

Running Head: MATERNAL PERCEPTION PREDICTS ATTACHMENT

Maternal Perception of Newborns Predicts Attachment Organization in Middle Adulthood

Elsie R. Broussard, M.D., Dr.P.H.

University of Pittsburgh

Jude Cassidy, Ph. D.

University of Maryland

Abstract

The goal of the present study was to examine the predictive relation between an individual's newborn status, as rated with the Neonatal Perception Inventories (NPI), and his or her adult attachment organization, as rated with the Adult Attachment Interview (AAI). All participants ($N = 26$) had been healthy, full-term, singleton, first-born infants whose mothers were recruited during the immediate postpartum hospital stay. The NPI was collected during home visits made when infants were 4- to 6-weeks of age. The AAI was administered 30 to 40 years later. The study hypothesis was that adult participants whose mothers had held negative perceptions of them as newborns would be more likely to be classified as insecure on the AAI than participants whose mothers had held positive perceptions of them. The study hypothesis was supported. A 2 (positive NPI vs. negative NPI) x 2 (secure AAI vs. insecure AAI) contingency table analysis indicated a highly significant connection between newborn (NPI) risk status and adult AAI classification, Fisher's exact test, $p < .003$, odds ratio = 18. As expected, negative maternal perception at one month of age was associated with subsequent insecure adult attachment status.

Maternal Perception of Newborns Predicts Attachment Organization in Middle Adulthood

Substantial evidence indicates that a mother's representations of her infant are associated with a broad range of aspects of child functioning. These connections have been examined with a focus on a variety of constructs, such as maternal perceptions of the infant (Broussard & Hartner, 1970, 1971), parental schemas (Stern, 1995), parental attributions (Buegental & Happaney, 2002; Lieberman, 1999), internal working models of the child (Zeanah, Benoit, Hirshberg, Barton, & Regan, 1994), and reflective functioning (Slade, 2005; Fonagy, Steele, Steele, Moran, & Higgitt, 1991). This issue is important to developmental and clinical researchers who are interested in understanding basic developmental processes, and to clinicians who believe that understanding which aspects of maternal representations influence which aspects of child functioning can be crucial for prevention and therapeutic interventions.

Most empirical findings of links between maternal representations and child functioning have emerged from concurrent studies, with relatively little longitudinal examination (e.g., Rosenblum, McDonough, Muzik, Miller, & Sameroff, 2002; Slade, Grieneberger, Bernbach, Levy, & Locker, 2005; Zeanah et al., 1994; yet see Benoit, Parker, & Zeanah, 1997, and Sroufe, Egeland, Carlson, & Collins, 2005). A notable exception has been the Pittsburgh First-Born Project, which has examined long-term child and adolescent outcomes of maternal perceptions of her newborn using Broussard's Neonatal Perception Inventories (NPI; Broussard & Hartner, 1970, 1971). The NPI were developed to measure the mother's perception of her newborn compared with her perception of "the average baby." The NPI can be viewed as a projective

measure because the mother is presented with a set of ambiguous stimuli which provide a gestalt upon which she projects her concept of what newborns are like and her expectations of what her newborn will be like. Understandably, this will vary from mother to mother and is dependent upon her past experiences. The mother's perceptions of her own infant are then compared to perceptions of average newborns. When a mother perceives her one-month-old as better than average (positive perception), the infant is considered to be at low risk for subsequent psychosocial problems, whereas infants *not* viewed as better than average (negative perception) are considered to be at higher risk. This conceptualization is based on the notion that an early negative maternal perception sets in motion and/or reflects problematic dyadic interaction patterns that in turn contribute to emotional and developmental difficulties.

The Pittsburgh First Born Program's prospective longitudinal studies have focused on healthy, full-term, singleton, first-born infants (Broussard, 1976, 1984a, 1986; Broussard & Hartner, 1970). The studies of a cohort born in 1963 ($N = 318$) examined the relation between the mother's perception of her newborn infant and the child's psychosocial development. Subsequent evaluations, conducted by clinicians who did not know the one-month risk ratings of the participants, established the predictive validity of the NPI. At each age (4½, 10½, 15, & 19 years), children who had been classified as higher risk at one-month because of a negative maternal perception were significantly more likely to have psychosocial disorder than those who had been classified as low risk.¹ Odds ratios for poorer psychosocial outcomes associated with neonatal higher risk status ranged from 3.5:1 to 7.8:1 across the four child and adolescent

assessments. Additional insight was gained by examining the data of the subset of 40 children who participated in all four follow-up assessments; significant findings indicated that whereas the majority of those who had been low risk infants were classified as free of disorder at two or more time points, this was true for only 11% of those who had been higher risk infants (Broussard, 1984a). At all ages, findings were similar for males and females. Similar predictive findings emerged from a separate 1973 cohort (N = 281), with follow-up assessments at 12 and 30 months (Broussard, 1979).

The characteristics of Broussard's participants who were well functioning at age 19 (i.e., those characterized by clinician-rated developmentally appropriate psychological functioning and positive interactions with others, over 80% of whom had had, as newborns, mothers with positive perceptions of them) are strikingly similar to the characteristics of individuals classified with the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1984) as secure/autonomous (Hesse, 2008). The AAI is a semi-structured interview designed to tap an individual's "current state of mind with respect to attachment" rather than an individual's past or current attachment to specific attachment figures. Both well functioning 19-year-olds in the Broussard study (1984a) and adults classified as secure on the AAI (Hesse, 2008) are characterized by flexibility, open communication of a wide range of emotions, fluent and coherent discourse, and empathy. Because of these similarities, it is reasonable to expect that variations in infant risk status as a function of maternal perceptions might predict variation in subsequent adult attachment. Understanding the predictors of adult attachment is important

because of evidence that secure adult attachment is associated with better relationship quality both as parents (see van IJzendoorn's 1995 meta-analytic findings) and romantic partners (Crowell, Treboux, Gao, Fyffe, Pan, & Waters, 2002; Roisman, Madsen, Hennighausen, Sroufe, & Collins, 2001), as well as with lower psychopathology (see van IJzendoorn & Bakermans-Kranenburg's 2008 meta-analytic findings; for additional reviews, see Cassidy & Shaver, 2008; Crowell, Fraley, & Shaver, 2008; Dozier, Stovall-McClough, & Albus, 2008; Hesse, 2008).

Evidence that adult attachment organization is rooted in part in early experience has emerged from longitudinal studies examining links between an individual's infant attachment (assessed in Ainsworth's Strange Situation procedure; Ainsworth, Blehar, Waters, & Wall, 1978) and his/her own adult attachment assessed with the AAI. Three longitudinal studies of low-risk samples have reported significant prediction from infancy to adulthood (Hamilton, 2000; Main, Hesse, & Kaplan, 2005; Waters, Merrick, Treboux, Crowell, & Albersheim, 2000; three studies that did not use the Main and Goldwyn [1984/1998] AAI coding system did not find such links [Becker-Stoll & Fremmer-Bombik, 1997; Lewis, Feiring, & Rosenthal, 2000; Zimmermann, 1994]; see also Grossmann, Grossmann, & Waters, 2005). Even within these relatively stable low-risk samples instances of discontinuity emerged, and interestingly, this discontinuity was lawfully related to intervening environmental changes (e.g., divorce, loss of a parent, life-threatening illness; Hamilton, 2000; Waters et al., 2000). Considerably less stability has emerged in the Minnesota high-risk sample, with only infant 12-month *disorganization* predicting 19-year-old *insecure* AAI classification (Weinfield, Sroufe, & Egeland, 2000; Weinfield, Whaley, &

Egeland, 2004). This lower stability is not surprising given the instability of *infant* attachment from 12- to 18-months, and given the high rate of intervening stressful life events beyond infancy. Greater stability emerged in this sample when prediction was made from 18-month infant attachment, thought to reflect a time when attachment may have stabilized, yet even then infant attachment significantly predicted AAI classification not during adolescence at age 19, but during adulthood at age 26, when greater maturity and new adult attachments may contribute to attachment organization (Sroufe et al., 2005).

The present study

The goal of the present study was to examine the predictive relation between an individual's NPI-rated risk status as a newborn and his or her adult attachment organization. All participants had been healthy, full-term, singleton, first-born infants whose mothers were recruited during the immediate postpartum hospital stay. The NPI was collected during home visits made when infants were 4- to 6-weeks of age. The Adult Attachment Interview was administered 30 to 40 years later. The study hypothesis was that adult participants whose mothers had held negative perceptions of them as newborns would be more likely to be classified as insecure on the Adult Attachment Interview than participants whose mothers had held positive perceptions of them. Previous studies have linked maternal representations of her infant with *infant* attachment (Slade et al., 2005; Zeanah et al., 1994). The present study is the first reported examination of the link between maternal representations (specifically, maternal perceptions assessed with the NPI) and the infant's subsequent *adult* attachment.

Method

Sample

Participants were 26 adults (14 males, 12 females) drawn from the 1963 or 1973 populations of the Pittsburgh First Born Program (Broussard & Hartner, 1970; Broussard & Cornes, 1981). The original Pittsburgh First-Born samples were randomly selected samples (consisting of all infants born in participating hospitals within a 2 ½ month period who met inclusion criteria and whose mothers agreed to participate; acceptance rate > 90% for both samples). In order to recruit the convenience sample of adults included in the present study, we first, for logistical reasons, identified individuals who had continued to participate in the longitudinal study and who were living in geographic proximity to the University. We contacted 29 individuals randomly selected from those in this geographically close group; 26 of these individuals (90%) agreed to participate. This recruitment strategy, by definition, resulted in a sample that was more geographically stable – and perhaps more stable in other ways as well – than the initial sample from which these 26 adult participants were drawn. This sample size was considered to be appropriate because it was similar in size to the original samples in which individual differences in attachment were observed in infants (Ainsworth et al., 1978) and in adults (with the Adult Attachment Interview; Main, Kaplan, & Cassidy, 1985).

Participants, all of whom were White, ranged in age from 27 – 43 years ($M = 34.38$; $SD = 5.97$; $Mdn = 39$). All participants had completed high school, and 89% had completed college. Sixty-eight percent were married. At the time of birth, participants' family education/occupation

(as indicated by the Hollingshead Index, 1958) covered the full range of categories (I through V), with 85% of families falling in categories II, III, and IV (ranging from skilled workers to mid-level white-collar employees with high school and college education); mean maternal age was 25.5 years ($SD = 4.3$); and all participants came from families in which the father was present in the home. Infant inclusion criteria were that the infant be a healthy, full term, first-born singleton, with birth-weight ≥ 2500 grams. Adult participants did not differ from individuals in the original populations from which they were drawn on family education/occupation, maternal age, or father presence, but did differ on race (6% of the 1963 population was non-white, as was 12% of the 1973 population; Broussard, 1986; Broussard & Cornes, 1981; Broussard & Hartner, 1970).

Measures

Neonatal Perception Inventory (NPI; Broussard & Hartner, 1970, 1971). The Neonatal Perception Inventories (NPI) measure the mother's perception of her newborn as compared to her concept of the average infant. The NPI consist of two forms, the Average Baby form and Your Baby form, each containing six items that reflect areas about which mothers are typically concerned and that reflect the state of functioning of the mother-infant system during the neonatal period. These areas are crying, spitting, feeding, elimination, sleeping, and predictability. For each of the six items, a 5-point Likert-type scale, ranging from 1 ("none") to 5 ("a great deal"), is used to indicate how much difficulty the mother perceives the infant to have related to that domain; lower scale values represent the more desirable behavior. Total scores are

created for each inventory by summing across items. The total score of the Your Baby Perception form is subtracted from the total score of the Average Baby Perception form, and the discrepancy constitutes the NPI score. Infants rated by their mothers as better than average (positive score) are considered at low risk. Infants *not* rated better than average (negative or 0 score) are considered at higher risk for subsequent development of psychosocial difficulty. The predictive validity of the NPI has been extensively demonstrated: As described in greater detail in the introduction, positive maternal perceptions predicted more positive (blind, clinician-rated) psychosocial functioning (e.g., flexible coping, resilience, emotion regulation capacities, positive social relationships) at 4 ½, 10, 15, and 19 years of age (Broussard, 1976, 1984a, 1986; Broussard & Hartner, 1970). In addition, in the Minnesota Study of Risk and Adaptation from Birth to Adulthood, a modified version of the NPI predicted maternal sensitivity at 6m (Sroufe et al., 2005), and differentiated infants who received “excellent maternal care” across the first year from those who received “inadequate care” (Brunnquell, Crichton, & Egeland, 1981).

Adult Attachment Interview (AAI; George et al., 1984). This widely used, psychometrically sound (Hesse, 2008) 90-minute semi-structured interview taps adults' "current state of mind with regard to attachment." The interview probes attachment-related experiences during childhood such as memories of feeling loved or unloved, memories of being upset or ill, and memories of separations and losses. Additional questions ask whether participants' parents were ever threatening or rejecting toward them; why parents may have acted as they did; and whether these attachment-related experiences have affected participants' adult personality.

Participants are asked to provide general descriptions ("semantic memories") of their relationship with each parent and to integrate specific instances ("episodic memories") with these more general descriptions.

Verbatim AAI transcripts are rated on a series of 9-point scales that reflect the interviewee's inferred attachment experiences (e.g., of being parented in a loving way, of experiencing parental rejection) and current state of mind with respect to attachment (e.g., idealization, lack of recall, coherence). Based on an integrated consideration of both inferred experiences and current state of mind, coders assign one of four attachment classifications: secure/autonomous, insecure/dismissing, insecure/preoccupied, and insecure/unresolved. Individuals classified as secure/autonomous value attachment relationships and consider them to be influential, yet can reflect on them with objective autonomy. When describing their early experiences, these individuals either (a) present a convincing portrait of the parent as providing security ("continuous secure"), or (b) they coherently and thoughtfully discuss their unsupportive parent without either derogating or idealizing him/her ("earned secure"). Individuals classified as dismissing of attachment dismiss the importance of attachment to themselves both as children and as adults. Individuals are classified as preoccupied with attachment who, while preoccupied with attachment, are unable to discuss their relationships in an objective or coherent way. These individuals may be angry at their parents and may continue to fight with them, yet they oscillate between quite positive and quite negative descriptions. Finally, individuals classified as unresolved have experienced an attachment-related childhood trauma (loss or abuse) that they

have been unable to successfully resolve; they may become incoherent or confused when discussing the event or may feel unreasonably to blame.

AAI transcripts were coded by one of five certified coders who were blind to additional information about the participants. A randomly selected 38% of cases ($n = 10$) were coded by two coders; inter-coder agreement was 80% ($\kappa = .62$) for secure/insecure group placement and 80% ($\kappa = .55$) for four-way group placement. A third blind coder resolved disagreements.

Procedure

This study includes data collected when the participants were one-month of age and their mothers completed the NPI during a home visit. As adults, participants were interviewed with the AAI at The Pittsburgh First-Born Laboratory. The research protocol was approved by the University's IRB, and participants provided written informed consent. Participants received no payment for their participation.

Results

A 2 (positive maternal perception vs. low maternal perception) x 2 (secure AAI vs. insecure AAI) contingency table analysis indicated a highly significant connection between the way an infant's mother had perceived him/her and that infant's subsequent adult AAI classification, Fisher's exact test, $p < .003$, odds ratio = 18:1. As expected, negative maternal perception at one month of age was associated with insecure adult attachment status. Whereas 86% (12 of 14) of positive perception infants were classified later as secure in adulthood, this was true for only 25% (3 of 12) of negative perception infants (see Table 1). The proportion of

total participants who were classified as secure (58%) matches the proportion of adults typically classified as secure in community samples (Hesse, 2008; Bakermans-Kranenburg & van IJzendoorn, 2009).

Additional analyses examined specific insecure AAI groups. Although evidence of at least one loss of a close person was present in the AAI's of nearly all participants (85%; no evidence of abuse emerged), no participant received an Unresolved classification. A 2 (positive maternal perception vs. low maternal perception) x 3 (secure vs. dismissing vs. preoccupied AAI) contingency table analysis indicated a highly significant connection between maternal perception during infancy and later AAI classification, Fisher's exact test, $p < .001$. For adults who had been perceived positively as infants, the distribution was 86% secure, 7% dismissing, and 7% preoccupied. For adults who had been perceived negatively as infants, the distribution was 25% secure and 75% dismissing, with no participants classified as preoccupied (see Table 2).

We also examined whether the positive and negative NPI groups differed as a function of AAI scales scores assessing inferred experiences (with mother) and current state of mind. We examined the scale scores that Main et al. (2005) examined in their longitudinal study, and added the mother rejection scale because of its particular conceptual relevance for this study; these encompass all the scales for which sample variation in the present study was sufficient for data analysis. For the inferred experience scales, findings revealed that individuals in the negative NPI group received significantly lower maternal loving and significantly higher maternal

rejection scores than individuals in the positive maternal perception group (see Table 3). For the state of mind scales, findings revealed that individuals in the negative NPI group received significantly lower coherence of transcript scores, and significantly higher idealization of mother and lack of recall scores (see Table 3).

Discussion

As hypothesized, the present study revealed that the experience of having been viewed negatively by one's mother as a newborn, as assessed with the NPI, substantially increased the risk of insecure adult attachment. The odds of having an insecure AAI for adults whose mothers had held a negative perception of them at one-month of age was 18 times greater than for adults whose mothers had perceived them positively. This finding meshes with earlier reports from the larger longitudinal sample showing that neonatal perception assessed with the NPI is a powerful predictor of subsequent psychosocial difficulties during childhood and adolescence (Broussard, 1976, 1984a, 1986; Broussard & Hartner, 1970). Moreover, this finding contributes to an understanding of the developmental precursors of the AAI; given evidence of the ways in which the AAI has proven clinically useful (Steele & Steele, 2008a, 2008b), such understanding is particularly important to developmental researchers and clinicians.

The nature of the distribution of the insecure attachment groups provides additional insight into the sequelae of negative maternal perception as well as the precursors of insecure adult attachment organization. Seventy-five percent of the adults who had been in the negative perception group were classified as insecure/dismissing. It is easy to imagine that an individual

whose mothers viewed him/her negatively would develop a stance in which the importance of attachment relationships is dismissed. The lack of individuals classified as Unresolved in this sample is noteworthy. Based on meta-analytic findings from non-clinical samples (Bakermans-Kranenburg & van IJzendoorn, 2009), four participants in the present study might have been expected to be classified as Unresolved. Although in a sample of this size this difference simply may be due to chance, it is also possible that the infant inclusion criteria (e.g., healthy, full-term, ≥ 2500 grams) and the geographic stability of the adult participants are contributing factors; furthermore, our participants are older (median age 39 years) than those included in the meta-analysis, and nothing is known about whether the ability to resolve loss/trauma changes through middle adulthood.

Findings from analyses using AAI scale scores provide additional theoretically and empirically grounded information. Adults whose mothers had held a negative perception of them as newborns, in comparison to other adults, were more likely to provide AAI narratives from which coders inferred that their mothers had less loving and more rejecting during childhood. This finding meshes with Main et al.'s (2005) finding that infant attachment security predicted higher AAI maternal loving scores. Not only did maternal perceptions predict subsequent inferred childhood experiences, but they also predicted three aspects of current state of mind with respect to attachment. The AAI scale viewed as most centrally reflecting overall security, the coherence of transcript scale (Hesse, 2008), significantly differentiated NPI groups, with adults in the negative perception group showing lower coherence scores; this finding meshes

with findings of a link between infant attachment security and greater AAI coherence (Main et al., 2005). In addition, the finding that having had a mother who viewed one negatively predicted the AAI scale scores for lack of recall and idealization of mother echoes links between insecure/avoidant infant attachment and subsequent scores on these two AAI scale scores (Main et al., 2005).

Our finding of substantial continuity from infant to adulthood converges with findings from studies examining middle-class samples in which considerable continuity also emerged (e.g., both Hamilton, 2000, and Waters et al., 2000, reported over 70% stability of secure vs. insecure attachment classification). It is important to note that although the original Pittsburgh First-Born samples were randomly selected samples (consisting of all infants born in participating hospitals within a 2 ½ month period who met inclusion criteria and whose mothers agreed to participate; acceptance rate > 90% for both samples), the 26 adult participants who were interviewed with the AAI were drawn for logistical reasons (albeit randomly) only from the pool of original participants still living in geographic proximity to the University laboratory. This relative geographic stability may be associated with other factors that would contribute to continuity over time. As such, this examination from infancy to adulthood can best be understood, like Main's Berkeley study, as providing information about "lawful outcomes in stable circumstances" (Main et al., 2005, p. 288). Future research with a less geographically stable sample will also provide important information.

It is also important to consider ways in which our findings can be viewed in a somewhat different light from those of previous studies examining infant precursors of AAI classifications. First, previous work has examined stability of the same individual's attachment organization over time – that is, an individual's Strange Situation infant attachment classification to the same individual's adult AAI classification. Our findings describe continuity from one individual to another -- from a newborn's mother to his/her own later adult attachment organization. In this regard, these findings reflect transmission from one individual's representational world to that of another. Second, studies examining stability of infant attachment report predictions from infant age 12 months (or in the case of the high-risk Minnesota sample, from infant age 18 months), whereas the present findings indicate continuity from the first month of life.

It is interesting to speculate about what mechanisms might account for the link between negative maternal perceptions of the newborn and subsequent insecure adult attachment. A variety of not mutually exclusive mechanisms may play a role, including continued maternal representations and maternal feelings toward the child. Broussard (1984b) provided clinical descriptions of mothers with negative perceptions of their newborns who continued to have negative perceptions, including hostile attributions, as the child grew. The mother's representations of mothering and of herself as a mother may also be important. Broussard (1979) provided additional descriptions of mothers with negative perceptions of their newborns as viewing themselves as incompetent mothers. Maternal representations about more global well-being may also play a role. Main's descriptions of adults with secure AAI classifications as

characterized by “an underlying confidence and calm” (Main et al., 2005, p. 291) suggests a mechanism that is decidedly similar to one proposed by Broussard, who noted that when the mother has a positive perception of her newborn, “the outcome of the child’s development and ability to master the successive life tasks may be dependent in large part on the mother’s positive hopefulness, a sense that things will work out” (Broussard & Hartner, 1971, p. 440).

The most central mediating factor through which a mother’s perceptions of herself, her newborn, and her world may operate is likely to be the mother’s behavior toward her child. Broussard (1979) has previously proposed, as have others (e.g., Lieberman, 1999), that a mother’s perception of her baby influences her behavior toward her baby, thus shaping the nature of the mother-infant interaction and their relationship. Clinical observations from Broussard’s laboratory (1979, 1984b) revealed aspects of maternal behavior toward higher-risk infants that might contribute to children’s subsequent poor psychosocial functioning and their insecure adult attachment organization. Mothers with a negative perception of their infants had limited awareness of their infant’s states, had difficulties recognizing their infant’s signals, and lacked a flexible and effective range of responses. Main, Hesse, and Kaplan (2005) have proposed that infants with such experiences develop strategies for regulating attention, memory, and affect that will predict insecure discourse during the AAI. Additionally, babies with mothers who perceive them negatively may be hindered in their capacity to develop representations of their mother as a secure base (e.g., a “secure base script;” see Vaughn, 2006), which in turn is thought to limit the kind of attachment-related flexibility characteristic of a secure AAI. Moreover, experiences of

being viewed negatively may lead the child to feel rejected and unloved, feelings that may contribute to an insecure state of mind with respect to attachment that is captured in the AAI. Future work will be needed to examine maternal behavior more systematically, and to examine a full range of potential mediating mechanisms. In addition, replication with larger and more diverse samples is important. Because all participants in the present study were White and middle-class, it will be important to examine whether the same findings would emerge in more diverse samples, and whether similar mediating mechanisms would hold.

The NPI are thought to provide a measure of the *adaptive potential* of the mother-infant system. Future work is needed to examine the underlying sources of a mother's perceptions of her newborn – the extent to which the measure taps the mother's early detection of genetic characteristics that may contribute to later difficulties and the extent to which it reflects her own internal representations and expectations. Even though there is some indication, at least in the context of a high-risk environment, that newborn characteristics can contribute to infant attachment (Sroufe et al., 2005), such work will have to be undertaken with the awareness that distinct considerations of “nature vs. nurture” are not useful. We join Feldman (2008) in her call for researchers to rethink the meaning of “innateness” in light of recent work on epigenetic effects, fetal programming, and the manner in which intrauterine conditions alter gene expression (see, for example, Diorio & Meaney, 2007).

A Clinical Perspective

During pediatric clinical practice in the 1940's and 1950's, Broussard noted that mothers of healthy newborns varied in their responses to their newborns and their needs. Some mothers made a smooth transition from pregnancy to motherhood and had pride and pleasure in raising their infants, and their infants thrived. These mothers and babies laughed and smiled together, reflecting to each other mutual positive feelings. Other mothers lacked pride in their infants and had little pleasure in motherhood even though physicians had judged the infants' biological endowments to be normal and viewed these infants as appealing. Physician and mother looked at the same infant and saw different things—as though the beauty lay in the eye of the beholder. Broussard noted that a mother's perception of her baby influences the way she relates to her baby, and that her behavior, in turn, influences the baby's development. These observations led her to develop an instrument to measure the mother's perception of her neonate – the Neonatal Perception Inventories -- and to conduct longitudinal studies of healthy neonates.

It is now widely accepted that the foundations for a variety of aspects of healthy development are rooted in early life (Shonkoff & Phillips, 2000), and as such, interest in preventing the development of psychosocial disorder or minimizing its impact through very early identification of those at risk and early intervention has increased (e.g., Berlin, Ziv, Amaya-Jackson, & Greenberg, 2005). Findings from the present study indicate that the relationship and perceptions that are in place at the end of the infant's first month predict a long-term outcome – adult attachment organization -- that is an important aspect of human functioning. Broussard's

clinical experiences – moving from pediatrics to public health to child psychiatry and psychoanalysis -- led her to urge clinicians, including primary service providers, to emphasize support systems for mothers during the early postpartum period (Broussard & Hartner, 1971). It remains the case that the existing system of postnatal and pediatric care often does not provide professional support for the mother during the critical interim between discharge from the hospital and the next “routine” contact with the physician at four to six weeks. Further institution and evaluation of programs aimed at fostering support for the new mother by husband, family, caring professionals, and society appear to be indicated. Moreover, the Neonatal Perception Inventories provide an easily administered, low-cost screening measure that can identify infants at increased risk of insecure adult attachment. When a mother is identified as holding a negative perception of her newborn, additional assessments can be undertaken to better understand the dyad and to determine what course of action, if any, is to be undertaken.

References

- Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the Strange Situation*. Hillsdale, NJ: Erlbaum.
- Bakermans-Kranenburg, M. J., & van IJzendoorn, M. H. (2009). The first 10,000 adult attachment interviews: Distributions of adult attachment representations in clinical and non-clinical groups. *Attachment & Human Development, 11*, 223-263.
- Becker-Stoll, F., & Fremmer-Bombik, E. (1977, April). *Adolescent-mother interaction and attachment*. Paper presented at the meeting of the Society for Research in Child Development, Washington, DC.
- Benoit, D., Parker, K., & Zeanah, C. H. (1997). Mothers' internal representations of their infants assessed prenatally: Stability over time and association with infants' attachment classifications at 12 months. *Journal of Child Psychology and Psychiatry, 38*, 307-313.
- Berlin, L. J., Ziv, Y., Amaya-Jackson, L. M., & Greenberg, M. T. (Eds). (2005). *Enhancing early attachments: Theory, research, intervention, and policy*. New York: Guilford.
- Broussard, E. R. (1976). Neonatal prediction and outcome at 10/11 years. *Child Psychiatry and Human Development, 7*, 85-93.
- Broussard, E. R. (1979). Assessment of the adaptive potential of the mother-infant system: The Neonatal Perception Inventories. *Seminars in Perinatology, 3*, 91-100.
- Broussard, E. R. (1984a). The Pittsburgh first-borns at age 19. In R. Tyson, J. Call, & E. Galenson (Eds.), *Frontiers of infant psychiatry* (pp. 522-530). New York: Basic Books.

- Broussard, E. R. (1984b). Maternal empathy: Its relation to emerging self-representations and empathy in infants. In J. Lichtenberg, M. Bornstein, & D. Silver (Eds.), *Empathy II* (Vol. 2, pp. 81-103). Hillsdale, New Jersey: The Analytic Press.
- Broussard, E. R. (1986). Prospective longitudinal study of first-born neonates. In L. Erlenmeyer-Kimling, & N. E. Miller (Eds.). *Life-span research on the prediction of psychopathology* (pp.49-64). Hillsdale, New Jersey: Lawrence Erlbaum.
- Broussard, E. R., & Cornes, C. (1981). Identification of mother-infant systems in distress: What can we do? *Journal of Preventive Psychiatry, 1*, 119-132.
- Broussard, E. R., & Hartner, M. S. (1970). Maternal perception of the neonate as related to development. *Child Psychiatry and Human Development, 1*, 16-25.
- Broussard, E. R., & Hartner, M. S. (1971). Further considerations regarding maternal perception of the first born. In J. Hellmuth (Ed.), *Exceptional infant: Studies in abnormalities* (Vol. 2, pp. 432-449). New York: Brunner/Mazel.
- Brunnquell, D., Crichton, L., & Egeland, B. (1981). Maternal personality and attitude in disturbances of child rearing. *American Journal of Orthopsychiatry, 51*, 680-691.
- Bugental, D., & Happaney, K. (2002). Parental attributions. In M. Bornstein (Ed). *Handbook of Parenting* (vol. 1, 2nd ed., pp. 509-535).
- Cassidy, J., & Shaver, P. R. (2008). *Handbook of attachment: Theory, research, and clinical applications* (2nd ed.). New York: Guilford.

- Crowell, J. A., Fraley, R. C., & Shaver, P. R. (2008). Measurement of individual differences in adolescent and adult attachment. In J. Cassidy & P. R. Shaver (Eds.) *Handbook of attachment: Theory, research and clinical applications* (pp. 599-634; 2nd ed). New York: Guilford.
- Crowell, J. A., Treboux, D., Gao, Y., Fyffe, C., Pan, H., & Waters, E. (2002). Assessing secure-base behavior in adulthood: Development of a measure, links to adult attachment relations, and relations to couples' communication and reports of relationships. *Developmental Psychology*, 38, 679-693.
- Diorio, J., & Meaney, M. J. (2007). Maternal programming of defensive responses through sustained effects on gene expression. *Journal of Psychiatry Neuroscience*, 32, 275-284.
- Dozier, M., Stovall-McClough, K. C., & Albus, K. E. (2008). Attachment and psychopathology in adulthood. In J. Cassidy & P. R. Shaver (Eds.) *Handbook of attachment: Theory, research and clinical applications* (pp. 718-744; 2nd ed.). New York: Guilford.
- Feldman, R. (2008). The intrauterine environment, temperament, and development: Including the biological foundations of individual differences in the study of psychopathology and wellness. *Journal of the American Academy of Child & Adolescent Psychiatry*, 47, 233-235.
- Fonagy, P., Steele, M., Steele, H., Moran, G., & Higgitt, A. (1991). The capacity for understanding mental states: The reflective self in parent and child and its significance for security of attachment. *Infant Mental Health Journal*, 13, 201-218.

- Freud, A. (1965). *Normality and pathology in childhood*. New York: International Universities Press.
- George, C., Kaplan, N., & Main, M. (1984). *Adult Attachment Interview Protocol*. Unpublished manuscript, University of California, Berkeley.
- Grossmann, K. E., Grossmann, K., & Waters, E. (Eds.). (2005). *Attachment from infancy to adulthood: The major longitudinal studies*. New York: Guilford.
- Group for the Advancement of Psychiatry, Committee on Child Psychiatry (1966). *Psychopathological disorders in childhood: Theoretical considerations and a proposed classification*. New York: Jason Aronson.
- Hamilton, C. (2000). Continuity and discontinuity of attachment from infancy through adolescence. *Child Development*, 71, 690-694.
- Hesse, E. (2008). The Adult Attachment Interview: Protocol, method of analysis, and empirical studies. In J. Cassidy & P. R. Shaver (Eds.). *Handbook of Attachment: Theory, research, and clinical applications* (pp. 552-598; 2nd ed.). New York: Guilford.
- Hollingshead, A. B., & Redlich, R. C. (1958). *Social class and mental illness*. New York: John Wiley.
- Leighton, D. C., Harding, J. S., Macklin, D. B., Hughes, C. C., & Leighton, A. H. (1963). Psychiatric findings of the Stirling County Study. *American Journal of Psychiatry*, 119, 1021-1026.

- Lewis, M., Feiring, C., & Rosenthal, S. (2000). Attachment over time. *Child Development, 71*, 707-720.
- Lieberman, A. (1999). Negative maternal attributions: Effects on toddlers' sense of self. *Psychoanalytic Inquiry, 19*, 737-756.
- Main, M., & Goldwyn, R. (1984/1998). *Adult attachment scoring and classification system*. Unpublished manuscript, University of California at Berkeley.
- Main, M., Hesse, E., & Kaplan, N. (2005). Predictability of attachment behavior and representational processes at 1, 6, and 19 years of age: The Berkeley Longitudinal Study. In K. E. Grossmann, K. Grossmann, & E. Waters (Eds.), *Attachment from infancy to adulthood: The major longitudinal studies* (pp. 245-304). New York: Guilford.
- Main, M., Kaplan, N., & Cassidy, J. (1985). Security in infancy, childhood, and adulthood: A move to the level of representation. In I. Bretherton & E. Waters (Eds.), *Growing points of attachment theory and research. Monographs of the Society for Research in Child Development, 50*(1-2, Serial No. 209), 66-104.
- Roisman, G. I., Madsen, S. D., Hennighausen, K. H., Sroufe, L. A., & Collins, W. A. (2001). The coherence of dyadic behavior across parent-child and romantic relationships as mediated by the internalized representation of experience. *Attachment and Human Development, 3*, 156-172.

- Rosenblum, K. L., McDonough, S., Muzik, M., Miller, A. & Sameroff, A. (2002). Maternal representations of the infant: Associations with infant response to the still face. *Child Development, 73*, 999-1015.
- Shonkoff, J. P. & Phillips, D. A. (Eds.) (2000). *From neurons to neighborhoods*. Washington, DC: National Academy Press.
- Slade, A. (2005). Parental reflective functioning: An introduction. *Attachment and Human Development, 7*, 269-281.
- Slade, A., Grieneberger, J., Bernbach, E., Levy, D., & Locker, A. (2005). Maternal reflective functioning, attachment, and the transmission gap: A preliminary study. *Attachment and Human Development, 7*, 283-298.
- Sroufe, L. A., Egeland, B., Carlson, E. A., & Collins, W. A. (2005). *The development of the person: The Minnesota study of risk and adaptation from birth to adulthood*. New York: Guilford.
- Steele, H., & Steele, M. (Eds.) (2008a). *Clinical applications of the Adult Attachment Interview*. New York: Guilford.
- Steele, H., & Steele, M. (2008b). Ten clinical uses of the Adult Attachment Interview. In H. Steele & M. Steele (Eds.) *Clinical applications of the Adult Attachment Interview* (pp. 3-30). New York: Guilford.
- Stern, D. (1995). *The motherhood constellation: A unified view of parent-infant psychotherapy*. New York: Basic Books.

- van IJzendoorn, M. H. (1995). Adult attachment representations, parental responsiveness, and infant attachment: A meta-analysis on the predictive validity of the Adult Attachment Interview. *Psychological Bulletin*, 117, 387-403.
- van IJzendoorn, M. H., & Bakermans-Kranenburg, M. J. (2008). The distribution of adult attachment representations in clinical groups: A meta-analytic search for patterns of attachment in 105 AAI studies. In H. Steele & M. Steele (Eds.), *Clinical applications of the Adult Attachment Interview* (pp. 69-96). New York: Guilford.
- Vaughn, B. (Ed.) (2006). Script-like representations and behavior in families and across cultures. Special Issue of *Attachment and Human Development*, 8.
- Waters, E., Merrick, S., Treboux, D., Crowell, J., & Albersheim, L. (2000). Attachment security in infancy and early adulthood: A twenty-year longitudinal study. *Child Development*, 71, 684-689.
- Weinfield, N., Sroufe, L. A., & Egeland, B. (2000). Attachment from infancy to young adulthood in a high risk sample: Continuity, discontinuity, and their correlates. *Child Development*, 71, 695-702.
- Weinfield, N., Whaley, G., & Egeland, B. (2004). Continuity, discontinuity, and coherence in attachment from infancy to late adolescence: Sequelae of organization and disorganization. *Attachment and Human Development*, 6, 73-97.

- Zeanah, C. H., Benoit, D., Hirshberg, L., Barton, M., & Regan, C. (1994). Mothers' representations of their infants are concordant with infant attachment classifications. *Developmental Issues in Psychiatry and Psychology, 1*, 1-14.
- Zimmerman, P. (1994). *Attachment in adolescence: Development while coping with actual challenges*. Unpublished doctoral dissertation, University of Regensburg, Germany.

Author Note

The Pittsburgh First-Born Project is a research program that has spanned more than 40 years, and we are grateful to the many people who have contributed in important ways. Alba Ruckert's valuable contributions have been pervasive, spanning all aspects of the research program. Ching Chun Li and Charles Stegman provided continuing statistical consultation throughout the course of the longitudinal study. Others who have made substantial contributions include Evelyn Atreya, Marilyn Bushey, Katherine Cone, Cleon Cornes, Deborah Dickey, Karen Fullerton, Margaret Gillick, Ruth Gumerman, Linda Haller, Fredricka Latshaw, Margaret McFarland, Mary Meldrum, Geraldine Rensko, Judith Rubin, Lawrence Staab, Claudia Titelman, Linda White, Robin Woods, and Lucy Zabarenko.

Since 1963, the Pittsburgh First-Born Project has been supported by state, local, and federal government agencies, private donations, the University of Pittsburgh, the Pittsburgh Child Guidance Center, and the following foundations: Buhl, Staunton-Farm, Claude Benedum, Howard Heinz, Vira Heinz, De-Luxe Check Printers, Amelia Miles, Pittsburgh National Bank Trust, and Stylette Plastics. Without their assistance this work would not have been possible.

Finally, we are also particularly grateful to the families who participated in the research – for their willingness to donate their time, energy, thoughts, feelings, and lives. The experience of learning about their lives has added meaning to our own.

Correspondence concerning this article and inquiries related to use of the Neonatal Perception Inventories should be addressed to Elsie R. Broussard, Professor Emerita, Graduate

School of Public Health, 203 Parran Hall, University of Pittsburgh, Pittsburgh, PA 15261. E-mail: first@pitt.edu

Footnote

1. Psychosocial disorder was assessed differently at different time-points, as a function of the developmental level of the child, and, at each time-point, the measure used was considered a “state of the art” clinical assessment. Assessments were conducted by two to four reliable child psychiatrists or psychoanalytically trained clinicians who had not previously seen the child and who were blind to NPI placement and to information from previous assessments. Assessments were based on a structured observation in the laboratory, and on interviews with teachers and parents. At age 4 ½, the classification proposed by the GAP Committee on Child Psychiatry was used (Group for Advancement of Psychiatry, 1966); at later ages, clinicians constructed diagnostic profiles using Anna Freud’s Metapsychological Profile (Freud, 1965), as well as a four-point Probability of Emotional Disorder scale adapted from Leighton’s psychiatric categories (Leighton, Harding, Macklin, Hughes, & Leighton, 1963). Children considered to be free from psychosocial disorder were characterized by developmentally appropriate and positive psychological functioning (e.g., flexible adaptation to environmental challenges, good coping skills, resilience, healthy emotion regulation capacities, confidence) and positive, flexible, and cooperative interactions with others.

Table 1

Adult Attachment Interview Secure vs. Insecure Classification as a Function of Mother's Neonatal Perception

Mother's Perception (NPI)	Adult Attachment Classification (AAI)		Total
	Secure	Insecure	
Positive Perception	12	2	14
Negative Perception	3	9	12
Total	15	11	26

Note. Fisher's exact test: $p < .003$
Odds ratio: 18:1

Table 2

Adult Attachment Interview Three-way Classification as a Function of Mother's Neonatal Perception

Mother's Perception (NPI)	Adult Attachment Classification (AAI)			Total
	Secure	Dismissing	Preoccupied	
Positive Perception	12	1	1	14
Negative Perception	3	9	0	12
Total	15	10	1	26

Note: Fisher's exact test: $p < .001$

Table 3

Mean AAI Scale Scores as a Function of Mother's Neonatal Perception

AAI Scales	Mother's Neonatal Perception		<i>t</i> (24 df)
	Positive (<i>n</i> = 14)	Negative (<i>n</i> = 12)	
<i>Inferred Experience Scales</i>			
Mother Loving	5.82 (1.56)	4.63 (1.32)	2.09*
Mother Rejecting	2.11 (1.35)	3.42 (1.72)	2.18*
<i>State of Mind Scales</i>			
Coherence of Transcript	5.79 (.96)	4.54 (1.51)	2.54*
Idealization	2.50 (1.36)	4.33 (1.64)	3.12**
Lack of Recall	2.07 (1.11)	3.79 (1.70)	3.10**

Note. Standard deviations are given in parentheses.

* $p < .05$

** $p < .005$