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Examining antecedents of infant attachment security with mothers and fathers: An ecological systems perspective[☆]

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Abstract

Taking an ecological systems perspective, early parent–child relationships can be affected by interactions between systems where some are more proximally linked to the child than others. Socioeconomic status, a distal factor, is associated with social functioning during childhood, but research on its association with functioning during infancy, particularly attachment, is scant and inconsistent. Moreover, it is not clear how distal factors affect infant functioning. Other systems such as marital adjustment and parenting may moderate or mediate relations between distal factors and infant attachment. The current longitudinal study ($n = 135$) examined the role of various systems – parental resources, marital functioning, parental sensitivity and involvement – in early infancy (3-, 5-, 7-months) on infant–mother (12-months) and infant–father (14-months) attachment security. Findings supported moderating processes but in different ways for infant–mother versus infant–father dyads. Implications for future studies and interventions are discussed.

Keywords

Attachment; Infancy; Ecological systems; Fathers; Marital satisfaction; Parental sensitivity; Parental involvement

1. Introduction

Attachment is considered one of the most important goals in the socio-emotional development of children (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969/1982; Sroufe, 1985). This emotional tie that a child has to a specific caregiver forms through his or her early patterns of social interactions during the first year of life (Ainsworth et al., 1978; Bowlby, 1969/1982; Grossman, Grossman, & Kindler, 2005; Sroufe, 1985). Indeed, many studies of the infant–parent attachment relationship have examined the parent–child microsystem, and have found that aspects of parenting, such as parental sensitivity, relate to infant attachment security (e.g., Brown, McBride, Shin, & Bost, 2007). An ecological

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systems perspective (Bronfenbrenner, 2005), however, would also argue that early parent–child relationships can be affected by interactions between many systems where some are more proximally linked to the child than others. For example, socioeconomic status (SES) is generally considered a more distal factor but has been found to relate to parenting quality and children’s social behavior (Dodge, Pettit, & Bates, 1994). Other systems, such as the spousal relationship, may impact the parent–child system in either more distal or proximal ways. For example, marital satisfaction can affect the child through parenting, such that parents who are unhappy in their marriage may withdraw emotionally and/or physically from their child, leading to a more negative parent–child relationship (e.g., Cummings, Davies, & Campbell, 2000). Alternatively, the marital relationship can affect children more directly if they are exposed to hostile conflict, which negatively impacts children’s felt security (Cummings & Davies, 2010). Thus, both proximal and distal factors are important to consider in the developing parent–child attachment relationship.

The study of more distal factors, such as socio-demographic characteristics and their impact on socio-emotional functioning during infancy, however, is scant and inconsistent (Bradley & Corwyn, 2002). Studies to date also have not addressed simultaneously how multiple potential systems of influence, such as socio-demographic factors, the marital relationship, and parent–infant interaction variables, are associated with infant–mother and infant–father attachment security. Thus, the current study aimed to examine how these different distal and proximal systems experienced in early infancy predict later infant attachment security with mothers and fathers. More specifically, we examined direct, mediating, and moderating processes.

1.1. Parent–infant interaction: proximal factors

1.1.1. Sensitivity—*Parental sensitivity* is a factor that is important to the developing infant (Zeifman, 2003), and is defined as the parent’s awareness of the infant’s state and the ability to make appropriate adjustments to this state (Ainsworth, Bell, & Stayton, 1974; Braungart-Rieker, Garwood, Powers, & Wang, 2001). Research has consistently shown that the degree to which mothers are sensitive toward their infants can influence the extent to which an infant develops a secure attachment relationship with his/her mother (Ainsworth et al., 1978; see De Wolff & Van IJzendoorn, 1997, for a meta-analysis; Nievar & Becker, 2008). Despite consistent results between sensitivity and attachment security, however, the magnitude of the relationship is rather moderate (e.g., $d = .24$; De Wolff & Van IJzendoorn, 1997), suggesting that additional factors may be at play when examining the development of attachment security.

Moreover, studies have established an association between paternal sensitivity and infant–father attachment security (see Lucassen et al., 2011, for a meta-analysis), though the magnitude is even more modest than it is for the infant–mother attachment relationship ($d = .13$; Van IJzendoorn & De Wolff, 1997). Parent sensitivity would thus be considered a proximal factor that can influence attachment given that the infant is directly embedded in the parent–child microsystem. Results also suggest, however, that we need to consider additional factors in the prediction of attachment, perhaps particularly so for the infant–father relationship.

1.1.2. Involvement—Similar to sensitivity, parental involvement would be considered a proximal factor because it is an index of the frequency or variety of interaction experiences parents directly provide to infants. Direct involvement can come in the form of *care*, which refers to activities such as feeding or changing diapers, or in the form of *play/interaction*, which refers to activities such as talking with the infant or showing him/her how to manipulate a new toy (Lamb, Pleck, Chamov, & LeVine, 1987). Thus, the frequency of parent–child interactions allows for the potential opportunity for both the formation and the maintenance of the parent–infant attachment relationship (Friedman & Boyle, 2008).

When comparing mothers and fathers, research indicates that mothers typically spend more time with their children (Marsiglio, Amato, Day, & Lamb, 2000; Parke, 2000), though fathers are increasingly becoming more involved (Pleck, 2010). Fathers have also been found to increase their involvement as their children get older (Gaertner, Spinrad, Eisenberg, & Greving, 2007; Lamb, 2004). Because mothers are often considered the primary caregivers, the associations between the amount of parental involvement and child outcomes have been studied within the context of the father–infant relationship and not as often in the infant–mother relationship. That is, it is often assumed that mothers are more actively involved in their children’s lives, with more variability in fathers’ involvement.

In addition, other than studies focusing on how infant participation in nonmaternal care (e.g., daycare) impacts the infant–mother attachment relationship, little research has examined how maternal involvement either directly impacts attachment or moderates other factors in its effect on infant attachment security. Results from these studies have been mixed; with some earlier findings indicating that nonmaternal care is associated with insecurity (e.g., Belsky & Rovine, 1988), but more recent findings indicating no direct association (e.g., Friedman & Boyle, 2008; NICHD ECCRN, 1997; Vermeer & Bakersmans-Kranenburg, 2008). Moreover, studies that have examined the amount of time mothers are available, rather than using nonmaternal care as a proxy for the inverse of involvement, have generally not found relations with infant–mother attachment (Booth, Clarke-Stewart, Vandell, McCartney, & Owen, 2002; Friedman & Boyle, 2008; Huston & Rosenkrantz Aronson, 2005). It is important to note, however, that measures of maternal involvement have not examined how mothers’ time was spent with infants (e.g., caregiving, interacting in play). Thus, research that assesses maternal involvement beyond the amount of time available to infants is needed to clarify its impact on infant–mother attachment.

Research examining the direct association between paternal involvement and father–infant attachment also has yielded mixed results. For example, some have found that fathers who were more involved were more likely to have secure parent–infant attachment relationships (Caldera, 2004; Cox, Owen, Henderson, & Margand, 1992). However, Brown et al. (2007) found an association between paternal involvement and father–infant attachment security, only when taking other factors into consideration (e.g., parental quality). These results suggest that there may be additional factors that aid in explaining the relationship between fathers’ involvement and infant–father attachment.

1.2. The marital relationship

In family research, it is important to examine both mothers and fathers because they can react differently to marital issues (Karney & Bradbury, 1995), which, in turn, may differentially affect their individual relationships with their children (Cummings et al., 2000). Research on marital adjustment has found that mothers and fathers react differently from each other when marital satisfaction is low and more similarly when marital satisfaction is high. For example, high marital satisfaction is related to high-quality parenting and is associated with greater similarities between mother–child and father–child interactions (Barnett, Deng, Mills-Koonce, Willoughby, & Cox, 2008). Conversely, low marital satisfaction is related to fathers', but not mothers' withdrawal from their marital relationships and children (Cummings et al., 2000; Howes & Markman, 1989).

There are several reasons that could explain why mothers and fathers react differently to marital distress. Mothers may be better at differentiating between various roles (i.e. parent vs. spouse), indicating that mothers' negative marital relationships may not carry-over and impact their parent–child relationships (Cummings et al., 2000). Mothers may also use compensatory mechanisms whereby problems in the marriage actually promote more sensitive parenting, perhaps to protect children from stress (Belsky, Youngblade, Rovine, & Volling, 1991). Fathers, on the other hand, may be more susceptible to spill-over effects, suggesting that fathers whose marital relationships are struggling may have more difficulty in their parenting role (Cummings, Goeke-Morey, & Raymond, 2004; Lundy, 2002). In addition, studies have found that fathers who are more satisfied in their marriages are more likely to interact positively with their infants (Coiro & Emery, 1998) and are more invested in their children (Corwyn & Bradley, 1999). Thus, harmony between wives and husbands is a key predictor of the father–child relationship (Lewis & Lamb, 2004). However, the impact of the marital relationship on either mother– or father–child relationships may also depend on other family characteristics.

1.3. Parental resources: distal factors

In addition to more proximal systems, parents and children are also embedded in a larger set of systems that are more distal in their influence on child development. One broad set of more distally relevant factors would include demographic factors such as parent age, education, and occupation, and family income. We refer to these factors as *parental resources*. The term *resource* refers to the human, social, or material capital utilized in adaptive processes (Masten & Reed, 2002). In other words, these various factors (age, education, occupation, and family income) are thought to be resources that are available to the parent that may contribute to how they approach parenting their infant. Parents who are older (and perhaps more mature), more educated, work in more intellectually stimulating jobs, and earn higher incomes will have more resources available to them, which may be particularly important at a time when parents are adapting to the challenges associated with raising an infant.

Parent age (Eshbaugh & Luze, 2007; NICHD ECCRN, 2000), parent education (Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004; Trentacosta et al., 2008), parent occupation (Bornstein, Hahn, Suwalsky, & Hayes, 2003; Gottfried, Gottfried, Bathurst, Guerin, &

Parramore, 2003), and family income (Bradley & Corwyn, 2002) have each been found to relate to parenting and child outcomes. For example, higher education was related to more paternal warmth but less involvement in caregiving. Older parents have been found to be more involved (Cooney, Pederson, Indelicato, & Palkovitz, 1993) and more sensitive than younger parents (e.g., Bornstein, Putnick, Suwalksky, & Gini, 2006).

It is also important to note, however, that various demographic variables tend to be correlated with each other. For example, very young parents tend to be less educated and earn lower incomes than older parents. Those who hold professional degrees tend to earn higher income than those who have less education. One study that examined family income, parental education, and parental age simultaneously found that fathers who earned higher incomes and were more educated had more positive perceptions of their paternal role than fathers with lower incomes and less education (Bronte-Tinkew, Carrano, & Guzman, 2006). Unfortunately, there has been little consensus about which demographic variables are most important or how best to combine them (Bradley & Corwyn, 2002; Krieger, Williams, & Moss, 1997). Most researchers agree, however, that a combination of factors better reflects socio-economic status than does each component individually (Bradley & Corwyn, 2002). For example, even though studies indicate significant associations between SES and children's cognitive, language, and health development, the number of studies examining SES and children's socio-emotional functioning are fewer and often yield inconsistent results across studies (Bradley & Corwyn, 2002), particularly during infancy. Thus, there is need for further examination of how SES and related demographic factors impact infants' well-being. In our study, we examine distal factors such as maternal and paternal age, education, occupation, and family income as a composite factor, reflecting the level of resources available to parents.

1.4. The present study

Using an ecological systems perspective (Bronfenbrenner, 2005), the current study aimed to examine how proximal factors in the infant–parent and spousal microsystems (e.g., sensitivity, involvement, and the quality of the marital relationship), more distal factors in the child's exosystem (e.g., parent age, education, occupation, and family income), and the interaction among the various factors predict infant–mother and infant–father attachment security. Using hierarchical logistic regression modeling, the present study aims to test how these various factors predict infant–parent attachment security: (1) in *direct* ways as evidenced by significant main effects, (2) as *mediating* processes, which are observed when the effects of earlier entered significant factors become nonsignificant once additional factors are included, and (3) as *moderating* mechanisms in which interactions among the various factors are significant.

Based on previous research, we expected that parent sensitivity would directly affect attachment such that infants whose mothers and fathers are more sensitive would be more likely to develop a secure rather than an insecure attachment relationship with them (De Wolff & Van IJzendoorn, 1997; Lucassen et al., 2011). We also expected, however, that mediating processes might be at play in which parental sensitivity mediates relations between parental resources and infant–parent attachment security. Finally, we explored

moderating mechanisms in which the effects of one factor on attachment depend on other factors. For example, it is possible that the effect of paternal involvement on infant–father attachment security depends on levels of sensitivity (Brown et al., 2007) or marital adjustment. The amount of parental resources might also moderate linkages between more proximal factors with attachment such that the effects of parental sensitivity or marital adjustment on infant–parent attachment are stronger when resources are more limited. Our hypotheses regarding mediating and moderating pathways are rather exploratory, given the dearth of attachment research testing such mechanisms.

2. Method

2.1. Participants

The total sample consisted of 135 (52.6% female infants) and their parents who were recruited from the local community for a larger longitudinal study. Several methods of recruitment were used: a child birth educator announced the study to her classes, flyers were sent home to new mothers from the hospital, business cards were distributed to various local community locations, and an informational booth was set up at several local community events.

The family's first visit occurred when the infant was 3-months old; the remaining visits took place when the infants were 5-, 7-, 12-, 14-, and 20-months of age (+/- 14 days). The present study involved data from the first 5 waves. The majority of parents were European American (mothers: 90.4%; fathers: 87.4%), and were predominately middle class: 15.2% of the families had annual incomes below \$29,999, 67.1% earned \$30,000–\$74,999, and 17.7% reported an annual income of \$75,000 or more. The age of parents varied widely (range = 19–44 years; mothers: $M = 29.3$, $SD = 5.32$; fathers: $M = 30.79$, $SD = 5.62$). Parents' education also varied: 2.9% of mothers and 5.2% of fathers attended but did not complete high school, 8.1% of mothers and 13.4% of fathers completed high school, 3% of mothers and 14.9% of fathers reported completing trade school or having some trade school, 58.6% of mothers and 46.2% of fathers reported either having some college or completed college, and 27.4% of mothers and 29.1% of fathers reported having some postgraduate training or completed postgraduate training. The majority of parents reported being either married (84.4%) or unmarried and living together (11.9%). Overall, the sample is a relatively low-risk community sample.

Of the total sample that completed the first visit at 3-months ($n = 135$ families), 124 families completed the 12-month visit (mother–infant visit) and 117 families completed the 14-month visit (father–infant visit). This yielded a low (13.33%) attrition rate from 3-months to 14-months. Statistical comparisons between the portion of the sample with complete data from 3- to 14-months ($n = 117$) and the entire sample ($n = 135$) along different demographic variables (e.g., parent age, cohabitation status, education, ethnicity, and income) revealed four significant demographic differences. Families in the present sample were slightly older (mothers: $t(133) = 3.31$, $p < .001$; $M = 29.91$, $SD = 5.05$ vs. $M = 25.61$, $SD = 5.62$, Cohen's $d = .80$), had higher education levels (mothers: Levine's test: $F = 13.307$, $p < .001$; $t(19.25) = 4.21$, $p < .01$; $M = 6.90$, $SD = 1.59$ vs. $M = 5.06$, $SD = 2.46$, Cohen's $d = .89$; fathers: $t(132) = 2.36$, $p < .05$; $M = 6.50$, $SD = 2.08$ vs. $M = 5.22$, $SD = 2.53$, Cohen's $d = .55$), were

more likely to be European American (fathers: $\chi^2(1) = 4.35, p < .05, \phi = .18$: 89.74% vs. 72.22%), and had slightly higher incomes ($t(129) = 2.80, p < .01; M = 4.42, SD = 1.90$ vs. $M = 3.06, SD = 1.98$, Cohen's $d = .70$) than those who did not complete the study. Thus, findings from this longitudinal study pertain to a population that is slightly older, more educated, with fewer minorities, and with slightly higher incomes than the original sample. All of the data that were available were included in the remaining analyses.

2.2. Procedures

2.2.1. 3-, 5-, 7-months—One week before each scheduled laboratory visit, parents received a packet of questionnaires in the mail, which included measures of marital satisfaction and parental involvement; they returned the completed packets at each visit. All laboratory visits were video-recorded using two separate video cameras onto a split screen generator. After signing consent forms, parents were randomly assigned to participate first or second with their infants in the Still-Face Paradigm (SFP; Tronick, Als, Adamson, Wise, & Brazelton, 1978), which is a laboratory procedure involving three episodes (90-s each). In the SFP, the infant is seated in an infant seat; the parent first interact with his/her infant (Episode 1), then pose a non-interactive still-face and refrain from talking or touching the infant (Episode 2), and then resume interacting with his/her infant (playing or soothing the infant if his/her became upset during the previous episode; Episode 3). Each lab visit lasted approximately 1 h.

2.2.2. 12- and 14-months—Infants participated in the Strange Situation (Ainsworth et al., 1978) with their mothers (12-months) and fathers (14-months). Previous research has indicated no order effects with at least a 4-week separation between assessments (Belsky, Rovine, & Taylor, 1984). Therefore, the order of the parents was not counterbalanced.

2.3. Measures

2.3.1. Parental resources—To measure parental resources, parents' age, education level, occupation, and family income were assessed at the first visit when infants were 3-months of age. Parents reported their age in years and their highest level of education completed by selecting from 9 different options ranging from 1 (*less than 9th grade*) to 9 (*completed graduate/professional degree*). Parents jointly reported their family income by selecting from ranges of income ranging from 1 (*less than \$15,000*) to 11 (*\$150,000 or more*). Lastly, parents reported their occupation, which was then coded using the *Socioeconomic Status Index of Occupations* (SEI; Entwisle & Astone, 1994; Nakao & Treas, 1992). Scores can range from 0 to 100. In the current study, the highest score for both mothers and fathers was 97.16 (e.g., physician). For mothers, the average score was 58.15 (SD = 16.85) and the lowest score was 32.38 (e.g., waitress). For fathers, the average score was 56.35 (SD = 19.90) and the lowest score was 26.69 (e.g., roofer). The average of both parents' occupations ($n_{\text{Mothers}} = 75; n_{\text{Fathers}} = 131$) was used to compute mean occupation scores. Only one parent's occupation score was used, however, when mothers ($n = 58$) were not employed or fathers ($n = 4$) were not employed ($n = 133; M = 57.16, SD = 18.07$). These six variables (maternal age, paternal age, maternal education, paternal education, average occupation, and family income) were included in an exploratory factor analysis. An exploratory factor analysis was chosen over a principal component analysis, because we

were interested in the common factor model rather than just variable reduction (Fabrigar, Wegener, MacCallum, & Strahan, 1999). The results revealed a 1-factor solution with an eigenvalue of 3.31 and factor loadings ranging from .65 to .80. An examination of the factor score frequencies revealed a normal distribution ($n = 128$, skewness = $-.39$, kurtosis = $-.24$). High factor scores reflected greater resources. The individual factor scores for each family were used in subsequent analyses. Seven families, from the original 135 families, did not have complete demographic data (e.g., 1 did not report father education, 2 did not report mother and father occupation and 4 did not report family income).

2.3.2. Marital satisfaction—Parents completed the *Short Marital Adjustment Test* (SMAT; Locke & Wallace, 1959), one of the most commonly used measures of global marital satisfaction, when infants were 3-, 5-, and 7-months old. The SMAT consists of 15 items in which response choices range from a 7-point scale (1: *very unhappy* to 7: *perfectly happy*) down to forced choice (*yes/no*). Both the mother and father completed the questionnaire individually and sealed them in separate envelopes. Following the standard scoring procedures, a total adjustment score was computed (one for mother and one for father) by summing the responses on the 15 items. Scores can range from 1 to 158 (Locke & Wallace, 1959). In the present study, Cronbach α scores ranged from .82 to .87. Two mothers and two fathers did not complete the SMAT at any time-point.

2.3.3. Parental involvement—Parents completed a self-report questionnaire of parental involvement (Planalp, Braungart-Rieker, Lickenbrock, & Zentall, 2013) that was created for the larger longitudinal study, which measures the amount of time parents were available, playing with, or caring for the infant within a 24 h period. Mothers and fathers separately chose a typical day, and checked off different child care (e.g., soothing, bathing) or play/interaction (e.g., tickling, teaching about a new object) events that they engaged in with their infants. Because not all events occurred for each parent, internal consistencies could not be calculated (Planalp et al., 2013; Stone, Kessler, & Haythornthwaite, 1991). Two scores were created for each parent by averaging the number of events parents checked related to caring or playing with their infants, which were subsequently averaged to create a parental involvement composite variable for each parent at each age. Thus, a high score indicates that parents engaged in a greater number of caretaking and playing activities with their infant. Two mothers and two fathers did not complete the checklist at any time-point.

2.3.4. Parental sensitivity—Parental sensitivity was assessed by rating two sets of behaviors for each parent during the SFP: sensitivity and intrusiveness, both on 5-point scales every 10-s. Coders rated parents only during the play sequences between the parent and infant and did not code the still-face episode because parents were instructed to refrain from interacting with their infant. *Parental sensitivity* was defined as the parent's awareness of the infant's state and the ability to make appropriate adjustments to this state (Braungart-Rieker et al., 2001). High levels of sensitivity, for example, is indicated when a mother follows her infant's gaze or correctly reads her infant's signals, whereas low parental sensitivity is observed when the parent forces his/her own agenda on the infant (e.g., interrupting the infant's signal according to his/her own wishes/moods, failure to respond contingently to the infant's signal). The scale was as follows: 5 (*high sensitivity*; display

could not be improved), 4 (*mostly sensitive*; consistently sensitive but improvement is possible), 3 (*some sensitivity*; mixture of sensitivity/insensitivity), 2 (*low sensitivity*; very few sensitive behaviors), 1 (*no sensitivity*).

Coders then assessed the degree to which the parent showed intrusive behaviors. *Parental intrusiveness* is defined as aggressiveness evidenced by intruding or advancing oneself onto the infant (Early et al., 2002). Intrusiveness was determined by the infant's response to the interaction, and examples included: the parent over-stimulates or overwhelms the infant, misses the infant's "slow-down" or "back-off" signals, is too rough based on the infant's affect. Parental intrusiveness was also coded on a 5-point Likert type scale: 5 (*no intrusiveness*), 4 (*ambiguous intrusiveness*; ambiguous behavior that has potentially intrusive acts), 3 (*some intrusiveness*; one to two brief/mild examples of intrusiveness), 2 (*mostly intrusive*; extended or intense examples of intrusiveness but not for the entire episode length), 1 (*extremely intrusive*).

Coders were trained to rate sensitivity and intrusiveness until they achieved sufficient reliability (intraclass correlations (ICCs) $\geq .80$), and to avoid bias were not allowed to code both parents of the same infant in one age-group. Gold standard coders ($n = 4$) recoded a random subset of tapes (25%) to check reliability. ICCs ranged from .88 to .96 ($M = .94$) for maternal sensitivity, .90–.96 ($M = .92$) for paternal sensitivity, .88–.96 ($M = .93$) for maternal intrusiveness, and .85–.96 ($M = .92$) for paternal intrusiveness. The sensitivity and intrusiveness ratings were averaged across intervals to create mean scores for sensitivity and intrusiveness. Because sensitivity and intrusiveness scores were highly correlated across all waves (range = .70–.80), a composite variable was created for each parent by averaging the sensitivity and intrusiveness variables together. High scores indicate high sensitivity/low intrusiveness. One father did not participate in the SFP with his infant at any of the time-points.

2.3.5. Data reduction—To reduce the number of variables, we created composite scores for both mothers' and fathers' marital satisfaction, parental involvement, and parental sensitivity by averaging scores across 3-, 5-, and 7-months. All pairs of scores were significantly correlated across the three waves for marital satisfaction (mean $r = .72$, range = .61–.78) and parental involvement (mean $r = .39$, $r_s = .33$ –.51). All but one pair of scores were significantly correlated across waves for parental sensitivity (mean $r = .23$, $r_s = .09$ –.30). Thus, there was empirical support for creating composites that reflect mothers' and fathers' marital satisfaction, parental involvement, and parental sensitivity during early infancy.

2.3.6. Infant attachment security—On the basis of their interactive behavior during the Strange Situation, infants were classified into one of four major groups: insecure-avoidant (A), secure (B), insecure-resistant (C), and disorganized (D)/secondary ABC categorization (see Ainsworth et al., 1978; Main & Cassidy, 1988 for scoring procedures). Infants received one attachment security classification with their mothers as well as one with their fathers. Two coders from the University of Minnesota, headed by Dr. Elizabeth Carlson, coded a subset of the total assessments (mothers: 16% and fathers: 17%) to assess inter-rater reliability (mothers: 90% agreement with $\kappa = .84$; fathers: 80% agreement with $\kappa = .71$).

Sample sizes for each group were as follows: avoidant (A: $n_{\text{Mother}} = 5$, $n_{\text{Father}} = 8$), secure (B: $n_{\text{Mother}} = 90$, $n_{\text{Father}} = 81$), resistant (C: $n_{\text{Mother}} = 10$, $n_{\text{Father}} = 7$), and disorganized (D: $n_{\text{Mother}} = 19$, $n_{\text{Father}} = 21$). In order to preserve power, we retained two attachment categories for subsequent analyses: insecure infants (A, C) versus secure infants (B). Furthermore, this allows us to specifically examine the development of attachment security per se, rather than attachment patterns. This method of examination is similar to previous studies that also aimed to examine attachment security in a more global sense (NICHD ECCRN, 1997). In addition, we adopted a similar strategy to previous research and placed infants who were identified as disorganized into their secondary attachment classification – A, B, or C (e.g., Burgess, Marshall, Rubin, & Fox, 2003; Martins & Gaffan, 2000). This resulted in group sizes as follows: secure ($n_{\text{Mother}} = 96$; $n_{\text{Father}} = 92$) and insecure ($n_{\text{Mother}} = 28$, $n_{\text{Father}} = 25$).

3. Results

Results are presented in four sections. First, preliminary analyses among the study variables were conducted. Second, analyses were conducted testing for relations between the study variables with demographic factors to determine if possible covariates should be included in subsequent models. Third, simple bivariate analyses were conducted examining relations among distal and proximal variables and with attachment security. Lastly, results from hierarchical logistic regression models that examined the extent to which proximal and distal factors serve as predictors of attachment are reported. We chose to run separate models for infant–mother and infant–father attachment security because previous research has shown that attachment is relationship-specific (Braungart-Rieker et al., 2001; Van IJzendoorn & De Wolff, 1997).

3.1. Descriptive statistics and tests for covariate inclusion

Table 1 depicts the descriptive statistics for parent variables averaged over the time-points. Each of the variables showed a fairly normal distribution. Paired comparisons examining mean differences in parenting and marital variables indicated that mothers and fathers were similar in their levels of marital satisfaction ($t(132) = .76$, $p > .05$, Cohen's $d = .03$). Mothers were both more sensitive ($t(133) = 3.13$, $p < .01$, Cohen's $d = .43$) and more involved ($t(132) = 16.24$, $p < .0001$, Cohen's $d = 1.90$) than fathers. In addition, the frequencies of the secure ($n_{\text{Mother}} = 96$; $n_{\text{Father}} = 92$) and insecure ($n_{\text{Mother}} = 28$, $n_{\text{Father}} = 25$) attachment classification are comparable to other studies with middle-class, low-risk samples of mother– and father–infant pairs (e.g., Hill & Braungart-Rieker, 2002). The attachment concordance was as follows, 75 infants were secure with both parents, 16 infants were secure with mothers and insecure with fathers, 17 infants were secure with fathers and insecure with mothers, and 9 infants were insecure with both parents. A chi-square test revealed that the attachment classifications for infant–mother versus infant–father dyads were not significantly concordant, which supports our decision to run infant–mother and infant–father dyads in separate hierarchical logistic regression models.

Chi-square analyses the examined demographic variables such as cohabitation status, infant ethnicity, infant gender, and parity with the study variables resulted in no significant

associations with attachment security or parent variables; thus, we did not include covariates in subsequent analyses.

3.2. Bivariate associations

Zero-order correlations were conducted to examine simple bivariate relationships among parental resources, marital satisfaction, parental sensitivity, and parental involvement, and are presented in Table 1. Families with more parental resources had mothers and fathers who reported greater marital satisfaction and were rated higher in sensitivity, as well as had fathers who showed less parental involvement. Within-parent correlations revealed that mothers, who reported greater marital satisfaction and were rated as more sensitive, were higher in involvement. Correlations for father measures were not significant. Several significant cross-parent correlations emerged: mothers reporting greater marital satisfaction had spouses who reported greater marital satisfaction, were more sensitive and were more involved, as indicated in Table 1.

Simple associations between infant–parent attachment security and parental variables were examined using one-way ANOVAs. Mothers of secure infants were significantly more sensitive than mothers of insecure infants ($F(1,123) = 6.85, p < .01$; secure $M = 4.32, SD = .30$ vs. insecure $M = 4.14, SD = .39, \eta^2 = .05$). Likewise, fathers of secure infants were more sensitive than fathers of insecure infants, $F(1,116) = 7.81, p < .01$; secure $M = 4.18, SD = .35$ vs. insecure $M = 3.94, SD = .45, \eta^2 = .06$. No other significant mean differences by attachment security emerged for maternal or paternal variables.

3.3. Predicting attachment security

Separate hierarchical logistic regression models testing more complex relations between proximal and distal factors with infant–mother and infant–father attachment security were conducted using SAS. For each set of logistic regression models, predictor variables were entered in four steps. First, the more distal factors (e.g., parental resources and marital satisfaction) were entered as main effects to examine if they were predictors of attachment security. Second, the proximal factors (e.g., parental sensitivity and involvement) were added as main effects. Third, the 2-way interactions among factors were added. In the last step, 3-way interactions were included.

Significant interactions were subsequently graphed and probed by examining scores one standard deviation above and below the mean in relation to the odds of being securely attached (Aiken & West, 1991; Cassidy, Woodhouse, Sherman, Stupica, & Lejuez, 2011) using Hayes and Matthes (2009) MODPROBE. In logistic regression, an odds ratio is a measure of effect size between two groups, and in our study, equals the odds of being secure for one group divided by the odds of being secure for the other (e.g., Cassidy et al., 2011). An odds ratio of 1 means the likelihood of being secure is equal for both groups, and the further from 1 indicates a larger effect (Agresti, 2002; Cassidy et al., 2011). Similar to Cassidy et al. (2011), we interpreted odds ratios that are greater than 2 or less than .50 as meaningful; therefore the odds must be twice as high in one group compared to the other.

Testing models in this hierarchical manner allowed us to examine improvement in model fit and whether factors that were previously significant in prior steps become nonsignificant, indicating potential mediating processes, particularly in step 2. Higher-order interactions (e.g., 4-way interactions) were not included, because a fully saturated model has perfect fit and cannot be interpreted alone (Agresti, 2002). One hundred and seventeen mothers had complete data at all of the time-points, whereas 110 fathers had complete data at all of the time-points.

3.3.1. Infant–mother attachment—As can be seen in Table 2, results for the first two steps testing main effects were not significant. In addition, there was no evidence for mediating effects in step 2 between proximal (sensitivity and involvement) and distal factors (resources and marital satisfaction). The third step that included the main effects and 2-way interactions of the distal and proximal factors, however, was significant indicating moderating effects. Once 3-way interactions were included in step 4, however, the model was no longer significant, although two of the three effects remained significant. Results from step 3 indicated significant main effects for sensitivity and involvement such that infants whose mothers were more sensitive or less involved were more likely to be securely attached.

The significant parental resources by maternal sensitivity interaction in step 3 also revealed that infants whose mothers were lower in parental resources were more likely to be classified as secure as mothers' sensitivity increased (19% vs. 98%, OR = .005). In contrast, infants whose mothers were higher in parental resources were equally likely to be classified as secure as mothers' sensitivity increased (81% vs. 72%, OR = 1.64). See Fig. 1 for graph.

3.3.2. Infant–father attachment—Similar to the model predicting infant–mother attachment security, the model that tested for the main effects for distal factors in step 1 (parental resources and marital satisfaction) predicting infant–father attachment security was nonsignificant. Also similar to infant–mother models, there was no evidence for mediating effects in step 2, though a main effect for sensitivity emerged: infants of fathers who were more sensitive were more likely to be secure than infants of fathers who were less sensitive. In step 3, a significant marital satisfaction by paternal involvement interaction emerged, which remained significant in step 4. Step 4 results also indicated two additional 2-way interactions and a 3-way interaction: parental resources by paternal involvement, marital satisfaction by paternal involvement, and parental resources by marital satisfaction by paternal sensitivity. The previously significant main effect for paternal sensitivity became nonsignificant in this final step. See Table 3 for father hierarchical logistic regression model results.

The parental resources by paternal involvement interaction revealed that infants of fathers who were low in parental resources were equally likely to be classified as secure as paternal involvement increased (80% vs. 72%; OR = 1.55). Fathers who were high in parental resources, however, were more likely to have infants who were classified as secure as their paternal involvement increased (42% vs. 97%, OR = .02). See Fig. 2A for graph of results. The marital satisfaction by paternal involvement interaction revealed that infants whose fathers were low in marital satisfaction were more likely to be secure as fathers'

involvement increased (55% vs. 89%; OR = .15). In contrast, infants who had fathers who were high in marital satisfaction were equally likely to be secure as paternal involvement increased (83% vs. 81%; OR = 1.15). See Fig. 2B for the graph of the results.

Fig. 3 presents the significant parental resources by marital satisfaction by paternal sensitivity interaction and indicates the following pattern. Infants were more likely to be classified as secure as paternal sensitivity increased when their fathers were low in parental resources and high in marital satisfaction (63% vs. 94%; OR = .11), low in parental resources and low in marital satisfaction (21% vs. 94%, OR = .02), and high in parental resources and high in marital satisfaction (20% vs. 96%; OR = .01). In contrast, infants whose fathers were high in parental resources but low in marital satisfaction were equally likely of being classified as secure as parental sensitivity increased (82% vs. 72%; OR = 1.77).

4. Discussion

Taking an ecological systems perspective, this study examined the extent to which parental resources, the marital relationship, and parenting in early infancy predict infant attachment security with both mothers and fathers. The present study is one of few studies that have examined antecedents of infant attachment security with fathers (e.g., Belsky, 1996; Braungart-Rieker et al., 2001; Brown et al., 2007; Cox et al., 1992). Additionally, this study is one of the first to examine how multiple contexts contribute to the development of attachment security with parents and the only study to specifically explore parental resources, marital adjustment, parental involvement, and parental sensitivity in relation to infant–parent attachment. Results involving hierarchical logistic regression analyses primarily supported moderational over direct or mediational processes. That is, the effects of one factor on attachment security depended on levels of another variable. Moreover, moderating associations differed for infant–mother versus infant–father dyads.

The influence of parental sensitivity on infant–parent attachment is well documented. Infants whose mothers and fathers are more sensitive are more likely to develop a secure attachment relationship with them (e.g., De Wolff & Van IJzendoorn, 1997; Van IJzendoorn & De Wolff, 1997; Lucassen et al., 2011). When included as a main effect, we also found that sensitivity was a significant predictor of infant–mother and infant–father attachment security. However, once moderating mechanisms were considered, we found that the effect of sensitivity on parent–infant attachment depends on other familial factors, which are not typically assessed in studies of attachment. Such findings may help explain why effect sizes for sensitivity–attachment linkages have been relatively moderate. More specifically, the effect of maternal sensitivity on the infant–mother attachment relationship depended on levels of parental resources, whereas the effect of paternal sensitivity depended on levels of both parental resources and marital satisfaction. Moreover, the level of parental involvement played a key role in the prediction of both infant–mother and infant–father attachment security. In the case of fathers, the effect of involvement depended on levels of parental resources and marital satisfaction. Taken together, these results suggest that to more fully understand how differences in parenting might impact infants; we need to consider other important family systems, both proximal and distal to the parent–infant microsystem.

4.1. Infant–mother attachment

Although the results from the present study indicated that infants were more likely to develop a secure attachment with mothers when mothers were more sensitive, the effect of sensitivity also depended on levels of family resources. Infants living in households with fewer resources were more likely to develop a secure attachment with mothers when maternal sensitivity was higher. In contrast, infants in families with fewer resources whose mothers were less sensitive were at a higher risk of developing an insecure attachment relationship. This pattern of findings for infant–mother dyads reflects a *protective-enhancing* effect (Luthar et al., 2000). That is, higher maternal sensitivity appears to protect infants and increase their chance of developing a secure attachment relationship when conditions are more challenging (parents are younger, less educated, and have lower paying occupations). These findings support previous literature that emphasizes the importance of maternal sensitivity on the development of infants' positive internal working models and subsequent attachment security (e.g., Braungart-Rieker et al., 2001).

In contrast to having fewer resources, infants whose families had more resources were equally likely to be secure, regardless of mothers' level of sensitivity. Thus, high parental resources may serve as a protective factor (e.g., Cummings et al., 2000), shielding infants from the potential negative impact of lower parental sensitivity (De Wolff & Van IJzendoorn, 1997). It is possible that if families have more resources, other factors such as high quality childcare, better quality social support, or less work-related stress, which can all influence the quality of parent–child dynamics (Costigan, Cox, & Cauce, 2003; Crosnoe, Leventhal, Wirth, Pierce, & Pianta, 2010) may offset the potential negative effects of experiencing lower maternal sensitivity. Clearly research is needed to more carefully examine these possible complex patterns. It is important to note that the sample from the present study is not considered to be of high risk. In other words, the meaning of “lower” sensitivity is relative. Studies involving mothers with more extreme challenges in parenting may yield different results.

It is also important to note that different contexts might evoke different levels of parental sensitivity because parents respond differently to their infants based on the demands of the situation. In our study, parental sensitivity was measured during the SFP (Tronick et al., 1978), a situation in which the infant might become negatively reactive in response to the parent ceasing face-to-face interaction. In accordance with attachment theory (Bowlby, 1969/1982), infants form expectations about their parents via the development of internal working models, which is emerging in early infancy. During the SFP, infants' expectations about their interactions with their parents are violated because the parent ceases interacting with them (Cohn, 2003). Infants, in turn, might become upset and parents may respond in sensitive ways in order to soothe the distressed infant. During more neutral contexts (e.g., free-play or book-reading), however, infants might not become distressed, and thus parents might not be required to be as sensitive (Mills-Koonce et al., 2007). Leerkes (2011) found that maternal sensitivity during distressing tasks (fear and frustration) to be predictive of later infant attachment security compared to a free play task. The present study focused on parental sensitivity during the SFP as a way of examining parents' use of sensitivity in response to a potentially distressing situation that would evoke sensitivity (and

intrusiveness). Thus, further research examining how parenting across multiple contexts might interact with parental involvement, the marital relationship, and parental resources is needed.

In addition to sensitivity, maternal involvement emerged as a significant predictor of infant–mother attachment. Surprisingly, however, results from the logistic regression models indicated that maternal involvement was inversely related to infant–mother attachment security. It is important to keep in mind, however, that bivariate relations between attachment and maternal involvement were not significant. Rather, once the effects of parental resources, marital satisfaction, and maternal sensitivity were simultaneously considered in the models, only then did the effect for maternal involvement emerge as a significant predictor of attachment. In addition, maternal involvement was positively correlated with both sensitivity and marital adjustment. Thus, we may be observing suppression effects in this case (Cohen, Cohen, West, & Aiken, 2003) and need to be cautious about interpreting the meaning of maternal involvement and its relation to attachment security when factoring in effects from parental resources, sensitivity, and marital satisfaction.

4.2. Infant–father attachment

In a somewhat different pattern from mothers, parental resources interacted with paternal involvement to predict infant–father attachment security. More specifically, for infants whose families had more resources, the probability of a secure attachment increased when fathers were more involved. It may be the case that families are likely to have more resources when both parents earn an income. Hence, greater levels of paternal involvement may be particularly helpful for enhancing the infant–father attachment relationship in dual-earner households. Lower involvement, however, was equally likely to lead to security when resources were low and suggests that paternal involvement has less of an impact on attachment in this context. A significant three-way interaction in our study may help clarify this finding. A parental resource by marital satisfaction by sensitivity interaction indicated that when resources are lower, greater levels of sensitivity correspond with a higher rate of infant–father attachment security. Thus, quality, not quantity of parenting is important for fathers with fewer resources. Patterns became more complex, however, in the context of having more resources. Greater paternal sensitivity was associated with a higher probability of attachment security when marital satisfaction was high, but sensitivity was not significantly associated with attachment when marital satisfaction was low in higher-resource families. Thus, the mother–father dynamic seems to play a stronger role in the infant–father attachment relationship in the context of having more resources.

Indeed, marital satisfaction emerged as an important factor to consider when examining paternal involvement as evidenced by the marital satisfaction by involvement interaction. In cases where marital satisfaction is low, infants are at risk for developing an insecure infant–father attachment relationship if fathers' involvement is also low. Such processes have been referred to as *spill-over* effects, in which fathers who were less satisfied in their marriages were more likely to withdraw from both their marriages and their interactions with their children (Howes & Markman, 1989). Interestingly, however, if fathers' marital adjustment

was low in the present study, the probability of infants developing a secure attachment relationship with fathers increased as long as those fathers were more involved. These findings have implications for intervention for couples whose marital relationship is struggling. If fathers can remain involved in their role as a parent, regardless of spousal discord, the infant–father relationship can be positive.

Fathers who were high in marital satisfaction were less likely to have secure infants as their level of parental involvement increased. These findings are somewhat puzzling and require further investigation. It is possible that even if involvement is low, having a more harmonious marital relationship may indicate that additional support structures are in place that enhance the quality of the infant–father attachment relationship. Thus, future studies might examine how mothers and other caregivers can affect infant–father attachment relationships, and vice versa.

These results underscore the importance of examining multiple systems and factors simultaneously so that more complex patterns can be revealed. Sensitivity emerged as an important predictor for both infant–mother and infant–father attachment security but its effect was impacted by levels of resources and/or marital relations. In addition, parental involvement emerged as a contributor to infant–parent attachment, but its association with attachment was also impacted by parental resources and marital satisfaction, at least for infant–father dyads.

4.3. Limitations and direction for future research

There are a number of limitations in the present study. First, our sample size limits our ability to test more complex models such as those that combine mother and father variables into the same model or interpret relationships that did not reach statistical significance. We also ran the risk of Type I error given the exploratory nature of our study. Furthermore, even though our study was longitudinal in nature, our models did not allow us to test the direction of effects. For example, it is possible that parental involvement, in particular, is affected by characteristics of the infant in which some infants may elicit more attention than others (Volling & Belsky, 1991), or that one parent requests more help from the co-parent to help ease the parenting stress (Crockenberg & Leerkes, 2003; Solmeyer & Feinberg, 2011). In addition, we examined infant attachment security versus insecurity but were not able to examine the more specific attachment insecure sub-types (avoidant, resistant) or the disorganized group due to limited statistical power. It is possible that additional interesting patterns might emerge if we were able to adequately examine how resources, marital satisfaction, involvement, and sensitivity relate to the development of various attachment patterns, including disorganization. For example, it is possible that the development of disorganized attachment is a response to particularly low levels of involvement or sensitivity along with heightened and potentially frightening marital conflict (Hesse & Main, 2006; Van IJzendoorn, Schuengel, & Bakersmans-Kranenburg, 1999). Moreover, the generalizability of our results is also limited by the characteristics of our sample. Our sample is a relatively low-risk sample – in parental resources, marital satisfaction, and parental sensitivity. Thus, our findings may not generalize to populations in which there are fewer parental resources, more severe marital distress or highly insensitive parenting.

There are also a number of limitations due to how our constructs were measured. For example, future studies could incorporate observational measures of the marital relationship which might reveal interesting aspects of couples' conflict that they, themselves, are unaware of. In particular, it would be important with respect to the development of attachment to learn what parents think about their roles as mothers and fathers, how they negotiate caregiving tasks, and how they handle the challenges more specific to infant development (e.g., infant night-waking). In addition, future research should include a more intensive parental involvement check-list (e.g., longer than one day) that also more precisely assesses what parents are doing (or not doing) with their infants and for how long.

Bronfenbrenner (2005) acknowledged the importance of the bidirectionality between the parent and child in relating to child outcomes. We did not examine how individual differences in children may affect their own development. Infant characteristics (e.g., temperament), for example, could contribute to infant attachment security (Rothbart & Bates, 1998) or how attachment security/insecurity is expressed (Braungart-Rieker et al., 2001). Infants who are temperamentally less engaging or more easily distressed may evoke less sensitive parenting (Cassidy, 1994). This parenting style may, in turn, contribute to the development of an insecure attachment relationship. Moreover, additional parent factors, such as personality (Eder & Mangelsdorf, 1997), psychopathology (Martins & Gaffan, 2000), and their own attachment histories (Van IJzendoorn, 1995), could contribute to the development of the infant–parent attachment relationship. Future studies should examine how these early individual differences may contribute in the development of infant attachment security.

4.4. Implications and conclusions

Results from the current study demonstrated that proximal and distal factors contributed in the prediction of infant attachment security with mothers and fathers. Parental sensitivity contributed to infant attachment security with both mothers and fathers but its impact depended on parental resources in the infant–mother relationship, and resources and marital satisfaction in the infant–father relationship. In addition, parental involvement contributed to infant attachment security with both mothers and fathers once other mechanisms were taken into consideration. Thus, the development of attachment appears to involve various family systems that operate in complex ways.

In sum, our study showed that is important to look beyond proximal factors such as parent sensitivity in the study of infant–parent attachment. Additional factors such as parental resources, parent involvement, and the marital relationship contributed to infant attachment security with mothers and fathers. Interesting differences in the antecedents of infant–mother and infant–father attachment also emerged indicating different moderating processes for infant–mother and infant–father dyads. Taken together, results from our study underscore the importance of a variety of factors when studying the development of infant attachment security with both mothers and fathers.

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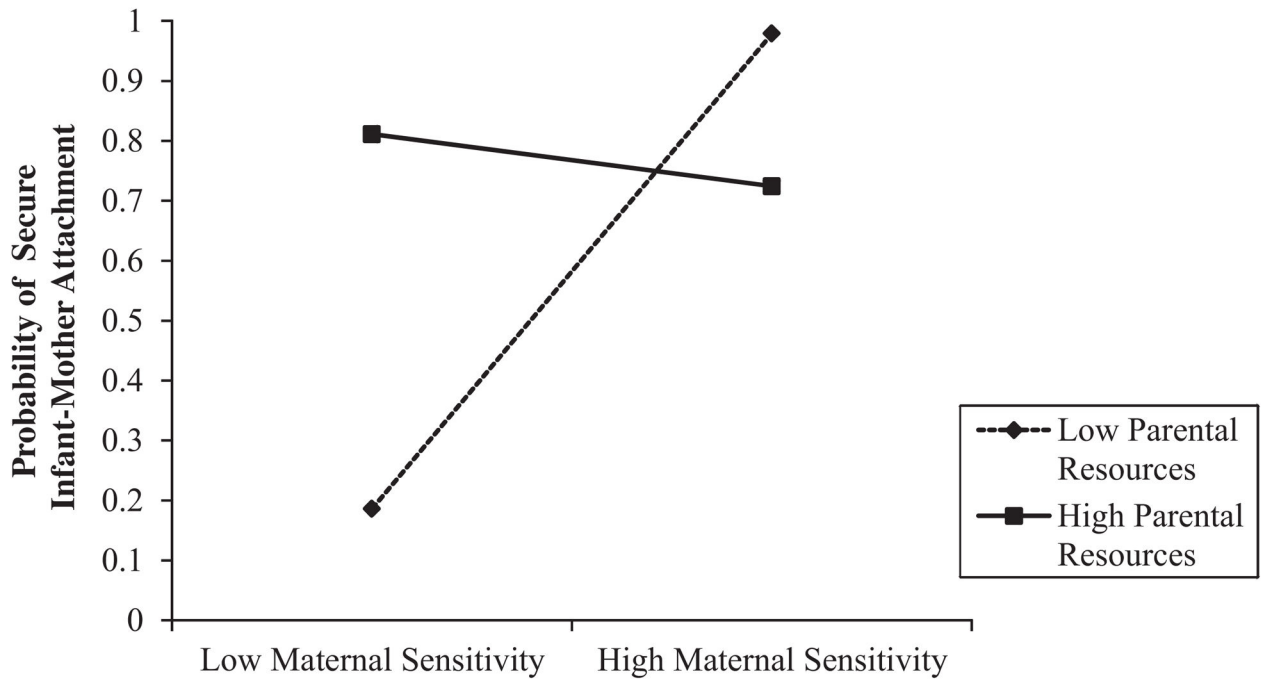


Fig. 1.
Graph of parental resources by maternal sensitivity interaction.

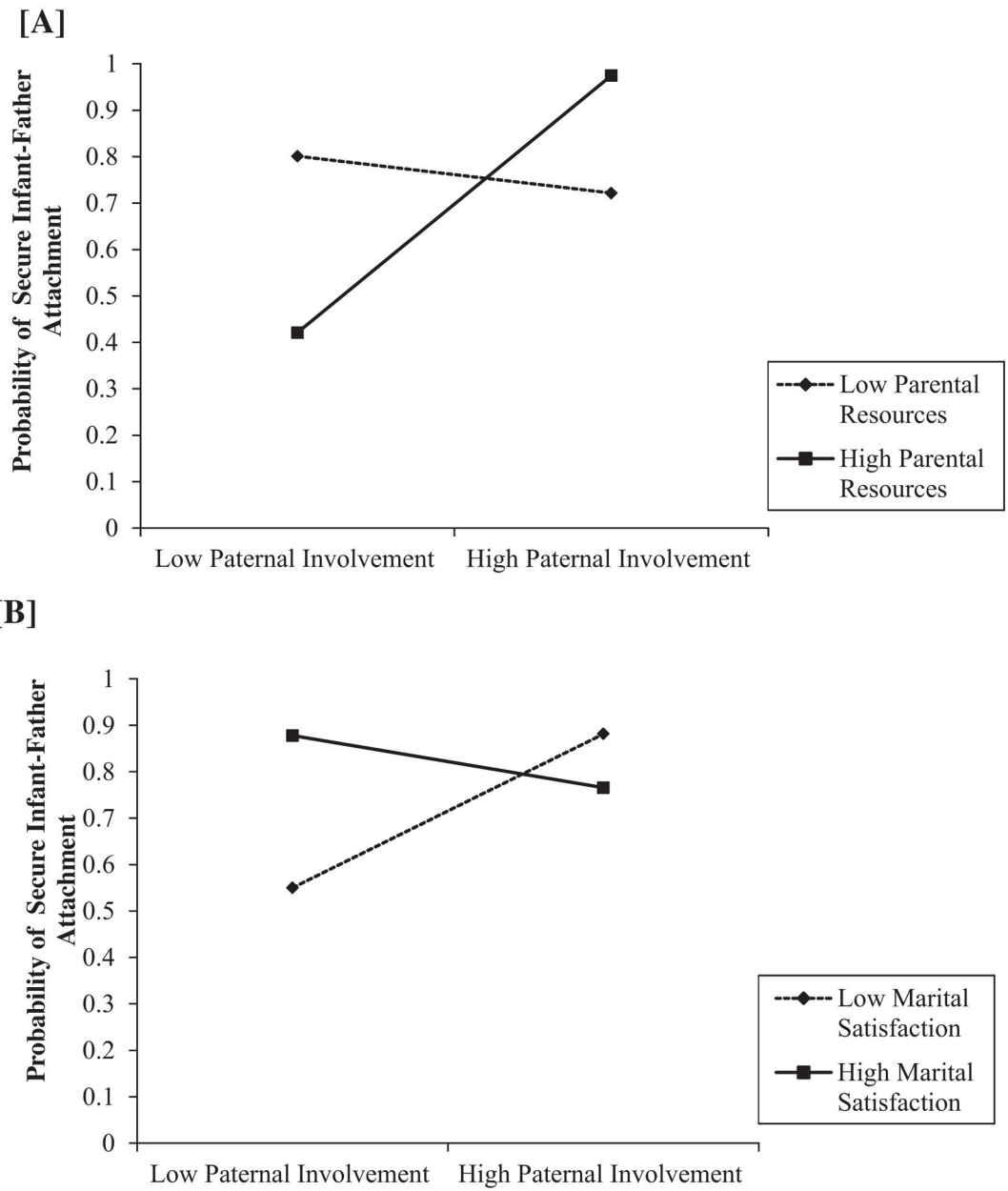


Fig. 2. Graphs of significant father 2-way interactions. (A) Graph of parental resources by paternal involvement 2-way interaction. (B) Graph of father marital satisfaction by paternal involvement interaction.

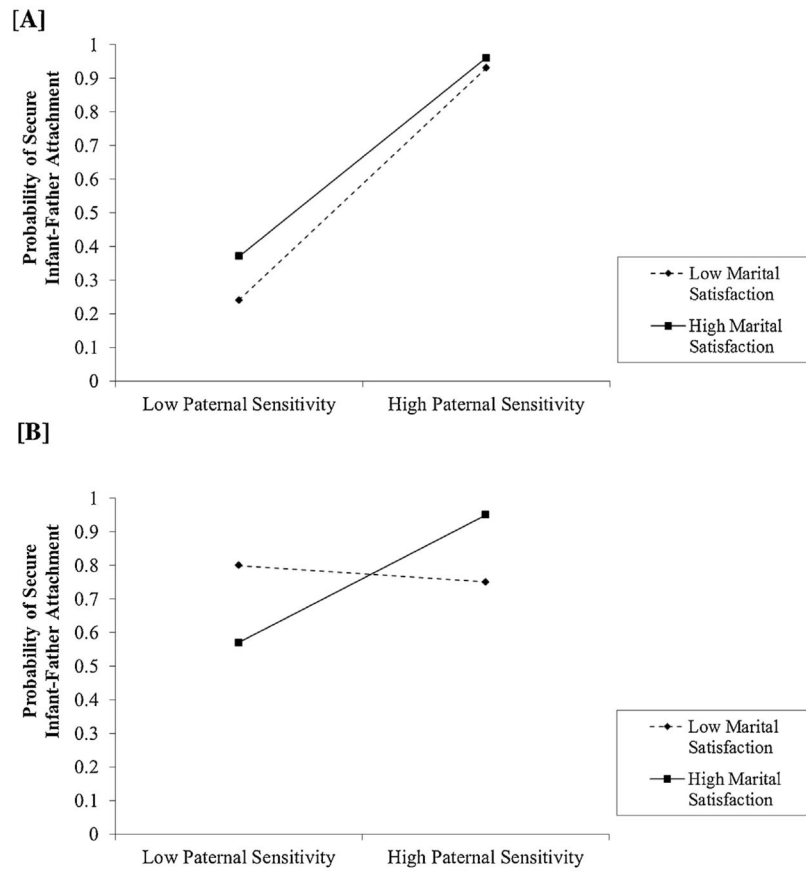


Fig. 3. Graph of parental resources by father marital satisfaction by paternal sensitivity 3-way interaction. (A) Fathers who are low in parental resources. (B) Fathers who are high in parental resources.

Table 1

Descriptive statistics and correlations for marital and parenting variables.

Variable	n	M (SD)	Skewness	Kurtosis	Parental resources	Mother measures			Father measures			
						1	2	3	4	5	6	
Mother												
1. Marital satisfaction	133	117.56 (18.03)	-1.43	3.28	0.22*	1.00						
2. Sensitivity	135	4.25 (0.42)	-2.26	10.86	0.29**	0.11	1.00					
3. Involvement	133	0.76 (0.12)	-0.68	0.66	-0.01	0.18*	0.20*	1.00				
Father												
4. Marital satisfaction	134	116.41 (18.63)	-0.95	3.28	0.22*	0.66*	0.14 [†]	0.15 [†]	1.00			
5. Sensitivity	134	4.10 (0.46)	-1.78	6.01	0.24**	0.21*	0.15 [†]	0.003	0.10	1.00		
6. Involvement	133	0.51 (0.15)	-0.28	0.22	-0.30**	0.19*	-0.05	0.08	0.16 [†]	0.04	1.00	

Note:

[†] $p < .10$.* $p < .05$.** $p < .01$.

Table 2

Hierarchical logistic regression models for infant–mother variables ($n = 117$).

Step		<i>df</i>	χ^2	R^2	β	SE
1	Likelihood ratio	2	0.13	0.001		
	Parental resources	1	0.10		-0.07	0.24
	Marital satisfaction	1	0.01		-0.002	0.01
2	Likelihood ratio	4	8.72 [†]	0.07		
	Parental resources	1	0.84		-0.23	0.25
	Marital satisfaction	1	0.23		-0.01	0.01
	Parental sensitivity	1	5.35*		1.76*	0.76
	Parental involvement	1	3.61 [†]		-4.83*	2.54
3	Likelihood ratio	10	19.56*	0.15		
	Parental resources	1	3.65		-0.69	0.36
	Marital satisfaction	1	0.70		0.02	0.02
	Parental sensitivity	1	7.35**		2.60**	0.96
	Parental involvement	1	5.02*		-6.39*	2.85
	Resources × satisfaction	1	1.85		-0.03	0.02
	Resources × sensitivity	1	4.85*		-2.14*	0.97
	Resources × involvement	1	0.52		2.60	3.60
	Satisfaction × sensitivity	1	2.90 [†]		0.11 [†]	0.06
	Satisfaction × involvement	1	0.57		-0.12	0.17
	Sensitivity × involvement	1	0.72		-7.01	8.27
	Likelihood ratio	14	20.24 [†]	0.16		
4	Parental resources	1	2.59 [†]		-0.64 [†]	0.40
	Marital satisfaction	1	0.52		0.02	0.02
	Parental sensitivity	1	6.53*		2.76*	1.08
	Parental involvement	1	2.80 [†]		-6.07 [†]	3.63
	Resources × satisfaction	1	1.30		-0.02	0.02
	Resources × sensitivity	1	4.05*		-2.30*	1.14

Step		<i>df</i>	χ^2	<i>R</i> ²	β	SE
	Resources × involvement	1	0.25		1.98	3.92
	Satisfaction × sensitivity	1	2.89 [†]		0.11 [†]	0.07
	Satisfaction × involvement	1	0.56		-0.14	0.18
	Sensitivity × involvement	1	0.44		-6.20	9.36
	Resources × satisfaction × sensitivity	1	0.31		-0.04	0.06
	Resources × satisfaction × involvement	1	0.16		-0.07	0.18
	Resources × sensitivity × involvement	1	0.01		1.48	12.68
	Satisfaction × sensitivity × involvement	1	0.007		0.04	0.53

Note: Attachment group status: 0 = insecure, 1 = secure.

[†] $p < .10$.

* $p < .05$.

*** $p < .01$.

Table 3

Hierarchical logistic regression models for infant–father variables ($n = 110$).

Step		<i>df</i>	χ^2	<i>R</i> ²	<i>B</i>	<i>SE</i>
1	Likelihood ratio	2	2.90	0.03		
	Parental resources	1	0.72		0.21	0.25
	Marital satisfaction	1	2.00		0.02	0.01
2	Likelihood ratio	4	11.31*	0.10		
	Parental resources	1	0.48		0.20	0.28
	Marital satisfaction	1	1.54		0.02	0.01
	Parental sensitivity	1	7.15**		1.63**	0.61
3	Parental involvement	1	1.04		1.92	1.88
	Likelihood ratio	10	21.84*	0.18		
	Parental resources	1	0.63		0.26	0.33
	Marital satisfaction	1	0.0001		-0.0002	0.02
	Parental sensitivity	1	4.54*		1.61*	0.76
	Parental involvement	1	0.57		1.67	2.21
	Resources × satisfaction	1	1.32		-0.02	0.02
	Resources × sensitivity	1	2.45†		-1.50†	0.96
	Resources × involvement	1	2.57†		3.67†	2.29
	Satisfaction × sensitivity	1	0.75		0.05	0.05
Satisfaction × involvement	1	4.32*		-0.28*	0.13	
4	Sensitivity × involvement	1	1.34		-6.44	5.56
	Likelihood ratio	14	28.43**	0.23		
	Parental resources	1	0.96		0.37	0.38
	Marital satisfaction	1	0.43		-0.02	0.02
	Parental sensitivity	1	0.74		0.84	0.97
	Parental involvement	1	2.36†		4.29†	2.79
	Resources × satisfaction	1	1.97		-0.03	0.03
Resources × sensitivity	1	2.66†		-1.65†	1.01	

Step		<i>df</i>	χ^2	<i>R</i> ²	<i>B</i>	<i>SE</i>
	Resources × involvement	1	3.70*		4.50*	2.34
	Satisfaction × sensitivity	1	1.45		0.08	0.06
	Satisfaction × involvement	1	8.93**		-0.47**	0.16
	Sensitivity × involvement	1	3.67*		-13.76*	7.18
	Resources × satisfaction × sensitivity	1	4.06*		0.15*	0.07
	Resources × satisfaction × involvement	1	0.87		0.09	0.10
	Resources × sensitivity × involvement	1	2.59 [†]		-13.43 [†]	8.34
	Satisfaction × sensitivity × involvement	1	1.95		0.73	0.52

Note: Attachment group status: 0 = insecure, 1 = secure.

[†] $p < .10$.

* $p < .05$.

** $p < .01$.