The Relations among Infant Temperament, Security of Attachment, and Behavioral Inhibition at Twenty-Four Months[1]

By: Susan D. Calkins and Nathan A. Fox

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Abstract:

The purpose of this study was to examine the relations among infant temperament, attachment, and behavioral inhibition. 52 infants were seen at 2 days, 5, 14, and 24 months of age. Assessments were made of temperament at 2 days and 5 months of age, and attachment and behavioral inhibition were assessed at 14 and 24 months, respectively. EKG was recorded at each assessment, and measures of heart period and vagal tone were computed. Distress to pacifier withdrawal at 2 days of age was related to insecure attachment at 14 months. 2 types of distress reactivity at 5 months, reactivity to frustration and reactivity to novelty, were identified and related to high vagal tone. Attachment classification at 14 months was directly related to inhibited behavior at 24 months. Infants classified as insecure/resistant were more inhibited than those classified as insecure/avoidant. In addition, an interaction of infant reactivity to frustration and attachment classification was found to predict inhibition at 24 months. Infants classified as insecure/resistant and who had not cried to the arm restraint procedure at 5 months were the most inhibited at 24 months. These findings are discussed in terms of hypotheses regarding multiple modes of distress reactivity and regulation in early infancy and their different social and behavioral outcomes.

Article:

Isolating early temperamental patterns that are predictive of later social behavior has been the focus of a considerable amount of recent research (e.g., Bates, 1987; Broberg, Lamb, & Hwang, 1990; Daniels & Plomin, 1985). Of particular interest has been the role of temperament in the developing attachment relationship (Bates, Maslin, & Frankel, 1985; Belsky, Taylor, & Bovine, 1984; Fox, Kimmerly, & Schafer, 1991; Goldsmith & Alansky, 1987; Miyake, Chen, & Campos, 1985; Vaughn, Lefever, Seifer, & Barglow, 1989) and in the etiology of shy, withdrawn, and inhibited behavior (Daniels & Plomin, 1985; Garcia-Coll, Kagan, & Reznick, 1984; Kagan, Reznick, & Snidman, 1987; Rothbart, 1988, 1989b; Rubin, Le- Mare, & Lollis, 1990; Rubin & Lollis, 1988). The assumption of much of this work has been that certain temperamental characteristics display themselves early in infancy, exhibit stability throughout childhood, and influence the infant's developing social relationships and social interactions (Bates, 1987; Riese,

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1987). However, there has not been a great deal of agreement with regard to the way in which temperament may exert its influence, particularly its role in developing attachments.

Assessment of mother-infant attachment has traditionally been conducted using the paradigm known as the Strange Situation (Ainsworth, Blehar, Waters, & Wall, 1978). The procedure involves a series of separations and reunions designed to elicit the extent to which a child uses the mother as a secure base from which to explore the environment and as a source of comfort in time of stress. The child's attachment system maintains a balance between exploration and proximity seeking. In moments of duress, when the child feels insecure, the balance shifts from exploring the environment to seeking proximity to the attachment figure. On the basis of infant behaviors observed throughout a series of seven brief episodes, infants are classified as avoidant and insecure (A), secure (B), or resistant and insecure (C). Within each of these three broad classifications, there are subgroups (Al, A2, B1, B2, B3, B4, C1, C2) as well. Infants classified as avoidant/insecure tend not to be upset when they are separated from their mothers, and are conspicuous in their attempts to evade proximity and contact with the mother during reunions. Conversely, securely attached infants tend to seek proximity and contact with their mothers, and may or may not, depending on their subgroup classification, become upset when mother leaves. Infants classified as resistant/insecure tend to experience distress at separation, and mix proximity-seeking behaviors with resistant behaviors upon reunion. The origin of the insecure infant's attachment to the mother is due, in part, to the style of sensitivity and responsivity of the mother. Avoidant/insecure infants may have been exposed to an angry or controlling mother, while resistant/insecure infants may have a mother insensitive to their signals (Ainsworth et al., 1978). Attachment theorists in the tradition of Ainsworth emphasize that the quality of attachment is, to a significant degree, dependent on the mother's sensitivity to her infant. Infant characteristics may influence the parent's behavior, but the direction of influence is, from the attachment theorist's perspective, from parent to infant (Sroufe, 1985).

Ainsworth's original work on infant attachment and maternal behavior has generated a great deal of research designed to specify the precise role of mother versus infant characteristics in developing attachments (Egeland & Sroufe, 1981; Waters & Deane, 1982). Much of this research has evaluated the role of infant temperament versus maternal caretaking style in the development of secure versus insecure attachment relationships. Goldsmith and Alansky (1987) provide a review of the literature examining the relations among presumably endogenous infant characteristics, behavior in the Strange Situation, and attachment classification. Three theoretical positions have received considerable attention. First, temperament may directly affect behavior in the Strange Situation and attachment classification. That is, temperamental characteristics such as irritability affect the way in which a child is likely to react to separation and reunion. An infant who is highly irritable is likely to experience extreme distress at separation and is therefore likely to seek proximity and contact upon mother's return, though he or she may not calm down. These children are likely to be classified as resistant/insecure. Second, maternal behaviors thought to influence security of attachment may affect the development of temperament. From this perspective, the mother's care- giving style and the subsequent quality of the bond between mother and infant may alter the child's expression of his or her temperament. Third, temperament may influence behavior in the Strange Situation but not security of attachment. Infants who are temperamentally irritable may fuss and cry in response to separation during the Strange Situation; however, their primary classification (secure/insecure) is not

affected by this temperamental predisposition (see Belsky & Bovine, 1987). Of these three perspectives, no single position has generated unequivocal empirical support.

A further difficulty with synthesizing the current literature is that there are a number of procedures used to assess temperament, and there have been several strategies for comparing different types of attachments. A number of studies have used parental report of temperament in exploring this relation. These studies have found only weak support for a relation between the two. Studies using direct observations of temperament, as opposed to parent questionnaires, have produced the strongest findings to date. This research suggests that a cluster of behaviors reflecting irritability, fussiness, proneness to distress, and difficult temperament predicts distress in the Strange Situation (Connell & Thompson, 1986; Frodi & Thompson, 1985; Waters, Vaughn, & Egeland, 1980). For example, Vaughn (Vaughn et al., 1989) found that difficult temperament predicted distress during separation only, suggesting that infant characteristics influence Strange Situation behaviors. Similarly, Gunnar (Gunnar, Mangelsdorf, Larson, & Hertsgaard, 1989) found a relation between adrenocortical activity and emotional reaction to separation, but no relations between any of the standard attachment classification groupings and adrenocortical activity. Still other researchers have suggested that irritability seen in the neonatal period is associated with resistant/insecure attachments (Crockenberg, 1981; Sagi et al., 1985). Crockenberg (1981) found that the best predictor of a secure attachment relationship was, in fact, maternal social support. Irritability was related to insecure attachments, but only in cases where the mother had little support to assist her in coping with a difficult child. As an attempt to bridge the temperament-attachment division, Belsky and Bovine (1987) argue that proneness-todistress is a predictor of irritability in the Strange Situation, but that this irritability predicts classifications of B3 through C2, not solely resistant/insecure (C) attachment.

While there is some evidence concerning irritability and the development of resistant/insecure attachments, there is less clarity on temperamental predictors of avoidant/ insecure attachments. Lewis and Feiring (1989) recently examined the possibility that avoidant/insecure infants were more object- oriented and less person-oriented than secure and resistant/insecure infants, and that secure infants were less irritable than resistant/insecure and avoidant/insecure infants. Based on assessments of infant temperament at 3 months and attachment at 12 months, Lewis and Feiring concluded that avoidant/ insecure infants were more object-oriented, and that there was a trend for them to be less person-oriented. No differences existed among these three groups in terms of crying and fretting, although the modified Strange Situation they employed may have produced a less stressful situation. In a study comparing dyads of extremely irritable infants and their mothers to dyads of nonirritable infants and mothers, van den Boom (1989) found that avoidant/insecure and resistant/insecure infants were similar in neonatal reactivity as indexed by irritability, and suggested that differences in their attachment behavior and classification were due to differences in maternal caretaking styles. Vaughn and colleagues (Vaughn et al., 1992) examined attachment (Q-sort data) and temperament (maternal report) in six samples of infants. Their analyses indicated that a small portion of the variance associated with attachment behavior was due to a temperamental dimension they termed "emotional reactivity." Vaughn and colleagues conclude that the dimensions of attachment and temperament may well share an emotional component, and indeed that the two domains may be thought of as lying on a single continuum.

Questions remain concerning the precise nature of the reactivity-insecurity link. The issue of the role of reactivity in developing attachments may be more complex than identifying a direct link between neonatal behaviors and later insecure classification. Recent models of temperament (Roth- bait, 1989a; Rothbart & Derryberry, 1981; Rothbart & Posner, 1985) have stressed the importance of individual differences in reactivity and regulation. Reactivity refers to emotional, attentional, and motoric responses to stimuli, and displays itself in arousability in both behavioral and physiologi cal systerns (Rothbart, 1989a). Fox (1989) and Stifter and Fox (1990) have demonstrated that there are stable, individual differences in reactivity during the first year of life. Infants who cried to pacifier withdrawal at 2 days were likely to cry to arm restraint at 5 months, and were likely to be rated by their mothers as being more active. These differences in reactivity were associated with individual differences in autonomic patterning; infants who cried in the newborn period had a higher vagal tone than did non- criers. Five-month-old infants who cried to arm restraint had a higher vagal tone than did noncriers. Infants who cried to both events had higher vagal tone and heart period than those who did not cry to both events, and were rated by their mothers as being more distressed to limitations. Fox and Stifter (1989) argue that infant negative affect in response to mildly stressful and frustrating events is related to individual differences in vagal tone. This particular reactive response may not be similar to the temperamental disposition of irritability or difficult temperament thought to be the precursor of resistant/insecure attachment. Infants who react intensely to frustration with anger or negative affect may not be perceived as irritable infants, or as having negative moods. Indeed, Fox (1989) found that infants displaying high frustrative reactivity in the lab at 5 months were likely to display positive approach behaviors toward strangers and novel events at 14 months, compared to those infants who were less reactive to frustration. Fox speculated that the frustrated child is not the irritable or difficult child, but is instead a child eager to explore the environment unhindered by parental limitations, and may be more social and less fearful when encountering new people. In contrast to this positive interpretation of reactivity is the finding of Izard and colleagues (Izard et al., 1991) that infants who exhibited high vagal tone (and were presumably more reactive) were more likely to be classified as insecure at 13 months of age. The precise relations between autonomic patterning and reactivity in predicting attachment and social behavior remain unclear.

Distress reactivity may not reflect a single dimension of negative emotional responding but may encompass distress to frustration, as well as distress to novelty. Indeed, many assessments of temperament are designed to tap separate dimensions of negative emotionality (Buss & Plomin, 1984; Rothbart, 1981). Some infants react negatively to situations that are frustrating, but may not be irritable or fussy in response to novel stimulation or people. Other infants, however, may react negatively to novelty because of its fear-inducing elements. The frequent encounters young infants have with new people, places, and objects may engender numerous occasions of irritable behavior in these types of infants. However, these infants may not become irritable in response to restraining events. In fact, they may take some comfort in being held or picked up in a manner that restricts their movement because it provides fewer opportunities for them to encounter frightening stimuli. Both types of infants may, early in life, demonstrate instances of negative mood or temperament in response to certain types of events. The origins of that negative mood, however, may be very different.

Previous research that has attempted to relate early irritability to later attachment may not have adequately assessed these separate dimensions of reactivity to frustration or novelty and, consequently, may have been unable to isolate correlates of avoidant/ insecure ("A") versus resistant/insecure ("C") attachment classification. Isolating the causes of distress reactivity in infancy, and in Strange Situation behavior, would make it possible to distinguish between insecurely attached infants. Indeed, recent research by Fhompson, Connell, and Bridges (1988) suggests that temperamental fear predicts negative reactions in the Strange Situation. And, Weber, Levitt, and Clarke (1986) found that infant difficulty as indexed by the Dimensions of Temperament Survey correlated to Strange Situation resistance to both mother and the stranger. These findings imply that distress in the Strange Situation has a strong fear component that may generalize to other social interactions. Goldsmith, Bradshaw, and Rieser-Danner (1986) suggest that a low threshold for fear may influence the tendency toward proximity-seeking behavior, thereby reducing the opportunity for exploratory behavior.

The first goal of the present study was to assess the efficacy of this model of multiple modes of distress reactivity (novelty vs. frustration) with specific attention to its role in emerging attachment classifications. It may be possible to isolate different aspects of distress reactivity that contribute to very different types of insecure attachments, and that would allow greater power in predicting later social interactional outcomes and personality development.

Such a perspective suggests a continuity between temperament, attachment, and later social behavior. Fhat attachment may have implications for later social development is an idea that has a long history (see Belsky & Nezworski, 1988; Matas, Arend, & Sroufe, 1978; Sroufe, 1978, 1983, 1988). Rubin (Rubin et al., 1990; Rubin & Lollis, 1988), in discussing the similarity between inhibited behavior and the behavior of resistant/insecurely attached infants, has recently described multiple pathways to social withdrawal that have their origin in primary attachments and their influence on the development of fearful and shy behavior. Rubin points out, however, that these pathways are the result of the complex interaction among "infant endogeny, socioecological setting conditions, and the socialization practices of the parent(s)" (Rubin & Lollis, 1988, p. 232). Kagan and colleagues (Garcia- Coll et al., 1984) have labeled the early form of shy behavior as behavioral inhibition. Inhibited responses are manifest in response to novel objects, events, and people. The research on behavioral inhibition suggests that early behavioral indices of the trait are high levels of motor arousal and irritability (Kagan, Reznick, & Gibbons, 1989). In addition, Kagan's research has also identified physiological correlates of inhibited behavior; high and stable heart rates are associated with shy, introverted behavior in young children (Kagan et al., 1987). There is reason to believe, then, that a relation exists between early reactivity to novelty, attachment, and later inhibited behavior.

The second goal of the present investigation was to describe the possible pathways to shyness in early childhood. Behavioral inhibition to the unfamiliar appears during the latter part of the first and the beginning of the second year of life and is a precursor to withdrawn behavior in peer interactions (Broberg et al., 1990). By examining temperament and attachment data from a longitudinal sample of infants seen from birth to 2 years of age, it was hoped that different paths to early social behavior could be identified. It was hypothesized that variations in response to frustrating and novel events would predict both behavior in the Strange Situation and attachment

classification, and that these early temperamental differences would interact with attachment to produce inhibited and uninhibited behavior in toddlerhood.

The following study was designed to examine the relation between individual differences in both physiological and behavioral reactivity assessed during the first year and attachment status and inhibition in the second year. Infants were presented with stimuli designed to elicit both frustrative responses and responses to novelty. In addition, heart rate was recorded at all assessment points, and measures of heart period and vagal tone (Porges, 1986) were computed. Finally, maternal report of infant temperament was acquired when the infant was 5, 14, and 24 months of age. This multimeasure approach was intended to allow the examination of the relations between infant distress reactivity and attachment classification, as well as to assess their impact on the development of shy, inhibited behavior.

METHOD

Subjects

The subjects of this study were 52 healthy, full-term infants. Four of the 52 infants were black, and all infants were from middle-class families. The criteria for selection were gestational age between 38 and 42 weeks, birth weight between 2,500 and 4,090 grams, vaginal or caesarean delivery, Apgar scores of at least 7 at 1 min and 8 at 5 min, and a normal pediatric examination. Pregnancies were uncomplicated by serious illness, and deliveries did not involve mid or high forceps or general anesthesia. The infants were assessed at 2 days of age and 5, 14, and 24 months of age. On average, newborn subjects (25 males, 27 females) were tested at 48 hours of age. Of these infants, 50 (25 males, 25 females) were seen at 5 months of age (M = 5.04 months), 52 (25 males, 27 females) were seen at 14 months (M = 14.45 months), and 48 (23 males and 25 females) were seen at 24 months of age (M = 24.67 months). It must be noted that many of the longitudinal analyses reported here concern fewer than 48-52 subjects. In some case, infants were too tired to complete part of an assessment at a given age. This, combined with the fact that some infants missed one or more of the four assessments, accounts for the variability in the number of subjects across the different analyses.

Procedures

General overview.—A description of the procedures administered at the newborn and 5-month age period may be found in Fox (1989) and Stifter and Fox (1990). Briefly, in the newborn period, 10 min of heart rate were recorded while the infant's state was observed. Periods of both active and quiet sleep were recorded. A pacifier withdrawal task (Bell, Weller, & Waldrop, 1971) was administered to the infant while he or she was in a quiet alert state. At 5 months of age, infants were seen in the laboratory. Five minutes of EKG were recorded while the infant sat in his or her mother's lap. Infants were then placed in an infant seat and the mother was instructed to gently hold her infant's hands down at the infant's side for 2 min (or less if the child cried). The purpose of this procedure was to observe the infant's response to a restraint imposed by the mother. Fhis response was believed to be indicative of the infant's threshold for frustration. The infant was then shown two sets of eight visual stimuli, consisting of slides of colorful geometric patterns. The slide presentation was intended to elicit the infant's response to novel stimuli. Each slide was presented for 10 sec with an average interslide interval of 15 sec.

Fourteen-month procedures.—At 14 months, infant and mother returned to the laboratory, and 5 min of heart rate were recorded while the infant sat in a high chair with the mother sitting next to him or her. The infant and mother were taken to a laboratory playroom and videotaped during a series of procedures that included (1) a free-play period, (2) interaction with an unfamiliar adult, (3) presentation of a novel object, and (4) the Ainsworth and Wittig Strange Situation (Ainsworth et al., 1978). In the free-play situation, the child played with toys for 5 min while the mother sat in a nearby chair. Following the free-play period, an unfamiliar adult entered the room and sat on the floor with her head bowed for 3 min. The stranger then raised her head and began playing with a toy that she had brought into the room with her. If the child did not approach her within 1 min, she attempted, for a period of no more than 3 min, to engage the child in the toy. The stranger then uncovered a battery-operated robot that moved in a circular fashion and made high- pitched sounds. The child was invited to touch the robot, and was given 2 min in which to do so. The stranger then left the room, and the experimenter entered to indicate to the mother the start of the Strange Situation procedure. It should be noted that the unfamiliar adult and the Strange Situation stranger were two different adult females whom the child had not seen during the previous assessment.

Twenty-four-month procedures.—At 24 months, the infant and mother returned to the laboratory. Again, 5 min of heart

TABLE 1

PROCEDURES AND MEASURES OF TEMPERAMENT AND ATTACHMENT AT 2 DAYS, 5 MONTHS, 14 MONTHS, AND 24 MONTHS

Age at Assessment	Procedures	Measures
2 Days	Pacifier withdrawal	Cry/no cry, latency to cry
	EKG recording	Heart period, vagal tone
5 Months	Arm restraint	Cry/no cry, latency to cry
	Novel slide stimuli	Cry/no cry, frequency of crying
	Peek-a-boo	Motor activity
	IBQ	6 scales
	EKG recording	Heart period, vagal tone
14 Months	Ainsworth-Wittig Strange Situation	Attachment classification, cry frequency
	Toddler Behavior Assessment Questionnaire	5 scales
	EKG recording	Heart period, vagal tone
24 Months	Free play, stranger approach	Behavioral inhibition score
	Presentation of novel object, robot	
	Clown approach	
	Toddler Behavior Assessment Questionnaire	5 scales
	EKG recording	Heart period, vagal tone

rate were recorded while the infant sat in a high chair next to the mother. The mother and infant were videotaped in a modified Strange Situation that included the following segments: a 10-min free play, a brief (3 min or less) separation, and a reunion (5 min). Following the modified Strange Situation, an unfamiliar adult entered the room and sat silently in a chair opposite the mother for 30 sec. The stranger then spoke to the mother for 30 sec, but did not attempt to interact with the child. After the 30-sec period, the stranger uncovered a battery- operated robot

that moved in a circular fashion and made high-pitched sounds. The child was invited to touch the robot, and was given 1 min in which to do so. The child was then presented with a tunnel large enough for the child to enter, and invited by the stranger to do so. This epoch lasted for 2 min. After this 2-min period, the stranger left the room. Two minutes later, an adult clown first knocked and opened the playroom door, then entered and stood silently for 30 sec. The clown then attempted to interact with the child, and invited the child to touch her (the clown's) nose.

Measures

Table 1 summarizes the procedures and measures used at each of the four ages. It should be noted that a number of measures from each of the four ages were collected as part of this longitudinal project. Among these are measures that will not be reported as part of the present investigation. These measures include, for example, detailed affect coding at many of the ages. These data will not be reported here, as the focus of the investigation is on the outcome measure of inhibition at 2 years of age, and the role of distress reactivity and attachment in its development.

Heart rate.—The EKG data were quantified off line. The r–r intervals were timed via computer to the nearest millisecond. This data set was edited to eliminate periods of artifact due to spurious or missed beats. Mean heart period and an estimate of vagal tone, V, were then computed. A description of the method of quantification of vagal tone may be found in Porges (1986), and a rationale for the choice of this measure is described in Fox (1989). Briefly, vagal tone is a measure of the variability in heart rate pattern that occurs at the frequency of breathing. The vagal tone measure represents an attempt to quantify the magnitude of the contribution of respiratory sinus arrythmia (RSA), thought to be mediated by the vagus nerve. The vagus is the primary nerve of the parasympathetic nervous system, and through a process of providing negative feedback in response to sympathetic activation, helps maintain a homeostatic state. In this way, observed differences in the amount of control exerted on the heart rate are thought to reflect individual differences in regulation (Porges, 1991). High heart rate variability, or vagal tone, reflects neural, and perhaps behavioral, regulation. Through a series steps including complex detrending of the heart period data and computation of a power spectrum from the residualized heart period data set, one can obtain an estimate of the degree of vagal influence on heart rate. The particular method developed by Porges to obtain this estimate has been shown to be more sensitive to mechanical and pharmacological manipulations of vagal activity than other more common measures of heart rate variability.

Through a series of studies, Fox (1989; Fox & Stifter, 1990) and Porges have documented the relations between vagal tone and infant affective reactivity. For example, Stifter and Fox (1990) report that infants with high vagal tone were more likely to cry to a number of different elicitors at both 2 days of age and 5 months of age. Fox (1989) found that infants with high vagal tone were more likely to cry to arm restraint at 5 months. And Stifter, Fox, and Porges (1989) reported that 5-month-old infants with high vagal tone were more facially expressive in response to an unfamiliar adult. Vagal tone was computed in the current study, and its relation to behavioral measures of distress reactivity was explored.

Distress reactivity.—At 2 days of age, distress reactivity was observed in response to pacifier withdrawal. Infant cry behavior was audiotaped and categorized as either cry or no cry, and the

latency to cry was recorded. At 5 months, infant responses during the arm restraint task were observed and videotaped. Infant cry behavior was categorized as either cry/no cry, and the latency to cry was recorded. A measure of reaction to novelty was coded during the visual stimuli and again indexed by the presence or absence of crying and the frequency of crying. Cry reactivity, as indexed by the presence or absence of crying, was stable from the neonatal to the 5-month assessment of frustration ($x2 = 4.62$, $p < .03$) and novelty ($x2 = 5.48$, $p < .02$). Reactivity to novelty and reactivity to frustration were not significantly correlated ($p < .15$).

Temperament scales.—At 5, 14, and 24 months of age, maternal assessment of tem perament was obtained using the Infant Behavior Questionnaire (IBQ, 5 months; Rothbart, 1981) and the Toddler Behavior Assessment Questionnaire (TBAQ, 14 and 24 months; Goldsmith, 1987). Six scales were computed from the original IBQ items: activity level, distress to limitations, duration of orientation, smiling, soothability, and latency to approach novelty. At 14 months and 24 months, five scales—anger, interest, pleasure, activity, and social fear—were computed from the TBAQ items.

Attachment coding.—The Strange Situation at 14 months was videotaped through a one-way mirror for later coding. Attachment classification was determined by raters who were trained in the Strange Situation classification and who achieved reliability with an experienced trainer (Christine Maslin). Coders were first trained with videotapes of 20 infants who were not subjects in the present investigation. Reliability was then computed on eight subjects from the present in-vestigation.

Strange Situation distress.—At 14 months, distress reactivity was assessed during the Strange Situation. Two summary scores, representing the frequency of crying during separation (episodes 4 and 6) and reunion (episodes 5 and 7) (Ainsworth et al., 1978), were computed. These two measures were positively correlated ($r = .34$, $p < .01$).

Behavioral inhibition.—A measure of behavioral inhibition for each infant was computed by standardizing the sum of the following standardized variables from the 24-month assessment: proximity to mother during free play; latency to vocalize during free play; proximity to mother during stranger approach, clown, robot, and tunnel sequences; latency to approach stranger, tunnel, robot, and clown; latency to cry to the approach of the stranger; latency to vocalize to the stranger and the clown. Behavioral inhibition was defined as high frequencies of proximal play; long latencies to vocalize and to approach the stranger, robot, tunnel, and clown; and short latencies to fret or cry to these events. The mean score on this index was .00, with a maximum of 2.63 and a minimum of – 2.67. These measures are similar to those used by Kagan and col-leagues in their studies of both selected and unselected samples (Kagan et al., 1989). Stability of the measure is quite high with selected samples, although unselected samples studied show moderate stability as well (Broberg et al., 1990; Reznick, Gibons, Johnson, & McDonough, 1989). The summary score index of behavioral inhibition consisted of a number of behaviors that showed moderate to high intercorrelations, although some behaviors that showed low correla-tions were considered to be characteristic of inhibition, and were therefore included in the index. Many of the behaviors reflecting inhibition may or may not co-occur (Reznick et al., 1989). Co-occurrence will likely be highest for those infants demonstrating extremely inhibited or uninhibited behavior.

RESULTS

Relations between Temperament and Attachment

Neonatal reactivity and attachment.— To test the hypothesis of an association between neonatal distress reactivity, as indexed by crying to pacifier withdrawal, and insecure attachment, a chi-square analysis between attachment classification and distress reactivity was computed. No relation was found between neonatal distress reactivity and ABC attachment. However, a second analysis of secure/insecure attachment and neonatal reactivity revealed a significant relation between the two. Table 2 contains the frequencies for these factors. Infants classified as insecure ("A" and "C" infants) were more likely to cry to pacifier withdrawal than those classified as secure ("B" infants), $x2(1) = 4.36$, $p < .03$. The secure versus insecure groups were also compared on the measure latency to cry to pacifier withdrawal. While the insecure group displayed a shorter latency (M = 37.6 sec) than did the secure group (M = 47.11 sec), this difference was not significant.

Five-month reactivity and attachment.—Table 3 presents the frequencies of infants classified as frustrated and fearful re-

TABLE 2

14-MONTH ATTACHMENT BY RESPONSE TO PACIFIER WITHDRAWAL AT 2 DAYS

	ATTACHMENT CLASSIFICATION	
RESPONSE TO PACIFIER WITHDRAWAL	Insecure (A & C)	Secure (B)
Cry	11	16
No cry	3	19

NOTE.—$\chi^2 = 4.36$, $p < .03$.

actors at 5 months and their attachment classification at 14 months. In order to examine the relation between these types of reactivity and attachment, two separate analyses were conducted.

Frustrated reactivity: Five-month frustrated reactivity was indexed by response to arm restraint (cry/no cry). In order to examine the relation between frustrated reactivity and attachment, a chi-square analysis between the factors attachment classification (ABC) and reactivity (cry/no cry) was computed. The analysis revealed no significant relation between crying to arm restraint and ABC attachment classification. In terms of latency to cry to arm restraint, there was no significant difference among the "A" (M = 83.7 sec), "B" (M = 89.0 sec), or "C" (M = 107.3 sec) attachment groups.

Fearful reactivity: Five-month fearful reactivity was indexed by response to the novel visual stimuli (cry/no cry). In order to examine the relation between fearful reactivity and attachment, a chi-square analysis between the factors attachment classification (ABC) and reactivity (cry/no cry) was corn-

TABLE 3

14-MONTH ATTACHMENT BY RESPONSE TO ARM RESTRAINT AND NOVEL STIMULI AT 5 MONTHS

REACTIVITY TO ARM RESTRAINT	ATTACHMENT CLASSIFICATION		
	Avoidant (A)	Secure (B)	Resistant (C)
Reactivity to arm restraint:			
Cry	4	13	2
No cry	3	21	5
Reactivity to novel stimuli:			
Cry	2	18	6

puted. The analysis revealed no significant relation between crying to novel stimuli and ABC attachment classification. In terms of frequency of crying to novel stimuli, there were no significant differences among the "A" (M = 1.7 sec), "B" (M = 3.6 sec), or "C" (M = 7.0 sec) attachment groups.

Neonatal and five-month distress reactivity and Strange Situation distress.— Measures of distress reactivity at the neonatal (latency to cry to pacifier withdrawal) and 5-month (latency to cry to arm restraint and frequency of crying to novel stimuli) period were compared to the measures of Strange Situation distress at 14 months using Pearson correlations. Analyses revealed that newborn crying to pacifier withdrawal correlated modestly with reunion, but not separation, crying ($r = -.27$, $p < .04$). Infants who exhibited shorter latencies to cry to the removal of the pacifier tended to cry more frequently during the reunion episodes of the Strange Situation. There was a trend for 5- month crying to arm restraint to correlate with separation, but not reunion, crying ($r = .24$, $p < .06$). Infants who exhibited shorter latencies to cry to arm restraint tended to cry less often during the separation episode of the Strange Situation. There was no relation between 5-month crying to novel stimuli and Strange Situation distress.

Maternal assessment of temperament and attachment.—In order to assess the relation between temperament assessments provided by mothers and attachment as measured in the Strange Situation, a number of ANOVAs comparing the subscale scores at each age across the ABC attachment groups were computed. These analyses revealed only one group difference; maternal rating of activity level on the 5-month IBQ was associated with attachment classification at 14
months, $F(2, 44) = 5.79$, $p < .01$. Infants who were classified as "A" (insecure/avoidant) in terms of attachment were rated by mothers as being most active. Infants classified as "B" (secure) in terms of attachment were rated by mothers as the least active (Tukey's HSD, $p < .01$).

Relations among heart period, vagal tone, and attachment.—The relations between vagal tone and heart period at 2 days, 5 months, 14 months, and 24 months of age and attachment at 14 months were investigated. There was no relation between heart period or vagal tone at any age and attachment at 14 months.

Relations between Temperament and Inhibited Behavior

Neonatal reactivity and inhibition.—In order to examine the relation between neonatal response to pacifier withdrawal and inhibition at 24 months of age, an ANOVA comparing the

behavioral inhibition scores of criers to noncriers was computed. Fhis analysis revealed no significant difference between the two groups on this measure. Further, an analysis of the relation between inhibition and latency to cry to pacifier withdrawal revealed no significant correlation between the two measures.

Five-month frustrated reactivity and inhibition.—In order to examine the relation between 5-month response to arm restraint and inhibition at 24 months of age, an ANOVA comparing the behavioral inhibition scores of criers to noncriers was computed. This analysis revealed no significant difference between the two groups on this measure. In addition, inhibition was not correlated with latency to cry to arm restraint.

Five-month fearful reactivity and inhibition.—At 5 months, the infants were again classified as criers or noncriers on the basis of their response to novel stimuli. An AN- OVA comparing the behavioral inhibition scores of these two groups of infants was computed. This analysis revealed no significant difference between the two groups on this measure. In addition, inhibition was not correlated with frequency of crying to novel stimuli.

Strange Situation distress and inhibition.—At 14 months, the frequency of crying during separation and reunion episodes of the Strange Situation was noted. Pearson correlations comparing scores on the index of inhibition and the frequency of crying during separation and reunion were computed. These analyses revealed a modest relation between reunion crying and inhibition ($r = .27$, $p < .04$). Infants who exhibited a high frequency of crying during the reunion episodes of the Strange Situation at 14 months were likely to display more inhibited behavior at 24 months.

Maternal assessment of temperament and inhibition.—In order to assess the relation between inhibited behavior at 24 months and maternal assessment of temperament, the IBQ and TBAQ subscale scores at each age were compared to the scores on the index of inhibition using Pearson correlations. Of the six temperament subscales assessed by mothers at 5 months of age, two were significantly correlated with behavioral inhibition. The 5-month scale assessing activity level was negatively correlated with the index of inhibition at 24 months ($r = – .32$, $p < .02$). Infants whose mothers rated them as not very active obtained high scores on the index of inhibition at 24 months. The subscale assessing smiling was also negatively correlated with behavioral inhibition ($r = – .30$, $p < .02$). Infants whose mothers rated them low on the smiling subscale displayed more inhibited behavior at 24 months.

Of the five temperament subscales assessed by mothers at 14 months of age, two were modestly related to behavioral inhibition at 24 months. The 14-month subscale assessing social fear correlated with the behavioral inhibition score at 24 months ($r = .23$, $p < .07$), as did the subscale assessing pleasure ($r = – .25$, $p < .06$). There was a trend for infants rated by their mothers as experiencing more social fear and less pleasure to be inhibited at 24 months.

Two of the five temperament subscales assessed at 24 months were significantly related to behavioral inhibition at 24 months. Mothers' ratings of their infants' level of social fear were positively related to the infants' scores on the index of inhibition ($r = .38$, $p < .01$). Infants rated by their mothers as experiencing high levels of social fear were more behaviorally inhibited in the laboratory at 24 months. There was also a negative correlation between inhibition and

mothers' ratings of activity level ($r = -.36$, $p < .01$). Infants rated by their mother as more active were less behaviorally inhibited in the laboratory at 24 months.

Relations between heart period, vagal tone, and behavioral inhibition.—The relations between vagal tone and heart period at 2 days, 5 months, 14 months, and 24 months of age and behavioral inhibition at 24 months were investigated. There was no relation between heart period or vagal tone at any age and behavioral inhibition at 24 months.

Relations between Attachment and Inhibited Behavior

Figure 1 presents the mean behavioral inhibition scores at 24 months for the three different attachment classifications (ABC) at 14 months. An ANOVA comparing the behavioral inhibition scores across the three attachment classification groups was corn puted. A significant difference was found among the three attachment groups at 14 months on the index of behavioral inhibition computed from the 24-month assessment, $F(2, 46) = 3.63$, $p < .04$. A post-hoc analysis revealed that infants who had been classified as "C" at 14 months were more behaviorally inhibited at 24 months than those classified as "A" (Tukey's HSD, $p < .01$).

Relations between Temperament and Attachment and Inhibited Behavior

To test the hypothesis that an interaction between temperament (distress reactivity) and attachment relationships produced inhibited versus uninhibited behavior, several analyses were conducted.

Neonatal reactivity, attachment, and inhibition.—The relations between response to pacifier withdrawal at 2 days, attachment at 14 months, and behavioral inhibition at 24 months were examined using a two-way ANOVA with distress reactivity (yes/no) and attachment classification (ABC) as between-subjects factors and the behavioral inhibition score as the dependent variable. The results revealed the previously reported main effect for attachment. Infants classified as "C" in terms of attachment were more inhibited than those classified as "A." Although there was no significant interaction of neonatal reactivity and attachment, the mean inhibition score for "C" infants who had cried to pacifier withdrawal was .75, (vs. – .18 for the infant who had not cried), while the mean inhibition score for "A" infants who had cried was – 1.01 (vs. – .35 for the two infants who had not cried).

Five-month frustrated reactivity, attachment, and inhibition.—The relations between response to arm restraint at 5 months, attachment classification at 14 months, and behavioral inhibition at 24 months were examined using a two-way ANOVA with 5-month frustrated crying (yes/no) and attachment classification (ABC) as between- subjects factors and the behavioral inhibition score as the dependent variable. In addition to the main effect for attachment, there was also an interaction of attachment and frustrated reactivity, $F(2, 38) = 3.77$, $p < .03$. Post-hoc analyses indicated that infants classified as "C" in terms of attachment and who did not cry to arm restraint were likely to be more inhibited than those infants classified as "C" who did cry to arm restraint, and were likely to be more inhib-

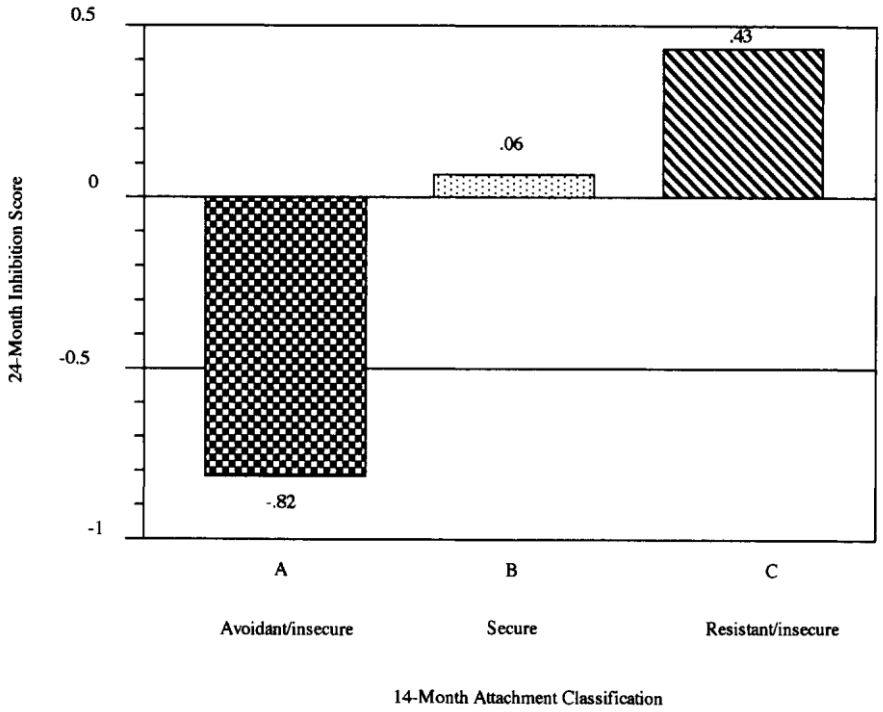

FIG. 1.—Mean behavioral inhibition score by attachment group (ABC)

ited than those infants who were classified as "A" (Tukey's HSD, $p < .01$).

Five-month fearful reactivity, attachment, and inhibition.—The relations between response to novel stimuli at 5 months, attachment classification at 14 months, and behavioral inhibition at 24 months were examined using a two-way ANOVA with 5- month novel crying (yes/no) and attachment classification (ABC) as between-subjects factors and the behavioral inhibition score as the dependent variable. Results revealed no significant relations between these variables.

Strange Situation distress, A1–B2/B3-C2 classification, and inhibition.—In order to address the issue of whether distress in the Strange Situation may be related to inhibited behavior, a number of analyses that were conducted with the ABC attachment classification were recomputed comparing the A1 through B2 attachment groups to the B3 through C2 attachment groups (Belsky & Rovine, 1987). Table 4 presents the means for these two attachment groups for the summary variables reflecting frequency of crying to separation and frequency of crying to re-union. Each ANOVA comparing the two groups on these measures revealed a significant group difference. The B3–C2 group displayed more crying to separation, $F(1, 46) = 21.5$, $p < .001$, and more crying upon reunion, $F(1, 46) = 7.214$, $p < .01$.

To determine whether this distress in the Strange Situation, rather than some elements of the attachment relationship, was influencing inhibition, the Al–B2 and B3–C2 groups were compared on the index of behavioral inhibition using an ANOVA. The analysis revealed no significant difference between these two groups on the index of inhibition.

Stability of autonomic measures.— Table 5 presents the between-age correlations for heart period and vagal tone. As can be seen, the vagal tone measure exhibited modest stability across the 19-month period, whereas measures of heart period did not.

Stifter and Fox (1990) reported a relation between frustrated reactivity and vagal tone; infants who had cried to both pacifier withdrawal and arm restraint were found to have higher vagal tone than those who had not cried to both events. In order to determine if a relation existed between auto-

TABLE 4

MEAN VALUES FOR SEPARATION AND REUNION DISTRESS BY A1–B2 AND B3–C2 ATTACHMENT GROUPS

	Attachment Classification	
Strange Situation distress	A1–B2	B3–C2
Mean separation crying frequency	1.65	3.36**
Mean reunion crying frequency	.25	3.57*

* $p < .01$.
** $p < .0001$.

nomic patterning and fearful reactivity, a similar analysis was conducted between fearful reactivity and vagal tone. Those infants who had cried to both pacifier withdrawal and the presentation of novel stimuli were compared to those infants who had cried to neither event on measures of vagal tone and heart period at 5 months. Infants who had cried to both events tended to exhibit higher vagal tone than did infants who did not cry to both events, $F(1, 28) = 3.83$, $p < .06$.

DISCUSSION

One of the questions asked in the present study was whether we could identify different temperamental patterns in early infancy that would be related to the different types of insecure attachment classification derived from the Strange Situation. Our hypothesis was that there may be some similarity in terms of distress response in early infancy that would be associated with insecure attachment, and that there would be some differentiation of this distress response that would allow us to distinguish insecure/resistant from insecure/avoidant infants. Further, this differentiation might map onto the development of fear and anger from undifferentiated distress in early infancy (Buss & Plomin, 1984).

Measures of infant distress/reactivity were collected at 2 days and 5 months of age. Although there were clear individual differences among infants in their response to pacifier withdrawal at 2 days of age, these differences distinguished between secure and insecure infants and not between avoidant and resistant infants. The relation between response to pacifier withdrawal and attachment status had previously been reported by Miyake and colleagues (1985) for a sample of Japanese infants. There, however, all insecure infants were of the C (resistant/insecure) classification. In the current data, among the insecure infants who cried to pacifier withdrawal, about half were avoidant and half were resistant. These data suggest that this early measure of distress/reactivity taps a more general disposition that may predispose infants toward insecure relationships but is not directly predictive of them.

One of the goals of the current study was

TABLE 5

24-MONTH INHIBITION SCORES BY 14-MONTH ATTACHMENT: ABC AND A1–B2 VERSUS B3–C2

	ATTACHMENT CLASSIFICATION			
	Avoidant (A)	Secure (B)	Resistant (C)	$\bar{X}$ (*n*)
A1–B2	−.82	−.02	(.00)	−.28
(*n*)	(7)	(15)	(0)	(22)
B3–C2	.00	.14	.43	.24
(*n*)	(0)	(16)	(9)	(25)
$\bar{X}$	−.82	.06	.43*	
(*n*)	(7)	(31)	(9)	

* $p < .03$.

to distinguish between different types of distress reactivity during early infancy. To this end, we presented multiple elicitors of crying/distress at 5 months. The data suggest that there are individual differences in response to events that were frustrating or novel. However, the correlation between these two measures was not negative, and, indeed, in a larger sample we might find a number of children who were reactive to both types of events. There did appear to be modest stability across the newborn to 5-month age period in these individual differences in reactivity. However, we were unable to confirm our hypothesis that these different types of reactivity would be related to subsequent attachment status. In part, this may be due to specific methodological issues. First, the number of subjects in our sample was small (n = 52) and the number of avoidant and resistant infants even smaller. Thus, it was difficult to find direct effects with such small sample sizes. Indeed, one of the problems with some studies of the Strange Situation is the small number of infants in the different attachment classifications. Often these small numbers lead to spurious conclusions regarding security of attachment. Fox et al. (1991), for example, found the pattern of mother/father concordance to be quite different when examined across studies as compared to the results of individual samples. Second, the relations between infant temperament and security of attachment may not be direct. Certain types of caregiving might modify (or amplify) particular patterns of infant reactivity (Belsky & Bovine, 1987; Sroufe, 1985). Thus, it is not surprising that we did not find direct relations between the different types of reactivity at 5 months and attachment status at 14 months of age.

Data from the current study confirm the relation between vagal tone and distress reactivity during the infancy period. Five- month vagal tone was associated with crying to arm restraint (Stifter & Fox, 1990) and crying to both pacifier withdrawal and novel stimuli at 5 months of age. We have argued elsewhere that the vagal tone measure may reflect the infant's tendency to be reactive to either frustrating or novel events (Fox, 1989; Fox & Stifter, 1989; Stifter & Fox, 1990; Stifter, Fox, & Porges, 1989). Infants with high vagal tone, for example, are more reactive as 5-month-olds and more sociable as 14-month-olds (Fox, 1989). And infants with high vagal tone are more facially expressive of both positive and negative affect (Stifter et al., 1989). While these relations are modest but significant during the first half of the first year of life, they tend to disappear by the end of the first year of life. Thus, in the current study, we found few significant associations past 14 months of age. Similarly, Stifter et al. (1989) report significant expres-

sivity/vagal tone correlations for 5- but not 10-month-old infants. Although the vagal tone measure exhibited modest stability across the present study period, there was also a great deal of variability. In addition, the infant's state may have differed during the "baseline" recordings at each age. That is, it is probable that the cognitive and affective states of the infants at 14 and 24 months were quite different than the state (quiet alert) monitored at 5 months of age. These differences might account for the low stability and lack of relations among vagal tone and either attachment or behavioral inhibition.

Two comments regarding these findings in comparison with other studies are in order. First, although we measured vagal tone at 2 days, 5 months, and 14 months of age, we did not find, at any age, a relation between vagal tone and attachment. This null finding is in contrast to the significant relation reported by Izard and colleagues (Izard et al., 1991), who found that infants classified as secure were more likely to exhibit low vagal tone at 3 months of age. There are a number of methodological differences between our report and that of Izard and colleagues that might account for the discrepancy. First, our measurements of vagal tone were at 2 days and 5, 14, and 24 months, compared to their report where measurement occurred at 3, 6, 9, and 12 months of age. Importantly, though, only measures of vagal tone at one age, the 3-month measure, were significantly associated with security status. The difference in age could conceivably cause the different pattern of findings. Second, Izard did not directly compare the means of infants classified as A, B, or C but rather computed a continuous variable representing attachment security versus insecurity. Vagal tone at 3 months was significantly correlated with this latter score, but not with attachment classification. The different methods of computation might produce the different pattern of results. We elected to examine the ABC group differences because one of our goals was to try to map two types of reactivity onto the two types of insecure attachments. In principle we would expect that infants who were highly reactive and sociable would be characterized by high vagal tone (see Fox, 1989), and those who were highly reactive and irritable would be characterized by low vagal tone. Further research with a larger sample size might clarify these predictions.

A second possible comparison might be raised between the current data and those of Kagan and colleagues, who found extremely inhibited children to exhibit shorter heart period and lower heart period variability compared to uninhibited peers (Kagan et al., 1989). There were no differences between inhibited and uninhibited children in the current sample, nor were there any relations between vagal tone and the index of inhibition. However, the current sample was randomly selected and did not represent children at the extreme ends of the distribution, as in Kagan's samples. Thus, it is not surprising to find a lack of relation between heart period and vagal tone and inhibition in the current unselected sample.

A second goal of the present study was to examine relations among infant temperament, attachment security, and behavioral inhibition. The current data revealed that behavioral inhibition at 24 months was related to attachment at 14 months. Infants who were classified as insecure/resistant were more inhibited children at 24 months, while those classified as insecure/avoidant were the most uninhibited children at 24 months. The securely attached children were not extreme in either the inhibited or uninhibited direction. Importantly, behavioral inhibition at 24 months was related to attachment classification and not to proneness to distress in the Strange Situation. Analyses using the A1—B2/B3—C2 continuum failed to find a

significant relation between this grouping and behavioral inhibition at 24 months. This is particularly significant when one considers that prior to the Strange Situation at 14 months, infants were assessed in a modified inhibition procedure that may have heightened the stress they experienced during the Strange Situation. Again, however, the significant relation was between ABC attachment and inhibition, not distressed versus nondistressed attachment and inhibition.

The current data suggest a more complex process than simply a direct path between security of attachment and behavioral inhibition. The data indicate that individual differences in infant distress/reactivity interact with attachment status to produce a particular inhibited or uninhibited profile. Infants who were classified as insecure/resistant but who did not cry to arm restraint displayed the most inhibited behavior. All but one of these infants cried to pacifier withdrawal, and six of nine cried to the novel stimuli at 5 months. Thus, specific predispositions toward distress/reactivity interacted with a particular attachment status to produce either an inhibited or uninhibited profile.

The data from the present longitudinal investigation, then, suggest several tentative conclusions regarding the complex process of change and development toward behavioral inhibition. First, there may be important individual differences in infant distress reactivity that are, in part, a function of the type of stimulus situation utilized to elicit this distress. Individual infants may have a low tolerance for frustration but would not be distressed when presented with novel situations. Or, an infant may be fearful and distressed to novelty but able to tolerate frustrating or limiting situations. Second, these different patterns of distress reactivity may interact with a particular caregiving situation (and attachment relationship) to produce either a child who appears behaviorally inhibited or uninhibited.

At the extremes, there are at least two possible pathways emerging from distress reactivity in the first months of life. The first involves infants who, in the first year, are highly reactive to frustrating situations or limitations on their movement. They are more active and easily aroused. Some parents may decide early on that the best way to respond to this "independence" is to extend the bounds of autonomous activity for the child. Such a child may exhibit avoidance in the Strange Situation and, if left unchecked, might respond in an undisciplined, highly active manner to subsequent social challenges. A second infant is one who is highly responsive to novelty, less active, but easily aroused. In many ways, these infants may appear similar to infants thought of as irritable or fussy. Indeed, while novelty may be a major elicitor of negative affect, other situations, such as changes in routine or environment, may also be difficult for these infants. They may be reactive to fairly low- level stimulation. Some parents May be unable to deal effectively with the frequent fussiness and bids for attention. These infants may display resistance during the Strange Situation and over time May withdraw from subsequent encounters that involve novelty, unfamiliar people, or change.

How may we account for these hypothesized diverging paths of early distress reactivity? Reactivity may be modulated by regulatory mechanisms that serve to control arousal levels (Rothbart, 1988). Children who are highly reactive may be able to cope with their arousal through positive expressivity or approach behaviors. These children may become frustrated to limitations or controls exerted by others. They may engage in more exploratory behaviors, spend less time in proximity to parents, and would be viewed as toddlers as uninhibited. Alternatively,

there are infants who cannot regulate their arousal in response to novelty. Their inability to cope with a high level of arousal may induce some children to withdraw in the face of novelty, and indeed to avoid and fear unfamiliar people and objects. Additionally, failure to regulate arousal may lead these children to be difficult to soothe when they are faced with a novel situation. The tendency to reactivity and irritability, then, may be amplified by an insecure, unsatisfactory bond that fails to ameliorate the stresses of the fear-inducing situation. The consequences of these sorts of experiences would likely be an augmentation of the child's tendency to withdraw from novelty, and to inhibit responses to novel or fear-inducing events. That is, children who have difficulty regulating their arousal, and who are not confident that their primary attachment figure will provide security (and a reduction of stimulation) in a time of stress, will likely experience more fear than children who are either able to regulate their own arousal or can comfortably depend on their attachment figure for security.

The findings suggest that both temperament, as measured by laboratory procedures and parent reports, and attachment may be implicated in the development of inhibited behavior. The development of this trait is, nevertheless, a complex process that likely involves the interaction of endogenous traits and caretaking style that cannot be identified from the present sample. Further, the notion of difficult temperament, or irritability, is clearly more complex than previously believed. Distress reactivity may take at least two forms that we have been able to identify: frustrated reactivity and fearful reactivity. The role of these types of reactivity in developing attachments remains unclear. We are encouraged, however, by the findings from this small sample, and by the work of Vaughn and colleagues (Vaughn et al., 1992), that finding common ground between temperament and attachment theories may involve isolating a component of temperament we have referred to as distress reactivity. Future investigations should be aimed at examining the role of emotional reactivity, as measured both behaviorally and physiologically, in attachment, with particular emphasis on identifying differences between the two types of insecure infants.

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