

More Than Maternal Sensitivity Shapes Attachment

Infant Coping and Temperament

MARINA FUERTES,^{a,b} PEDRO LOPES DOS SANTOS,^b
MARJORIE BEEGHLY,^a AND EDWARD TRONICK^a

^a*Child Development Unit, Children's Hospital, Boston and Harvard Medical School, Boston, Massachusetts, USA*

^b*Faculdade de Psicologia e de Ciências da Educação, University of Porto, Porto, Portugal*

ABSTRACT: The aim of this longitudinal study was to investigate the effect of a set of factors from multiple levels of influence: infant temperament, infant regulatory behavior, and maternal sensitivity on infant's attachment. Our sample consisted of 48 infants born prematurely and their mothers. At 1 and 3 months of age, mothers described their infants' behavior using the Escala de Temperamento do Bebê. At 3 months of age, infants' capacity to regulate stress was evaluated during Tronick's Face-to-Face Still-Face (FFSF) paradigm. At 9 months of age, mothers' sensitivity was evaluated during free play using the CARE-Index. At 12 months of age, infants' attachment security was assessed during Ainsworth's Strange Situation. A total of 16 infants were classified as securely attached, 17 as insecure-avoidant, and 15 as insecure-resistant. Mothers of securely attached infants were more likely than mothers of insecure infants to describe their infants as less difficult and to be more sensitive to their infants in free play. In turn, secure infants exhibited more positive responses during the Still-Face. Infants classified as insecure-avoidant were more likely to self-comfort during the Still-Face and had mothers who were more controlling during free play. Insecure-resistant exhibited higher levels of negative arousal during the Still-Face and had mothers who were more unresponsive in free play. These findings show that attachment quality is influenced by multiple factors, including infant temperament, coping behavior, and maternal sensitivity.

KEYWORDS: attachment; infants born prematurely; resilience; multidimensional approach

Address for correspondence: Marina Fuertes, Child Development Unit, Children's Hospital, 1295 Boylston Street, Suite 320, Boston, MA 02215. Voice: 617-355-3545; fax: 617-730-0074.
e-mail: marina.fuertes@childrens.harvard.edu

Ann. N.Y. Acad. Sci. 1094: 292–296 (2006). © 2006 New York Academy of Sciences.
doi: 10.1196/annals.1376.037

INTRODUCTION

Infants born prematurely are at risk for attachment problems.¹⁻³ Classical attachment theory postulates that maternal sensitivity is a primary factor in determining the quality of the attachment relationship.⁴ However, modern attachment theorists argue for a transactional, multicontextual approach.^{5,6} The aim of this longitudinal study is to investigate the effect of a set of factors from multiple levels of influence: infant temperament, infant regulatory behavior (coping), and maternal sensitivity on infant's attachment in a sample of infants born prematurely.

SAMPLE

The sample consisted of 48 Portuguese prematurely born infants (M gestational age at birth = 33.94; SD = 1.97; range: 31–36 weeks; M birth weight = 2.104 g.; SD = 0.495; range: 1.100–2.500 g.) and their mothers (M age = 27.98; SD = 5.69; range: 18 to 40 years). No infants had sensory or neuromotor disabilities or serious illnesses, and no parents had any known mental health or drug/alcohol addiction problems. Infants' age at each follow-up assessment was corrected for gestational age at delivery.

PROCEDURE

Infant Temperament

When infants were 1 and 3 months old, mothers described their infants' temperament using the Escala de Temperamento do Bebê.⁷ This scale is statistically explained by a single factor and highly correlated with other parental ratings of infants' difficulty. Mothers rated infants' behavior (e.g., "My child calms down") on a 7-point Likert scale (1 = very easy, 7 = very difficult).

Infant Regulatory Behavior

At 3 months, infants' capacity to regulate stress was evaluated during Tronick's Face-to-Face Still-Face (FFSF) paradigm.⁸ The infants' behavior was coded using the Infant Regulatory Scoring System (IRSS).⁹ Following scoring, IRSS behaviors were grouped into three categories: positive expression, negative expression, and self-comfort.

Mother–Infant Play Interaction

At 9 months, mother–infant interactive behavior during free play was scored using the CARE-Index.¹⁰ This scale assesses the mother's interactive behavior

according to three qualifications (sensitive, controlling, and unresponsive), and the infant's interactive behavior according to four qualifications (cooperative, compulsive, difficult, and passive).

Attachment

At 12 months, the Strange Situation was administered and scored by trained and reliable coders. Infants were categorized as either secure, insecure-avoidant, or insecure-resistant using Ainsworth *et al.*¹¹ guidelines.

RESULTS

Distribution of Attachment Classifications

A total of 16 (33.3%) infants were classified as securely attached, 17 (35.4%) as insecure-avoidant, and 15 (31.3%) as insecure-resistant.

Infant Temperament and Infant Attachment

Compared to mothers of secure infants, mothers of avoidant infants were more likely to describe their infants as difficult at both 1 month (H-Kruskal-Wallis = 16.780; $P < 0.001$) and at 3 months of age (H-Kruskal-Wallis = 9.971; $P = 0.002$). Similarly, mothers of resistant infants were more likely than mothers of secure infants to rate their infants as difficult at both 1 month (H-Kruskal-Wallis = 16.924; $P < 0.001$) and 3 months of age (H-Kruskal-Wallis = 18.446; $P < 0.001$).

Infant Temperament and Maternal Interactive Behavior

Mothers who rated their infants' temperament as more difficult at 1 and 3 months interacted with them in a less sensitive and more passive manner during free play at 9 months (TABLE 1).

Infants' Regulatory Behavior and Attachment

Secure infants were more likely than avoidant infants (H-Kruskal-Wallis = 3.837; $P = 0.05$) or resistant infants (H-Kruskal-Wallis = 4.560; $P = 0.033$) to exhibit positive responses to their mother during the FFSF paradigm. Infants classified as avoidant used more self-comforting behaviors to regulate their

TABLE 1. Correlations (Spearman's ρ coefficients) between mothers' interactive behavior and their ratings of infants' difficult behavior at 1 month and at 3 months (corrected for the gestational age)

	Difficult temperament at 1 month	Difficult temperament at 3 months
Sensitivity	-0.752**	-0.684 **
Control	0.200	0.160
Passivity	0.326*	0.336*

* $P < 0.03$; ** $P < 0.001$.

stress during the Still-Face than secure infants (H-Kruskal-Wallis = 3.982; $P = 0.05$) or resistant infants (H-Kruskal-Wallis = 12.233; $P < 0.001$). Finally, negative expression was significantly higher in ambivalent-resistant infants compared to avoidant-attached infants (H-Kruskal-Wallis = 4.948; $P = 0.026$), and marginally higher than in secure infants (H-Kruskal-Wallis = 2.9783; $P = 0.084$).

Maternal Interactive Behavior during Free Play and Attachment

Compared to mothers of insecure infants, mothers of secure infants were more sensitive with their infant during free play (H-Kruskal-Wallis = 26.884; $P < 0.001$). In turn, mothers of avoidant infants were more controlling (H-Kruskal-Wallis = 15.804; $P < 0.001$) and mothers of resistant infants were more unresponsive than mothers of secure infants (H-Kruskal-Wallis = 22.961; $P < 0.001$).

DISCUSSION

A relatively low incidence of secure attachment (33.3%) was found in this sample. These results corroborate findings from prior Portuguese studies that also reported a lower incidence of securely attached infants, compared with American and other Western samples.¹² The results are also consistent with findings from other attachment studies with infants born prematurely at high medical risk.¹⁻³

In relation to coping and temperament, securely attached infants were more likely to be described by their mothers as less difficult and to exhibit more positive responses during the FFSF paradigm. Their mothers also were more sensitive in free play compared with insecure infants. Infants classified as insecure-avoidant were more likely to self-comfort during the FFSF paradigm and had mothers who were more controlling during free play. Insecure-resistant exhibited higher negative arousal during the FFSF paradigm and had mothers who were less responsive in free play. These findings are consistent with a

transactional and multicontextual conceptual model of development rather than a single-factor causal model.

ACKNOWLEDGMENT

This work was supported with a fellowship from Fundação para a Ciência e Tecnologia, Secretariado Nacional para a Reabilitação da Pessoa com Deficiência and Fundação Marquês de Pombal.

REFERENCES

1. COX, S.M., J. HOPKINS & S.L. HANS. 2000. Attachment in preterm infants and their mothers: neonatal risk status and maternal representations. *Infant Ment. Health J.* **21**(6): 464–480.
2. MANGELSDORF, S.C. *et al.* 1996. Attachment security in very low birth weight infants. *Dev. Psychol.* **32**: 914–920.
3. WILLE, D.E. 1991. Relation of preterm birth with quality of mother-infant attachment at one year. *Infant Behav. Dev.* **14**: 227–240.
4. BOWLBY, J. 1969. *Attachment and Loss*. Penguin Books. London.
5. SROUFE, L.A. 1996. *Emotional Development: The Organization of Emotional Life in the Early Years*. Cambridge University Press. New York.
6. CICCETTI, D. & D. BARNETT. 1991. Attachment organization in maltreated preschoolers. *Dev. Psychopathol.* **3**: 397–411.
7. LOPES DOS SANTOS, P., M. FUERTES & M. SANCHES-FERREIRA. 2005. A percepção materna dos atributos temperamentais do bebé: características psicométricas de um questionário e seu valor prognóstico relativamente à qualidade da vinculação. *In* *Desenvolvimento: Contextos Familiares e Educativos*. J. Bairrao, Ed.: 142–170. Livpsic. Porto, Portugal.
8. TRONICK, E.Z. *et al.* 1978. The infant's response to entrapment between contradictory messages in face-to-face interaction. *J. Am. Acad. Child Adolesc. Psychiatry* **17**: 1–13.
9. TRONICK, E.Z. & K. WEINBERG. 1990. *The Infant Regulatory Scoring System (IRSS)*. Unpublished Manuscript. Children's Hospital and Harvard Medical School, Boston.
10. CRITTENDEN, P.M. 2003. *CARE-Index Manual*. Unpublished Manuscript. Family Relations Institute, Miami, FL.
11. AINSWORTH, M.D.S. *et al.* 1978. *Patterns of Attachment: A Psychological Study of the Strange Situation*. Lawrence Erlbaum Associates. Hillsdale, NJ.
12. FUERTES, M. 2005. *Rotas da Vinculacao*. Doctoral Thesis. Porto University. Porto, Portugal.