							
2. Parenting Sensitivity	.36**						
3. Parenting Negativity	-.43*	-.80**					
4. Maternal Reflective Functioning	.30**	.28*	-.35**				
5. Demographic Risk	-.25*	-.17	.26*	-.24*			
6. Childhood Maltreatment Experiences	-.07	-.07	.06	-.05	.18		
7. Maternal Depression Symptoms	.03	.09	-.06	.29*	.11	.22*	
8. Maternal PTSD Symptoms	.07	.002	.05	.03	.08	.31**	.66**

Note. PTSD= Post Traumatic Stress Disorder

*
p < .05;

**
p < .01

Table 4
Descriptive Statistics and ANOVA Results for Parenting, Reflective Functioning, and Risks by Attachment Classification

	Secure (<i>n</i> = 53)		Avoidant (<i>n</i> = 11)		Ambivalent (<i>n</i> = 7)		Disorganized (<i>n</i> = 12)		<i>F</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Parenting Sensitivity	3.83 ^{a,d}	.62	3.43 ^b	.38	3.62	.42	3.15 ^b	.72	5.07	.003
Parenting Negativity	1.46 ^{a,d}	.45	1.86 ^b	.41	1.85	.36	2.09 ^b	.76	6.25	.001
Maternal Reflective Functioning	4.81 ^{a,d}	1.42	3.83 ^b	1.27	4.86	1.86	3.83 ^b	1.12	3.66	.016
Demographic Risk	.29 ^{a,d}	.63	1.09 ^{b,c}	.94	0 ^{a,d}	0	.77 ^{b,c}	1.36	3.94	.011
Childhood Maltreatment Experiences	43.89 ^a	17.24	51.75 ^b	19.45	38.00	9.67	42.84	15.87	1.80	.154
Depression Symptoms	64.15	23.55	63.75	18.16	61.40	21.35	59.50	22.67	0.03	.994
PTSD Symptoms	3.63	4.14	2.75	.94	2.60	2.41	3.25	1.36	6.04	.714

Note. PTSD= Post Traumatic Stress Disorder

- ^a significantly different from avoidant
- ^b significantly different from secure
- ^c significantly different from ambivalent
- ^d significantly different from disorganized