



## ASSOCIATIONS AMONG MATERNAL REPRESENTATIONS AT BIRTH AND ATTACHMENT IN PORTUGUESE DYADS WITH PRETERM AND FULL TERM INFANTS

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### ABSTRACT

This longitudinal study investigated the relation between: maternal representations at birth; maternal representations of their infants' temperament (at 9 months); and mother-infant attachment in 57 dyads with infants prematurely born and 60 dyads with infants born at term. Forty eight hours after birth, an interview was performed to collect mothers' representations of their pregnancy, labor, and about their newborns. Our findings indicate that mothers that delivered prematurely had more negative perceptions about their pregnancy and labor. These mothers were more concerned about their infant's health and development. Nonetheless, they were as confident as mothers of at term infants in their ability to engage in a positive relationship with their infant. At nine months, maternal positive representations of prematurely born infants' temperament were associated with positive expectations about their babies' development and family social support at birth. At 12 months, secure attachment was related with maternal representations at nine months.

*Key Words:* Maternal representations, attachment, premature birth



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### INTRODUCTION

Commonly in the third trimester of pregnancy women develop a clear and rich representation of their infants (e.g., Ammaniti, Baumgartner, Candelori, Perucchini, Pola, Tambelli et al., 1992), which are influenced by mother's early attachment, as well as the movements and levels of fetal activity, which are being organized in cycles and patterns that are interpreted by the mother (Brazelton & Cramer, 1990; Korja, Savonlahti, Haataja, Lapinleimu, Manninen, Piha, Lehtonen, & Grp, 2009). Those representations generated during perinatal period seem to affect mother-infant relationship (e.g., Benoit, Parker & Zeanah, 1997; Zeanah, Benoit, Hirshberg, Barton, & Regan, 1994). Nevertheless, birth reveals the real baby that confronts the idealized baby. Prenatal representations are open to change arising from the real interaction and the need to provide care to the baby that will adjust mothers' expectations to the newborn (Stern, 1991; Fava-Vizziello, Antonioli, Cocci, & Invernizzi, 1993). Therefore, shortly after the birth, parents may form new and more accurate representations of their "real" newborn (Benoit et al., 1997).

Maternal representations can be understood as mothers' internal subjective experiences of their relationships with their babies (Zeanah & Benoit, 1995). Many studies have examined the nature, origins and developmental implications of maternal representations on attachment relationships with their infants (Hugh-Bocks, Levendosky, Bogat & von Eye, 2004; Sokolowski, Hans, Bernstein, & Cox, 2007; van der Mark, van Ijzendoorn, & Bakermans-Kranenburg, 2002; Zeanah et al. 1994).

Balanced and positive maternal representations, as measured pre and postnatal, have been associated with secure attachment (Benoit, Parker, & Zeanah, 1997; Bretherton, Biringen, Ridgeway, Maslin, & Sherman, 1989; Cox, Hopkins, & Hans, 2000; Izard, Haynes, Chisholm, & Baak, 1991; Kochanska, 1998; Zeanah et al., 1994; Korja, et al., 2009). Infants whose mothers made more positive and stable temperament reports are more likely to be classified as securely attached at the end of the first year of life (Benoit et al., 1997; Bretherton, Biringen, Ridgeway, Maslin, & Sherman, 1989; Cox, Hopkins, & Hans, 2000; Fuertes, Lopes dos Santos, Beeghly, & Tronick, 2006; 2009; Izard, Haynes, Chisholm, & Baak, 1991; Kochanska, 1998; Zeanah, Benoit, Hirshberg, Barton, & Regan, 1994).

Although the role of maternal representations on mother-infant attachment has been robustly studied, there is a gap in the literature concerning mothers' representations on first days after delivery. Indeed, most studies are performed during prenatal period or during infancy (e.g., at 3, 6 or 9 months). Indeed, to our knowledge, there is no studies focus on maternal representations collected at newborns first days of life. In this period, mothers are chanelled to rapidly cope with the integration of new representations about the baby and at the same time to start to taking care of the baby (this can be especially demanding for first time mothers).

Furthermore, only few studies compared dyads with preterm and full term newborns regarding maternal representations and attachment. Concerning mother-infant attachment when samples are characterized by additional risk factors such as low socio-economic status (Wille, 1991), low maternal education (Pederson & Moran, 1996), co-morbid infant health problems (Plunkett, Meisels, Stiefel, Pasick, & Roloff, 1986), or maternal depression (Poehlmann & Fiese, 2001), premature birth is associated with a higher prevalence of insecure attachment (see also Belsky, 2005, for a review).

Trying to relate maternal representations with mother-infant attachment, Fuertes, Lopes-dos-Santos, Beegly, & Tronick (2006; 2009) found a significant association between maternal representations of their infant's difficult temperament (at 3 months) and infants' attachment status at 12 months corrected age. Results indicated that infants classified as securely attached were perceived as being less difficult, on average, than infants classified as insecure-avoidant or insecure-resistant.



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Nevertheless, this study only reports findings for mothers of prematurely born infants without a control group.

In this present study, we wonder what role maternal representations in the beginning of the relationship (48 hours after the birth) plays on mother-infant attachment. We aim: i) to study differences of mothers' *initial* perceptions of their pregnancy, labor, and experiences in the first 48 hours in both dyads with premature infants and at term infants. ii) to investigate mothers' representations of infants' difficult temperament comparing both groups at nine months of age (corrected age for prematurely born infants). iii) to study both the relation between maternal representations at birth and maternal perception of infants' temperament at nine months and iv) to explore the relation between maternal representations (at birth and at 9 months) and mother-infant attachment observed at 12 months in both groups.

## METHOD

### Participants

Two independent Portuguese samples were compared: 57 dyads with prematurely born infants (born between 31 and 36 weeks of gestation); and a control group of 60 dyads with full term babies ( $\geq 37$  weeks of gestation).

The participants were primarily Portuguese Caucasians from middle-class homes with urban backgrounds. Compared to other samples collected in Western countries, maternal formal education was quite low in this study but those values are roughly similar to Portuguese indices for women's education (INE, 2004). Descriptive statistics are provided in Table 1.

Table 1 - Infant and Maternal Demographics

	Full term, middle-class (n=60)	Premature, middle-class (n=57)
Sex		
	F	28
	M	32
Parity		
	<i>M</i> (min.-max.)	0, 64 (0-2)
Gestational age (weeks)		
	<i>M</i>	38,93
	<i>SD</i>	1.36
	(min.-max.)	(37-42)
Gestational weight		
	<i>M</i>	3219.5 g
	<i>SD</i>	432 g
	(min.-max.)	(1860-4050)
Apgar		
	1-min	8.74 (5-10)
	5-min	9.83 (8-10)
Mothers years of education		
	<i>M</i>	11.6
	<i>SD</i>	10.26
	(min.-max.)	(.90)
		(6-19)
Mothers age		
	<i>M</i>	29.98
	<i>SD</i>	4.63
	(min.-max.)	(18-41)



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All infants were healthy and clinically normal at delivery as determined by pediatric examination. No infants had sensory or neuromotor disabilities, serious illnesses, or congenital anomalies. No parents had any known mental health or drug/alcohol addiction problems. All infants lived with both parents in the same household.

### Procedure

Twenty-four hours after birth, a research assistant contacted potential participants and explained the study purpose and procedures. To determine eligibility, mothers were administered a brief interview to collect demographic information. Eligible mothers gave their informed consent. Information from the infant's hospital medical record was obtained regarding his or her perinatal health condition. The Portuguese Hospital's Ethics Commission and People Rights Protection approved the study aims and procedures.

The following day, the research assistant conducted a one hour semi-direct interview with interested mothers to collect their representations of pregnancy, labor and their experiences in the first 48 hours. At nine months (corrected age) mothers were asked to rate their infant's difficult temperament on a Portuguese validated scale (Lopes dos Santos, Fuertes, & Sanches-Ferreira, 2005). Mother-infant attachment was observed with Ainsworth laboratorial *Strange Situation* (Ainsworth, Blehar, Walters, & Wall, 1978), at 12 months of age (corrected age).

### Maternal semi-structured interview.

During mother's and newborns stay at the Neonatal Care Unit, maternal representations were collected 48 hours after birth regarding: *pregnancy* (planned/unexpected pregnancy; father's reaction to pregnancy announcement; other family members' reaction; medical services; social support; family support, worries, expectations and affectional emotions; parents arrangements and preparation for welcoming the newborn), *labor* (preparation, emotions, worries) and *maternal experience* (emotions, areas of difficultness, own baby versus idealize baby; self-evaluation of the ability to take care and engage with the infant, perceptions of the infant's social interactive competencies). The interview lasted approx. one hour.

The interview was previously tested in two steps. In each step (two weeks apart) five interviews were performed. After the first five interviews, a critical evaluation of the process was attended and the interview guide was improved regarding organization, number of questions, and formulation of questions.

### Maternal Ratings of Infant Temperament.

At nine months, mothers described their infant's temperament using the Portuguese validated scale: *Escala do Temperamento do Bebé* (Lopes dos Santos et al., 2005). Mothers were asked to rate nine aspects of their infant's current behavior using a 7-point Likert scale concerning several aspects including amount of crying, amount of sleeping, reaction to environmental changes (e.g., turning on/off lights, sound), pain reactions, responses to parent's cues, difficultness to calm down, difficultness to dress/undress. The *Escala do Temperamento do Bebé* was previously tested in a sample of 127 healthy infants (60 preterms and 67 full-terms) at one and three months of age (Lopes dos Santos, Fuertes, & Sanches-Ferreira, 2005). Items were factor analyzed in each of both applications, yielding a single factor ("Difficult Behaviour") that explained more than 60% of the total variance of the results (60.1% and 65.4%, respectively). Adequate reliability estimates was found with alpha coefficients ranging from .922 to .933 and with a test-retest correlation of  $r = .793$ .

### Attachment.

At the 12-month visit, infant's attachment behavior with their mother was observed during Ainsworth's *Strange Situation* and videotapes were scored by two blinded coders (against study



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hypotheses and group study) applying traditional scoring guidelines developed by Ainsworth et al. (1978). All cases were scored twice and independently and classified as secure, insecure-avoidant, or insecure-resistant. Scoring disagreements were resolved in conference. Overall inter-coder agreement for major classification prior to conferencing was over 81%.

### Data Reduction and Analyses

Three sets of statistical analyses were carried out to address the goals of this study. First, the distribution of the three attachment classifications (secure, insecure-avoidant, insecure-resistant) was calculate in both groups (preterm and full-term) using univariate frequency analyses. Second, bivariate analyses were used to compare both groups concerning maternal representations of the pregnancy, labor and the beginning of the relationship with the newborn on day two, maternal representations of the infant's temperament at nine months and mother-infant attachment at 12 months. Third, bivariate association between attachment classification (secure, insecure-avoidant, insecure-resistant) and demographic variables, maternal representations on day two, and maternal representations at nine months were studied. Alpha was set at .05.

## RESULTS

### Infant Medical and Maternal/Familial Demographic Variables

Maternal representations or attachment status was not significantly associated with infant gender, parity, gestational age, or Apgar scores in both samples. For the group of prematurely born infants, birth weight was correlated with total scores of maternal representations of infant's temperament at nine months (Pearson Rho = .326;  $p < .05$ ). Indeed, mothers of babies born with higher gestational weight had more positive representations of infant's temperament. Maternal education and maternal age were not associated with any dependent variables.

### Differences in mothers' representations of pregnancy, labor and first days of interaction with newborns

Findings, from bivariate analyses, indicate that mothers who delivered prematurely had more negative perceptions of pregnancy [ $t(115) = 2.678$ ;  $p < .05$ ] and labor [ $t(115) = 3.340$ ;  $p < .01$ ] compared to mothers in the control group. In addition, mothers who delivered prematurely were more concerned about their infant's health [ $t(115) = 2.056$ ;  $p < .05$ ] and development [ $t(115) = 2.109$ ;  $p < .05$ ].

However, mothers of prematurely born infants were as confident as control-mothers regarding their ability to engage in a positive relationship with their infants [ $t(115) = 1.012$ ; *n.s.*]. Furthermore, no significant group differences concerning expectations of child rearing difficulties were found [ $t(115) = 1.555$ ; *n.s.*].

### Differences in mothers' representations of infant's difficult temperament at nine months

Regarding mothers' representations of infant's temperament at nine months (corrected age criteria for infants prematurely born), there was no significant difference for the overall scores. However, mothers of infants prematurely born rated their infants as follows: difficult to calm down with a pacifier [ $t(115) = -2.394$ ;  $p < .05$ ] and difficult to dress and undress [ $t(115) = -3.562$ ;  $p < .001$ ].

When maternal representations of infant's temperament at nine months were crossed with mothers perceptions at birth, we found that mothers of prematurely born infants that had expressed higher positive expectations about their infant's future development [ $F(2, 56) = 7.281$ ;  $p < .05$ ] and that expected to receive help in taking care of the infant [ $F(2, 56) = 5.444$ ;  $p < .05$ ] rated their infants as less difficult at nine months.



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### Attachment incidence

Of the 57 prematurely born infants who participated in this study, 23 (41.8%) infants were classified as securely attached, 18 (32.1%) as insecure-avoidant, and 14 (25.5%) as insecure-resistant at 12 months corrected age. Two cases were unclassifiable with the A, B or C attachment classificatory system (Ainsworth et al., 1978). Of the 60 infants born at term who participated in this study, 29 (48.4%) infants were classified as securely attached, 20 (33.3%) as insecure-avoidant, and 11 (18.3%) as insecure-resistant in *Strange Situation*. No significant differences were found regarding attachment status in both groups.

### Mother-infant attachment and maternal representations

For the group of infants that were prematurely born, a significant association was observed between maternal representations of their infant's average difficult temperament at nine months and infant's attachment status at 12 months [ $F(2, 53) = 1.70$ ;  $p < .05$ ,  $\eta^2 = .14$ ]. A LSD post-hoc test indicated that infants perceived as being less difficult were more likely to be classified as securely attached ( $M = 27.65$ ,  $SD = 5.81$ ) than insecure-avoidant ( $M = 33.5$ ,  $SD = 4.70$ ) or insecure-resistant ( $M = 29.87$ ,  $SD = 5.22$ ). The mean value difference between these two last groups was not significant [ $F(2, 53) = .868$ ; *n.s.*]. No significant differences were found among infants born at term. Furthermore, no significant relation was found between mothers' perceptions on day two and mother-infant attachment at 12 months.

## DISCUSSION

The associations between maternal representations of early mother-infant relationship on day two, maternal representations of their infant's temperament at nine months and mother-infant attachment at 12 months was studied in dyads with infant prematurely born and infants born at term. The first aim of this longitudinal study was to investigate differences of mothers' perceptions of pregnancy, labor, and *initial* experience in the first 48 hours in both dyads with prematurely born infants and infants born at term. The second aim was to study maternal representations of infants' difficult temperament comparing both groups at nine months of age. The third aim was to study the association between maternal representations at birth and maternal perception of infants' temperament at nine months, also for both groups. The fourth goal was to investigate the relation between maternal representations (at birth and at nine months) and mother-infant attachment at 12 months for these two groups.

Our findings suggest that Portuguese mothers of prematurely born infants have different perceptions and worries concerning labor, pregnancy and first interactions with their newborns two days after birth, compared to mothers of full-term infants. Mothers of premature infants were more negative about labor and pregnancy. Moreover, these mothers were concerned about their infant's health and development. These worries reported by mothers of prematurely born infants may contribute to some of the anxiety and intrusiveness that these mothers often present (e.g., Forcada-Guex, Pierrehumbert, Borghini, Moessinger, & Muller-Nix, 2006; Golberg & DiVitto, 1995; Muller-Nix, Forcada-Guex, Pierrehumbert, Jaunin, Borghini, & Ansermet, 2004). Nonetheless, they were as optimistic about their children future development as mothers of infants born at term. *Can these maternal positive expectations be a open door to resilience?*

At nine months, specific differences were found for mothers' perceptions of infant's difficult temperament. Indeed, mothers of prematurely born infants rated their daughters/sons as more difficult to calm down and to dress/undress.

It seems that maternal initial representations of pregnancy, labor, and first 48-hours of maternal experience act indirectly on attachment by affecting mothers' late perceptions of infant's tempera-



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ment (at nine months). Indeed, securely attached infants (at 12 months) had mothers that rated their temperament as less difficult than insecurely attached infants (at nine months). Mothers that rated the temperament of their infants as less difficult at nine months had more positive expectations about their infant's future development and expected help in taking care of the child. However, no direct relations were found between attachment and maternal representations of pregnancy, labor, and first experiences with newborn.

Some limitations of our study must be acknowledged. The relatively small sample size prevented us from evaluating potential indirect as well as direct effects of maternal, infant, and demographic variables on infants' attachment formation. Indeed, from those factors that were analyzed (infant gender, parity, gestational age, birth weight, Apgar scores, maternal education, and maternal age), only infant birth weight was positive and significantly associated with maternal perceptions at two days and nine months. Additional longitudinal research with larger sample sizes is needed to investigate how maternal representations change over time and how they contribute to individual differences in infant attachment status.

Nevertheless, our results raise two important and unstudied questions: *What is the impact of premature birth on maternal representations? How does initial maternal representation contribute to later maternal behavior and attachment?*

Our results suggest that there are clear differences among mothers of prematurely born infants and mothers of infants born at term regarding perceptions of pregnancy, labor, first two days of experiences with the newborn and infant's temperament. These differences seem to affect future maternal representations of infant temperament at nine months that are linked with mother-infant attachment at 12 months. Past studies have shown that parents' representations, both pre- and postnatal, have been linked to attachment security and children's socio-emotional outcome as well as to parenting (Benoit et al., 1997; Bretherton, et al. 1989; Cox et al., 2000; Izard et al., 1991; Kochanska, 1998; Zeanah et al., 1994). The origins and development of such representations across pregnancy and at birth as well as their impact on infant's development may need further studies.

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