

## **Poor Infant Soothability and Later Insecure-ambivalent Attachment: Developmental Change in Phenotypic Markers of Risk or Two Measures of the Same Construct?**

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### **Abstract:**

Using data from the Durham Child Health and Development Study ( $n = 148$ ), the current study examines the associations between child and parenting variables at 6 months and child attachment quality at 12 months of age and maternal report of child self regulation at 24 months of age. Child and parent variables predicted distinct forms of insecure attachment relationships. Observations of infant soothability during the reunion session of the Face-to-Face Still Face Paradigm at 6 months differentially predicted children with later insecure-ambivalent attachments from those with secure attachments. Observations of maternal negative intrusiveness at 6 months of age differentially predicted children with insecure-avoidant attachments from those with secure attachments. Maternal sensitivity at 6 months was associated with maternal report of child affective problems at 24 months, but this association was moderated by infant negativity during soothing and later moderated by child attachment quality. Collectively, these results suggest the following two mutually exclusive possibilities regarding infant soothability and later ambivalent attachment quality: either infant soothability is a unique and distinct predictor of later ambivalent attachment quality and this cascade represents a developmental shift in child risk during the first year of life, or that infant soothability following a stressful task at 6 months of age is itself an early indicator of ambivalent attachment behavior with the mother. The data from the current study could not provide differential support for one possibility over the other.

**Keywords:** Temperament | Soothability | Attachment | Maternal sensitivity | Emotional development | Infants

### **Article:**

Research suggests a broad range of influences on the formation of early parent-child attachment quality, with a majority of studies identifying the independent and joint influences of parental sensitivity and child temperament. However, the development of a secure attachment is not a developmental end point but rather a period of transition in the cascading development of the child's early social and emotional functioning (Cox, Mills-Koonce, Propper, & Gariepy, 2010). Therefore, it is not surprising that the interplay between child characteristics, parenting behaviors, and parent-child attachment quality has been associated with multiple domains of socioemotional functioning, including the development of self-regulation (Cassidy, 1994 and Isabella, 1993), empathy (Sroufe & Fleeson, 1986), attention processes (Atkinson et al., 2009), internalizing and externalizing behaviors (Lyons-Ruth, Easterbrooks, & Cibelli, 1997), and peer relationships (Booth et al., 1991 and Kerns, 1994). In the current study we examine child and parental precursors of attachment quality at 1 year of age, as well as the interplay among these variables in the prediction of child affective problems one year later. An emphasis is placed on situating the emergence of the parent-child attachment relationship within a broader developmental cascade leading to early self-regulatory abilities.

### **1. Child and parent factors associated with parent-child attachment quality**

Research on early temperament and parent-child attachment formation has produced largely equivocal results. Some studies have found direct associations between early temperament and attachment quality (Kochanska, 1998, Mangelsdorf et al., 2000 and Susman-Stillman et al., 1996); others find indirect or moderated associations (Ispa et al., 2002 and Klein Velderman et al., 2006), and some find no associations whatsoever (Bokhorst et al., 2003, Kochanska et al., 2005, Pauli-Pott et al., 2007 and Scher and Mayseless, 2000). Although a review of over 50 published studies of infant temperament and attachment by Vaughn, Bost, and van IJzendoorn (2008) led to the authors' conclusion that individual differences in attachment quality (secure vs. insecure) could not be explained by temperament constructs, it is possible that some of the mixed findings in the current literature stem from methodological inconsistencies as well as a focus on secure vs. insecure analyses instead of differentiating subtypes of insecurity (avoidant vs. ambivalence).

Methods for assessing infant temperament generally include one or some combination of the following: (1) parental report of infant behavior, (2) standardized laboratory measures, or (3) home observations of child behavior. Furthermore, they may reflect temperamental constructs as varied as duration of orientation, distress to limitations, positive affectivity, activity level, soothability, and fear. Of the available evidence for an association between difficult child temperament and attachment insecurity, a disproportionate number of studies report that child fearful and reactive temperament specifically differentiates children with secure attachment from those with insecure-ambivalent attachments (see Crockenberg, 1981, Niederhofer and Reiter, 2003 and Susman-Stillman et al., 1996), while far fewer studies report that temperament differentiates children with insecure-avoidant attachments from those with secure attachments

(Lewis and Feiring, 1989 and Mangelsdorf et al., 2000). This notion is supported by meta-analytic evidence from 18 studies that found small, but significant, effects of temperament as a predictor of insecure-ambivalent attachment behavior only (Goldsmith & Alansky, 1987). Furthermore, non-optimal neurological status on 7- and 10-day Brazelton NBAS assessments has been found to specifically predict insecure-ambivalent attachments (Crockenberg, 1981 and Waters et al., 1980), as have in utero experiences (such as exposure to cocaine, opiates, and other substances) (Seifer et al., 2004).

In contrast to the mixed findings relating early temperament and attachment quality, greater parental sensitivity has repeatedly predicted an increased likelihood of a secure parent-child attachment relationship (for meta-analysis see De Wolff & van IJzendoorn, 1997). Bowlby (1969) posited that the caregiving system provides a secure base by fostering a sense of mastery through encouragement and support of exploration when the child's exploration system is activated, and by providing comfort and regulation of negative affect when the child's fear system is activated. From this perspective, the construction of a secure attachment relationship rests on a history of sensitive care characterized by contingent, unconditional responsiveness to the activation of the needs of the child whenever they are expressed over time and across contexts. Indeed, empirical research has repeatedly found maternal sensitivity to be one of the most reliable predictors of attachment security (Bretherton, 1990, Isabella and Belsky, 1991 and Sroufe, 1985) across socioeconomic (Diener, Nievar, & Wright, 2003) and cultural groups (Arace, 2006 and Vereijken et al., 1997), although it should be noted that more specific conceptualizations of non-optimal parenting, such frightened/frightening caregiving (Hesse and Main, 2006 and Main and Hesse, 1990) or disrupted affective communication (Lyons-Ruth, Bronfman, & Parsons, 1999) are better predictors of attachment disorganization.

## **2. The interplay among parenting, child factors, and attachment quality in the development of emotional and affective problems**

Heightened and prolonged levels of negative affectivity in young children have been identified as a risk factor for the development of poor/maladaptive emotion and emotion regulation (Belsky et al., 2001, Eisenberg et al., 1993, Hagekull and Bohlin, 2003 and Stifter and Spinrad, 2002). When children are predisposed to high levels of negative affect and are unable to independently regulate or co-regulate (with the help of a caregiver) this negativity may lead to an increased likelihood of maladaptive developmental outcomes. A sensitive and supportive caregiver, however, influences the way a young child reacts to various situations by helping to alleviate negative emotions, reinforcing positive ones, and structuring the environment that solicits the emotional experience (Kopp, 1989 and Thompson, 1994). As such, maternal sensitivity to infants' signals and affective expressions during the first year of life has been found to play a crucial role in the formation of infants' ability to regulate their own emotion (Crockenberg and Leerkes, 2004, Haley and Stansbury, 2003 and Moore et al., 2009), which in turn has been related to successful self-regulation in later years (Elicker et al., 1992, Shulman et al.,

1994 and Sroufe et al., 1999). Furthermore, poor emotion regulation and uncontrolled emotionality has been associated with later psychopathology, such as depression, aggression, and social withdrawal (Calkins, 1994, Cicchetti et al., 1995 and Izard, 2002).

The effects of parenting behaviors on emotional development, however, are not independent of child variables. Multiple studies have identified the interaction between sensitive caregiving and child temperament as a critical component of emotional and behavioral development (Ghera et al., 2006, Propper and Moore, 2006 and van Aken et al., 2007). Whereas some studies identify sensitive caregiving as a protective factor for children predisposed to elevated levels of temperamental negativity, other research has examined the moderating role of child characteristics on the developmental influence of caregiving on child outcomes (Belsky and Pluess, 2009 and Boyce and Ellis, 2005). Specifically, Belsky and Pluess (2009) posits that some children are more susceptible to environmental influences on developmental processes than other children, and several studies have identified early levels of child reactivity and negativity as a potential indicator of increased child responsiveness to variation in caregiving behaviors (Belsky et al., 1998, Deater-Deckard and Dodge, 1997, Feldman et al., 1999 and Morris et al., 2002).

Thompson (1994) has proposed that the quality of the parent-child attachment relationship may also moderate the effects of child and parental variables by influencing how children interpret and process emotions and environmental experiences. In this sense the attachment system is developmentally unique in that it both influences and is influenced by mother and child factors over time. For example, due to their almost complete reliance on parental support for emotional and behavioral regulation, the strategies and processes used by caregivers as external regulators of their infant's arousal are likely to be internalized by children over time, thus affecting both their attachment quality (as an immediate adaptation to the caregiving environment) and their more generalized strategies for coping with stress and emotional challenge (Kopp, 1982). Cox et al. (2010) framed this transition as part of a larger developmental cascade through which the child acquires self-regulation through the experience of arousal and co-regulation in the parent-child relationship, and then uses the behavioral and cognitive expectations stemming from that attachment relationship to interpret and respond to future stresses and challenges. To this effect, it has been suggested that insecure attachments may not directly lead to negative outcomes, but rather increase the risk for maladaptive developmental outcomes by predisposing children and parents to non-optimal interaction styles (Greenberg et al., 1993 and Sroufe, 1990). Evidence for this general effect has been demonstrated by Kochanska, Barry, Stellern, and O'Bleness (2009) who reported that attachment security moderated the association between a maladaptive cycle of parent-child behavior and future child antisocial behavior. Specifically, it was only among insecurely attached dyads that maternal power assertion triggered a cascade of children's resentful opposition of the parent and ultimate antisocial behavior. Consistent with previous research, this finding highlights the role of early secure attachment relationships in the development of successful and adaptive self-regulatory abilities (Cole et al., 2004, Schore, 2001 and Sroufe, 2005), specifically for children at elevated risk for maladaptive development.

### **3. The current study**

The goal of the current study is to examine how early temperamental and caregiving characteristics are associated with the formation of parent-child attachment relationships by the end of the first year of life, and to consider the developmental interplay between child, parent, and attachment variables in the development of early affective problems. Our first set of questions involved the prediction of attachment quality at 1 year of age, including whether child variables (such as child negativity) would be associated with an increased likelihood of insecure-ambivalent attachments and whether variation in maternal variables (such as insensitive parenting) would be associated with an increased likelihood of insecure-avoidant attachments. Our second set of questions included analyses of maternal behaviors as predictors of subsequent child emotional reactivity and affective problems, and whether the strength of these associations varied as a function of child variables and parent-child attachment quality.

### **4. Method**

#### **4.1. Participants**

The participants in the current study were 148 families recruited by the Durham Child Health and Development Study. Families were drawn from a largely urban community via fliers and postings at birth and parenting classes, as well as through phone contact via birth records. Birth order or family structures were not used as inclusion criteria. The sample was 56% African-American and 44% European-American with approximately 53% was low income (below 200% of the poverty level). A total of 13% of mothers had no high school degree, 43% had either a high school diploma or a G.E.D., 11% had some college or vocational school, and 33% had a four-year bachelors degree or higher. The ages of mothers in this sample ranged from 18 to 40 ( $M = 28.3$ ,  $SD = 5.6$ ). The sample was split almost evenly based on the sex of the child, with 51% male.

#### **4.2. Procedures**

##### **4.2.1. 6-month home and lab visits**

When the child was 6 months of age research assistants conducted a home and laboratory visit. For a majority of families (74%) the home visits occurred prior to the lab visits (based upon family availability), and over 90% of the home visits occurred within 2 weeks of the laboratory assessment. The average age of the child at the lab visit was 6.7 months ( $SD = .71$  months) and over 90% of visit occurred before the child was 8.5 months of age. Parent interviews and questionnaires were completed at both assessments. The Face-to-Face Still Face Paradigm (FFSFP; Tronick, Als, Adamson, Wise, & Brazelton, 1978) was administered during the laboratory visit and a mother-child free play interaction was recorded during the home visit. As part of the FFSFP, each mother was asked to secure her child in a car seat situated on top of a large, sturdy table and then talk and interact with her child for 2 min as she normally would do if

they were traveling and the child was fastened in the car seat. Mothers were then asked to turn her head away from the child for 15 s. When she returned to face her child, she was instructed to begin the still face episode of the FFSFP during which she had to maintain a fixed stare at her child and to refrain from facial movements or displays of affect for 2 min. The mother was then again asked to turn her head away for 15 s, after which she was instructed to interact with her child for a 2 min reunion session during which she could attempt to soothe her child. Because many children find this procedure to be highly dysregulating, mothers were informed that they could take their child out of the car seat if necessary during reunion to soothe the child. This procedure was filmed using two cameras, one aimed at capturing the infant's face and body and the other aimed at capturing the face and behavior of the mother. During the home 6 months visit, a 10-min mother-child free play task was filmed for later coding. Mothers were provided with a set of standardized toys developmentally appropriate for the child's age and asked to play with their children using these toys as they normally would during 10 min of free time during the day (see Barnett, Deng, Mills-Koonce, Willoughby, & Cox, 2008).

#### 4.2.2. 12-month lab visit

Mothers and children participated in a laboratory visit at 12 months of child age. The average age of the child at this lab visit was 12.9 months ( $SD = 1.26$  months) and almost 90% of visits occurred before the child was 14.5 months of age. During the lab visit mothers completed interviews and questionnaires, and children and mothers participated in the Ainsworth Strange Situation Paradigm (SSP; Ainsworth, Blehar, Waters, & Wall, 1978). This procedure followed the protocol developed by Ainsworth et al. for observing and classifying infants into discrete categories of attachment quality.

#### 4.2.3. 24-month lab visit

Mothers and children participated in a laboratory visit at 24 months of child age. During the lab visit mothers completed interviews and questionnaires. The average age of the child at this lab visit was 23.8 months ( $SD = .90$  months) and all visits were completed by 27 months of child age.

### 4.3. Measures

#### 4.3.1. Infant behavioral negativity across contexts

During each 6-month observation (free play, still face episode of the FFSFP, and reunion episode of the FFSFP), child negative affect was coded in five-second intervals using a 3-point scale adapted from previous studies (Haley & Stansbury, 2003). Children were given a score of 1 if they displayed little to no negative affect during the 5-s interval. They were given a score of 2 if they exhibited mild levels of negativity and 3 if they showed high levels of negativity, such as prolonged crying, intense protest, or venting. An overall infant negative affect score was calculated for each observational context as the percentage of 5-s intervals during which the

child was rated as 2 or higher in negative affect. Inter-rater reliability was calculated in two ways. First, 20% of the sample was randomly double coding for each 5-s interval of each task. Each pair of coders demonstrated a kappa  $>.70$  for each task. Second, to account for slight differences in timing across the 5-s intervals, intraclass correlations were examined for each pair of coders base on the overall infant negative affect score (the percentage of intervals for which the child was rated as at level 2). Each pair of coders demonstrated  $\alpha >.85$  for the overall infant negative affect score for each task. The overall measure of infant affect has been successfully used in previous analyses from this study (author reference, 2007). For the current purposes, negative affect during the free play session is conceptualized as child *observed negative mood*; negative affect during the child challenge tasks is conceptualized as *observed behavioral reactivity*; and negative affect during the recovery session from the challenge tasks is conceptualized as *observed child soothability*.

#### 4.3.2. Maternal report of child temperament

Measure of soothability, distress to limitations, and fear were assessed by maternal report using the distress to limitations, fear of novelty, and soothability subscales of the Infant Behavior Questionnaire-Revised (IBQ-R; Goldsmith & Rothbart, 1991) at 6 months of age. Internal consistency for the IBQ-R range from .70 to .90 on the individual subscales and convergence between the IBQ and other measures of temperament suggest adequate validity (e.g., Goldsmith & Rothbart, 1991). Internal consistencies of the temperament dimensions from the current study were  $\alpha = .82$  for soothability,  $\alpha = .83$  for distress to limitations,  $\alpha = .89$  for fear of novelty.

#### 4.3.3. Maternal sensitivity and negative intrusiveness

Caregiving during the 10 min free play interaction context was coded using 5-point rating scales (Cox & Crnic, 2002) adapted from Egeland and Heister (1993) and the NICHD Early Child Care Research Network (1997). The free play interactions were coded by two independent coders who were unaware of the study's hypotheses. Coders were trained to reliability using selected video recorded free play episodes that had been previously coded by criterion coders. To reach inter-rater agreement, coders continued training until an inter-class correlation coefficient of .80 was reached for each coder on each construct with the criterion coders. Overall, coders' inter-rater reliability on all subscales remained above .80 based on double coding of 100% of the observations (all differences were resolved through conference coding). Seven subscales were used to evaluate maternal behavior during the free play task for a global rating of maternal sensitivity, including: sensitivity/responsiveness, detachment/disengagement, intrusiveness, positive regard, animation, stimulation of development, and negative regard. For each subscale, mothers received a score between 1 and 5 with '1' being not at all characteristic of their behavior during the dyadic interaction and '5' being highly characteristic of this interaction. Factor analyses suggested two factors that guided the creation of two composites variables. The first composite, labeled *maternal sensitivity*, involved summing the scale scores for sensitivity/responsiveness, detachment/disengagement (reverse scored), positive regard,

animation, and stimulation of development (factor loadings were .89, .88, .85, .89, and .71, respectively). The second composite was a summation of negative regard and intrusiveness and was labeled *maternal negative intrusiveness* (factor loadings were .92 and .77, respectively).

#### 4.3.4. Attachment security

Patterns of child behavior observed during the Strange Situation Paradigm are used to classify children into the following three broad categories: secure, insecure-avoidant, and insecure-ambivalent based on the procedures outlined by Ainsworth and colleagues (1978). Children were separately coded for disorganized attachment behaviors. Two coders trained and certified by the Sroufe attachment group coded videotapes for attachment quality. Cohen's kappa for these coders was  $k = .85$  for 30% of the full sample. Any disagreements were resolved by conferencing. Current analyses were first based on three-way attachment classifications and then replicated using the four-way classification.

#### 4.3.5. Child emotional difficulties

Mothers were given the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2000) within a packet of questionnaires to complete at a 24-month laboratory visit. In addition to traditional CBCL scales, current CBCL scoring also includes DSM (Diagnostic and Statistical Manual)-oriented scales that are comprised of items rated as being very consistent with DSM diagnostic categories, including emotional reactivity and affective problems and have been found to predict DSM diagnoses (Ferdinand, 2008). It should be noted, however, that these measures were not being used as diagnostic criteria for child psychopathology, but rather indicators of potential emotional or regulatory risk in toddlerhood. As such, continuous measures of emotional reactivity and affective problems are used in subsequent analyses as child outcomes at 24 months of age.

## 5. Results

### 5.1. Descriptive analyses

Means, standard deviations, and bivariate correlations among continuous predictor and criterion variables can be found in Table 1. The distribution of 12-month attachment classifications in the present sample consisted of 91 children classified as secure, 28 children classified as insecure-avoidant, 15 classified as insecure-ambivalent, and 14 classified as insecure-disorganized. One-way ANOVAs were conducted to examine simple three-way attachment group differences among predictor and criterion variables. There were significant attachment group differences in observations of child soothability [ $F(2, 89) = 7.73, p < .001$ ] and observations of maternal negative intrusiveness [ $F(2, 89) = 5.62, p < .01$ ]. Tukey post hoc tests revealed that children with insecure-ambivalent attachments displayed lower levels of observed soothability as compared to both secure ( $p < .001$ ) and insecure-avoidant ( $p < .05$ ) children. Mothers of children with



insecure-avoidant attachments were observed to exhibit more negative intrusiveness than both mothers of secure ( $p < .01$ ) and insecure-ambivalent ( $p < .05$ ) children.

### [Table 1 Omitted]

#### 5.2. Child and parental correlates of attachment quality

Based on the results from the descriptive statistics and preliminary analyses of attachment group differences among covariates, a multinomial regression was used to predict child attachment quality at 12 months as a function of observed child soothability during the FFSFP reunion episode and maternal negative intrusiveness during free play sessions. The multinomial regression also included as controls were child race, family income level, and child negativity during the FFSFP still face episode. The later was included to control for the potential of affective spillover from the challenge session into the reunion period. Overall, the model was significant [ $\chi^2 = 24.84, p < .01$ ], as were the effects of observed child soothability (during the FFSFP reunion) [ $\chi^2 = 6.47, p < .05$ ] and maternal negative intrusiveness during free play [ $\chi^2 = 8.46, p < .05$ ]. Specifically, low child soothability during the FFSFP reunion differentially predicted insecure-ambivalent attachment quality from secure [ $\beta = -.04, \sigma = .02; p < .01$ ] and insecure-avoidant [ $\beta = -.03, \sigma = .01; p < .05$ ] attachments. Maternal negative intrusiveness during free play differentially predicted insecure-avoidant attachment quality from secure [ $\beta = .50, \sigma = .24; p < .05$ ] and insecure-ambivalent [ $\beta = .33, \sigma = .16; p < .05$ ] attachments. Each of these findings represent unique main effects; there was no evidence of any interaction between child and maternal variables in the differential prediction of child attachment quality.

#### 5.3. Infant negativity, attachment classification and later behavior problems

A hierarchical regression analysis was conducted to examine the effects of 6-month child and mother variables and 12-month attachment quality on child emotional reactivity and affective problems at 24 months of age. The first model in the hierarchical regression included controls for ethnicity family income-to-needs ratio; the second model included the main effects and interaction term for observed child observed soothability during the FFSFP reunion and maternal sensitivity (based on findings from descriptive analyses); and the third model included effects of different attachment qualities and their interactive effects with maternal sensitivity (ambivalent and avoidant attachments were dummy-coded with *secure* as the reference).

For maternal-rated emotional reactivity at 24 months there were no substantive findings of interest related to observed child soothability, attachment, and maternal sensitivity. There were, however, several findings of interest for maternal-rated affective problems at 24 months of age. As seen in Table 2, the first model did not account for a significant amount of variance of child affective problems. In the second model, maternal sensitivity was negatively associated with later affective problems [ $\beta = -.42, \sigma = .13; t(90) = -3.15, p < .01$ ], but this effect was moderated by observed child soothability [ $\beta = -.12, \sigma = .01; t(90) = -2.43, p < .05$ ]. This effect

was probed using procedures outlined by Aiken and West (1991) and using utilities provided by Preacher, Curran, and Bauer (2006). Results indicated that maternal sensitivity was negatively associated with child affective problems when the children were at average levels [ $\beta = -.42$ ,  $\sigma = .13$ ;  $t(90) = -3.19$ ,  $p < .01$ ] and one standard deviation below average levels [ $\beta = -.70$ ,  $\sigma = .18$ ;  $t(90) = -3.85$ ,  $p < .001$ ] of observed child soothability (Fig. 1). When child soothability was high, there was no effect of maternal sensitivity on later affective problems.

**[Table 2 Omitted]**

**[Figure 1 Omitted]**

In the third model, there was a marginal effect of maternal sensitivity, a main effect of insecure-ambivalent attachment (as compared to children with secure attachments), and an interaction between ambivalent attachment quality and maternal sensitivity. Probing this interaction revealed that maternal sensitivity was negatively associated with later child affective problems among children with secure [ $\beta = -.29$ ,  $\sigma = .10$ ;  $t(59) = -2.81$ ,  $p < .01$ ] and ambivalent [ $\beta = -1.81$ ,  $\sigma = .39$ ;  $t(11) = -4.60$ ,  $p < .001$ ] attachments, but not among children with avoidant attachments (Fig. 2). When examined separately by attachment classification, maternal sensitivity accounted for up to two-thirds of the variance in affective problems among children with ambivalent attachments ( $r^2 = .67$ ); sensitivity accounted for 10% of the variation in affective problems among securely attached children and was negligible among children with avoidant attachments. Once the interaction between child attachment quality and maternal sensitivity was included in the model, the interaction between observed child soothability and maternal sensitivity was no longer a significant predictor of later affective problems.

**[Figure 2 Omitted]**

#### 5.4. Replication of analyses using the four-way attachment classifications

Because of the limited number of children with disorganized attachment classifications, the above analyses were conducted based on a three-way (ABC) classification of child attachment quality. However, all of the above analyses were replicated with the inclusion of disorganized attachment quality as an independent attachment classification. The key main effects and interactions did not change as a function of distinguishing the disorganized attachments, nor did any significant effects emerge as related to the disorganized classification.

## 6. Discussion

The current study examined the unique prediction of infant attachment quality as a function of child and maternal variables as well as the roles of early child variables and later attachment insecurity as markers of heightened risk or susceptibility to parental effects on children's emotional development. Partially consistent with previous research on unique predictors of child attachment quality in infancy, mother characteristics were associated with differentiating

children with insecure-avoidant attachments and child characteristics were associated with differentiating children with insecure-ambivalent attachments. Specifically, high levels of maternal negative intrusiveness during free play at 6 months were associated with a greater likelihood of having an insecure-avoidant attachment at 1 year of age, and lower levels of observed child soothability at 6 months were associated with a greater likelihood of having a later insecure-ambivalent attachment. This latter finding is interesting for two reasons. First, there was greater predictive validity of the observed measure of soothability vs. the maternal report measure, and that these two measures were not significantly related (although a positive correlation did trend towards significance). Collectively, these findings may suggest that maternal report reflects both the child's experience and the mother's perceptions, which may be influenced by environmental, interpersonal, and intrapersonal maternal factors (Matheny, Wilson, & Thoben, 1987), although several studies report both multi-method convergence and validity for maternal report of child temperament (Rothbart & Hwang, 2002). Second, given the clear importance of infant negative affectivity as a means of communicating emotional needs, temperamental predispositions towards heightened negative affect with the parent may be a unique source of child influence on the development of attachment relationships (Rothbart & Bates, 1998). More specifically, poor soothability over the first year of life may be particularly predictive of insecure-ambivalent attachment quality based on the theorized need of insecure-ambivalent children to increase the expression of negative emotionality in order to obtain and hold the attention of an otherwise inconsistent or unavailable caregiver (Ainsworth et al., 1978 and Belsky et al., 1984). By contrast, children with secure attachments are expected to down-regulate negativity in response to their caregiver, insecure-avoidant children are expected to minimize negative affectivity in the presence of the caregiver, and insecure-disorganized children are expected to display mixed or contradictory affective signals to the caregiver (Ainsworth et al., 1978, Cassidy, 1994 and Main and Solomon, 1990). Only insecure-ambivalent children are expected to maintain or increase their negative affectivity while being comforted by a caregiver, suggesting a potential deficit in soothability, at least within the context of the dyadic interaction with the mother.

It is important to note that ambivalent attachment quality was only associated with child negativity when expressed in the context of maternal soothing, consistent with previous reports of child behavior during comparable laboratory tasks (Kochanska et al., 2005). One explanation for this context-specific finding is that insecure-ambivalent children may develop an over-dependence on the caregiver that emerges as a function of repeated attempts to gain increasing degrees of her attention when distressed (Main & Solomon, 1986). Even once they achieve this goal, the heightened reactivity may continue due to a fear that once the negative emotionality ends, so will the elicited parental warmth and responsiveness. Thus, in a situation involving relatively benign stimuli that may call for only moderate levels of arousal, insecure-ambivalent children may display exaggerated fear responses in order to obtain caregiver warmth and comfort. To this effect, Braungart and Stifter (1991) reported that in the SSP infants with ambivalent attachments displayed intense levels of negative reactivity and little regulation during

reunion episodes (see also Ainsworth et al., 1978 and Shiller et al., 1986). Although this strategy may be adaptive for these infants in terms of eliciting increased attention from an unresponsive caregiver, in the long term it may undermine the development of their self-regulatory abilities (Derryberry and Rothbart, 1988 and Eisenberg and Fabes, 1992).

The prior explanation for this finding presupposes that infant soothability at 6 months is being expressed *independent* of an already existing attachment schema for the child. An alternative explanation is that infant soothability at 6 months of age is actually an early behavioral manifestation of the insecure-ambivalent attachment relationship. To this effect, consider the context of the Strange Situation Paradigm, particularly the episodes during which resistant and ambivalent behavior is coded. Each of these episodes involve a reunion with the mother that is preceded by a separation episode in which the mother leaves the child either with just the stranger or all alone in the strange room. In many ways, this procedure is similar to the FFSFP administered at the 6-month laboratory visit (e.g., the child experiences a developmentally appropriate stressor followed by an opportunity to be actively soothed by the mother). Thus, given the developmental timing of these measures and the comparability of the assessments, it is alternatively possible that what was observed at 6 months was not a temperamental characteristic of the child, but rather an early expression of the developing insecure-ambivalent attachment relationship. Unfortunately, the current study is unable to provide empirical evidence that favors one possibility above and beyond the other.

The second noteworthy finding from this study is that observed child soothability during the FFSFP reunion moderated the association between maternal sensitivity during free play and subsequent child affective problems at 24 months of age. This finding is consistent with previous reports that infant negativity may be a marker of increased susceptibility to environmental (in this case, caregiving) influences on young children (Belsky, Bakermans-Kranenburg & van IJzendoorn, 2007). The current study reports that less maternal sensitivity was associated with later child affective problems only among children who displayed average or high levels of negativity during soothing as infants. Similarly, the association between maternal sensitivity and child affective problems was also limited to children with insecure-ambivalent attachments to their mothers. Comparable associations between parenting and child affective problems were not observed for children with secure or insecure-avoidant attachments. Furthermore, when this interaction was considered simultaneously with the previous child soothability by maternal sensitivity interaction, only the former remained independently predictive of subsequent child affective problems.

This last finding is particularly intriguing given the association between poor infant soothability at 6 months and child insecure-ambivalent attachment quality at 12 months. It is possible that a new moderating influence in toddlerhood (insecure-ambivalent attachment) may emerge from an earlier moderating influence (poor soothability), suggesting a developmental shift in terms of what characteristic is associated with increased susceptibility to parental influence. To this effect, Cox et al. (2010) has noted the importance of cascading effects within the developmental

system as they pertain to both main effect and coactional models of development. With development comes the emergence of new organismic phenomenon and subsequent shifts in loci of control within the developmental system. In the present study, the developmental transition from poor soothability to the formation of insecure-ambivalent attachment relationships may represent such a shift as the marker for heightened child susceptibility to environmental influence changes over time. This interpretation suggests that individual variation in susceptibility may stem from both constitutional and transactional factors, and as such is likely a characteristic of the developmental system and not a single variable, trait, or genotype. Of course, this interpretation also rests on the assumption that the association between poor soothability and insecure-ambivalent attachment represents a developmental change and is not simply two measures of the same underlying construct across time.

There are multiple strengths to the current study that differentiate it from previous research on the interplay between parenting, temperament, attachment and early emotional development. Observational coding of both maternal sensitivity and negative intrusiveness during free play provides a more holistic assessment of the maternal parenting behaviors. Similarly, including observations of child negativity across multiple contexts, in addition to maternal reports of child temperamental qualities, provides a more complete and objective assessment of children's affective predispositions. There are also some methodological limitations of the current study that should be considered. Although the overall sample was reasonable for a longitudinal study of this nature, the number of children with insecure-ambivalent attachments was relatively small ( $n = 15$ , 10% of the full sample), although proportionate to larger studies such as the NICHD Study of Early Child Care and Youth Development, multi-site national study of 1060 children with comparable attachment data (insecure-ambivalent attachment rate = 9.2%; NICHD ECCRN, 2001). Therefore, whereas the restricted sample size may limit the power of the current analyses it does not necessarily limit the generalizability of the current results. Also, given the question of whether what was observed in the current study reflects temperamental continuity or early emergence of ambivalent attachment dynamics, it would be highly worthwhile to add longitudinal assessments of soothability prior to 6 months and following 12 months of age to better understand the trajectory of this potential temperamental contribution, and how it may influence or be influenced by the emergence of insecure-ambivalent attachment formation. Lastly, it is possible that larger differences in child behavior and emotionality could be found based on differentiating subgroups within specific attachment categories (i.e.,  $A_1$ ,  $A_2$ ,  $B_1$ - $B_4$ ,  $C_1$ ,  $C_2$ ) (Frodi and Thompson, 1985 and Thompson and Lamb, 1983); however, this study was under-powered to test such intriguing hypotheses. Despite these limitations, the current study provides new insight into potential child factors associated with early attachment formation as well as a developmental systems perspective on children's heightened susceptibility to parenting influences.

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