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Maternal Care and Attachment Security in Ordinary and Emergency Contexts

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One of the foundations of attachment theory is the notion that early care plays a key role in determining the quality of child–caregiver attachment relationships. Studies have consistently shown relations between maternal sensitivity and infant security. Further research is required to resolve issues arising from modest correlations, focus on research in stressful as opposed to ordinary contexts, and questions about the generality of results across cultures and social contexts and about the context specificity of caregiving behavior. This article addressed these issues in 2 studies of child care in home and hospital contexts. Q-sort scores derived from extended naturalistic observations were used. Results are discussed in terms of links between methodology and effect sizes, the generality of links between maternal care and child security, the need for further research on caregiving in ordinary and emergency situations, and the context sensitivity of maternal behavior.

The notion that early experience plays a key role in the emergence and organization of secure-base behavior is one of the cornerstones of modern attachment theory. Ainsworth's identification of maternal caregivers' sensitivity to signals, cooperation with ongoing behavior, accessibility, and acceptance as important dimensions of infant care has provided a valuable framework for empirical research on this issue (Ainsworth, Blehar, Waters, & Wall, 1978). Studies have consistently shown relations between these variables and infant security. Ainsworth's (1967) naturalistic observations in Uganda and her longitudinal study of 26 mother–infant dyads in Baltimore (Ainsworth et al., 1978) have provided initial support for the role of sensitive care in attachment development.

Although the relations between maternal care and infant security in Ainsworth et al.'s (1978) Baltimore study were substantial, most subsequent studies have reported moderate to modest effects (e.g., Belsky, Rovine, & Taylor, 1984; Crockenberg, 1981; Grossmann, Grossmann, Spangler, Suess, & Unzner, 1985; Hubbard & van IJzendoorn, 1991; Isabella, 1993; Lyons-Ruth, Connell, Zoll, & Stahl, 1987), and a few have reported nonsignificant effects (e.g., Fagot & Kavanagh, 1993; Lewis & Feiring, 1989; Seifer & Schiller, 1995; Ward & Carlson, 1995). A recent meta-analysis (De Wolff & van IJzendoorn, 1997) concluded that, overall, empirical research supports a link between maternal care and infant security; the conclusion has to be qualified in light of moderate effect sizes. Of course, low correlations sometimes reflect measurement problems rather than weak effects (Block, 1977; Epstein, 1983; Waters, 1978). Thus, Isabella (1993), Isabella, Belsky, and von Eye (1989), and Pederson and Moran (1995) have argued that Ainsworth et al.'s (1978) many hours of naturalistic observations throughout childrens' first year afford a better assessment of maternal sensitivity and child behavior than the less extensive, structured observations and narrowly focused measures typical of most subsequent studies. Indeed, the results of recent studies that involved observations and measures more akin to those of Ainsworth have yielded comparable results (Pederson & Moran, 1995, 1996; Pederson et al., 1990). In addition, they have provided information on ways of characterizing and describing certain insecure relationships more vividly and in more detail; for instance, they describe two subtypes of the avoidant relationship: the teaching relationship and the ignoring relationship (Pederson & Moran,

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1995). Clearly, the issue of effect size in research on maternal care and infant security requires further study, and special attention should be paid to construct definitions, observational strategies, and measurement issues. In the meantime, as Abelson (1985) has pointed out, even small correlations should not be dismissed in contexts in which they can be projected through large numbers of events or interactions to produce important effects.

In addition to predicting that early care is an important determinant of infant security, attachment theory also assumes that this relation holds across a wide range of ordinary and stressful contexts and across cultures. To be sure, Bowlby (1982) postulated attachment behavior as species-specific and thus common to all children reared within the range of our evolutionary environment of adaptedness. This can be understood as a propensity to organize an attachment behavioral system and develop an attachment relationship in the context of child–mother interactions. Furthermore, Bowlby postulated that the specific quality of an attachment relationship (i.e., secure or insecure) depends on the particular interaction experiences within a given child–mother dyad. Research findings indicate that the secure-base phenomenon is characteristic in children from different cultures and socioeconomic contexts (Posada, Gao, et al., 1995). They also show that rates of secure attachment are lower in families under stress than in middle-class families (e.g., Posada, Gao, et al., 1995; Valenzuela, 1990; Vaughn, Egeland, Sroufe, & Waters, 1979) and vary from culture to culture (e.g., Grossmann et al., 1985; Mikaye, Chen, & Campos, 1985; van IJzendoorn & Kroonenberg, 1988). These latter results are not inconsistent with the Bowlby–Ainsworth perspective. In fact, if they reflect underlying differences in patterns of early care, they would be an important confirmation of their hypothesis. The key issue is whether the link between early care and infant security (not the proportion of secure vs. insecure attachments or the distribution of attachment classifications) is consistent across contexts and cultures.

Finally, as with attachment behavior (Sroufe & Waters, 1977), the Bowlby–Ainsworth perspective assumes that caregivers' behavior is multifunctional and that different behaviors may serve the same function. Thus, in addition to expecting the relation between quality of early care and security to hold in different contexts, one also expects that specific sensitive caregiving behaviors vary according to the particular circumstances (e.g., ordinary and emergency) surrounding the mother–child pair. Sensitive care simply means that the caregiver is available and responsive to the child's signals. Different behaviors may accomplish this goal; what matters is that the child's needs are responded to appropriately. In different contexts and situations, caregivers' behavior may vary, but the results for the child are the same. From the child's point of view, the important issue is that he or she learns that the caregiver is responsive and available when needed.

In the following studies, we investigated the child–mother attachment relationship in different real-life settings—at home (Study 1) and in a hospital (Study 2)—and we thus observed both maternal caregiving and children's secure-base behavior in naturalistic contexts. We conducted these two studies to determine if methods and measures similar to those of Ainsworth et al. (1978) consistently yield stronger effects than those predicted from recent meta-analyses of research on early care and infant security. We also conducted these studies to determine whether early care and infant security are significantly related in different caregiving contexts (ordinary and emergency) and for other than North American middle-class samples. Finally, we conducted these studies to determine specific aspects of caregiving behavior significantly associated with infant security in each context (ordinary and emergency) and whether those specific behavioral referents vary in relation to context.

Study 1

We studied whether there was an association between maternal sensitivity, inferred from a mother's caregiving behavior during everyday circumstances, and her child's attachment security, inferred from the child's secure-base behavior at home. Thus, for this study we obtained trained observers' descriptions of both mothers' and children's behavior at home on separate occasions.

Method

Participants

Participants were 41 mother–child dyads from Sector 3, a middle-class/working-class sector of Bogota, Colombia (DANE, 1991). We contacted participants through a health, housing, and education provider with whom the families were associated. All children were healthy and from a nonclinical population. There were 19 boys and 22 girls who were between 8 and 19 months of age (M = 12.56 months) at the time of the first attachment assessment. All families were intact; children lived with both parents. Mothers declared themselves to be the child's main caregiver; their ages ranged from 21 to 42 years (M = 31.5), and their education ranged from incomplete high school to having a university degree (i.e., 3 mothers did not complete high school, 8 had a high school degree, 12 had a technical degree, and 15 had a university degree; 3 mothers did not report on their education). Fathers' ages ranged from 25 to 53 years (M = 34.9), and their education ranged from primary school (5 years) to a university degree (i.e., 1 father had completed primary school, another did not complete high school, 3 had a high school degree, 8 had a technical degree, and 23 had a university degree; 5 did not report on their education).

Procedure

Mothers were approached by members of the research team, who invited them to participate in the study. Those mothers who agreed to participate were given additional specific details about the study and filled out a sociodemographic form. Four 2-hr home visits were conducted per family, two to observe mothers' behavior and two to observe children's behavior. The home visits were unstructured; mothers were told to go about their activities as they normally would. Observers were allowed to interact with both mother and child during the visits. We used Q methodology to describe both maternal and child behavior; this allowed us to obtain global assessments as well as more detailed descriptions of the constructs.

We collected data on mothers' caregiving behavior at home when the baby was between 6 and 12 months of age. Two observers visited the infant–mother pair on two separate occasions (there was only one home visit for two families due to scheduling difficulties). The lapse of time between home visits varied between 1 and 4 months. One of the observers for the second home visit was new. After the visits, each observer independently used the Maternal Behavior Q-Set (Pederson & Moran, 1995) to describe a mother's behavior. The four descriptions were averaged into a composite that was used as the Q description of a mother's behavior.

One to 3 months after having completed the observations of maternal behavior, two observers conducted two 2-hr home visits to describe the children's secure-base behavior (there was only one home visit for 5 of the 41 families due to scheduling difficulties). These visits were con-

ducted 1 to 3 months apart, and at least one of the two observers for the second visit was new. Two of the three observers for the child assessment were different from the observers who described maternal behavior. After each visit, observers independently described the child's behavior with the Attachment Q-Set (Waters, 1995). The four descriptions were later averaged into a composite Q description that was used for analyses.

Assessment

Maternal caregiving behavior. Maternal caregiving behavior in everyday circumstances at home was described by observers with the Maternal Behavior Q-Set (Pederson & Moran, 1995). This Q set has 90 items, and its validity has been supported in various studies (e.g., Moran, Pederson, Pettit, & Krupka, 1992; Pederson & Moran, 1995, 1996; Pederson et al., 1990). The Q set was first translated into Spanish and then translated back into English by a different person. The two English versions were then checked for accuracy by one of the authors (Germán Posada); adjustments to the Spanish version were made when necessary. Interobserver reliability (calculated from the agreement between the Q descriptions for each visit) ranged from .67 to .97 (M = .84) for the first home visits and from .66 to .94 (M = .85) for the second home visits. The descriptions were then averaged into a Q composite description. A global maternal sensitivity score was obtained by correlating that composite description with a criterion sort that describes an optimally sensitive mother (Pederson & Moran, 1995). The correlation between these two descriptions is a mother's sensitivity score. To investigate the relevance of more specific aspects of maternal behavior, we used the individual Q set item scores. This is in line with a descriptive approach that facilitates the identification of important behavioral referents of maternal sensitivity. In addition, because the sample used here was from a different culture and the Maternal Behavior Q-Set is a relatively new instrument that has not been used with samples other than North American, a descriptive approach at the level of the items was deemed appropriate.

Children's secure-base behavior. Children's secure-base behavior at home was assessed with the Attachment Q-Set (Waters, 1995). The validity of the Attachment Q-Set has been documented elsewhere (e.g., Park & Waters, 1989; Pederson & Moran, 1996; Vaughn & Waters, 1990; Waters & Deane, 1985). Children's behavior at home was described by observers who were trained in the use of the Q set. Interobserver reliability (calculated from the agreement between the Q descriptions for each visit) ranged from .67 to .97 (M = .84) for the first home visits and from .68 to .96 (M = .85) for the second home visits. The descriptions were then averaged into a Q composite description. A global security score for each child was obtained by correlating that description with a security criterion sort that describes the hypothetically secure child. The correlation between these two descriptions is a child's security score.

Results

The mean for the scores on maternal sensitivity was .73, with a standard deviation of .11; the scores ranged between .45 and .88. This mean is comparable to that of studies in which nonclinical, middle-class individuals (e.g., Pederson et al., 1990) have participated. The mean score for the attachment security scores was .43, with a standard deviation of .24; the scores ranged between −.27 and .76. This mean is also comparable to that reported in studies with middle-class samples (e.g., Park & Waters, 1989; Pederson et al., 1990; Posada, Waters, Crowell, & Lay, 1995).

A Pearson correlation index indicated that the global scores on maternal sensitivity and attachment security were significantly and positively associated (i.e., r = .48, $p \leq .001$). Further, the association between the constructs was investigated at different ages (i.e., younger and older children). We divided the sample into two groups by means of a median split (Mdn = 12) and then conducted correlational analyses for each group. Results indicated that sensitivity and security were significantly associated in both age groups (younger children, n = 21, r = .49, $p \leq .05$; older children, n = 20, r = .46, $p \leq .05$). Subsequently, to find out and describe specific aspects of maternal behavior that were relevant to the association between sensitivity and attachment security, we conducted correlational analyses at the item level for the Maternal Behavior Q-Set. A total of 21 items were found to be significantly associated with attachment security (see Table 1).

Discussion

Maternal sensitivity assessed in everyday circumstances was significantly associated with infant's attachment security at home in a middle-class Colombian sample. Being sensitive to an infant's signals and communications is related to higher scores in attachment security. This corroborates findings about the relation between the constructs reported by various researchers and cited elsewhere (e.g., De Woolf & van IJzendoorn, 1997). The size of the association between maternal sensitivity and infant security is comparable to the one reported by Pederson and Moran (1995, 1996; Moran et al., 1992; Pederson et al., 1990). These results also indicate that the relation between quality of early care and infant security suggested by attachment theory holds for everyday contexts.

Analyses of specific aspects of maternal caregiving behavior at home indicated that the more that mothers were aware of their infant's signals and communications and the more they responded promptly, accurately, and consistently, the higher their children's security scores were. Also, the more that mothers participated in smooth, close, face-to-face interactions, monitored their children, let them know of their whereabouts, structured the environment in consideration of the infant's needs and their own needs, and exhibited less anger and resentment toward their children, the higher their infants' attachment security scores were. These results support Ainsworth et al.'s (1978) conceptualization of maternal caregiving behavior (i.e., sensitivity, cooperation, acceptance, and accessibility) and its relation to infant security. In addition, they underscore the importance of paying special attention to observational strategies, measurement issues, and contexts of assessment used when studying the association between quality of early care and infant security.

Study 2

We asked whether there was an association between maternal sensitivity, inferred from a mother's behavior when taking care of her sick child in a hospital, and that child's attachment security, inferred from a maternal description of the child's secure-base behavior at home. Different from most projects that focus on the child in the emergency situation, this study included an emergency situation that involved both the child and the mother, and it was maternal behavior that was observed and described when the child was hospitalized. Because children's health was compromised and the setting of observation was a hospital, we expected that maternal sensitivity, although still significantly related to attachment security, would be exhibited through caregiving behavior in a manner different from that exhibited in ordinary circumstances.

Table 1
Maternal Behavior Q-Set Items Significantly Associated With Attachment Security in Each Sample

Item	Correlational analysis: Study 1 Home	Correlational analysis: Study 2 Hospital
4. Response is so delayed that baby cannot connect mother's response with the action that initiated it.	−.50**	−.43**
70. Responds accurately and promptly to signals of distress, but often ignores (is unresponsive to) signals of positive affect.	−.40**	−.51**
9. Responds consistently to baby's signals.	.46**	.47**
68. Often appears to "tune out" and not notice distress or bids for attention.	−.42**	−.47**
8. Responses to baby's communications are inconsistent and unpredictable.	−.53**	−.39**
13. Is irritated by demands of baby.	−.53**	−.36*
20. Seems to resent baby's signals of distress or bids for attention.	−.33*	−.51**
7. Responds only to frequent, prolonged, or intense signals.	−.38*	−.48**
2. Unaware of or insensitive to baby's signals of distress.	−.48**	−.30*
65. Not skillful in dividing her attention between baby and competing demands thus misses baby's cues.	−.31*	−.45**
34. Seeks face to face interactions.	.41**	.37*
83. Leaves the room without any sort of "signal" or "explanation" to the baby, e.g., "I'll be back in just a minute."	−.40**	−.34*
40. Praise directed toward baby.	.39*	.35*
63. Monitors and responds to baby even when engaged in some other activity such as cooking or having a conversation with visitor.	.38*	.36*
11. Sometimes is aware of baby's signals of distress, but ignores or does not respond immediately to these signals.	−.37*	−.33*
43. Kisses baby on head as major mode of expressing affection.[a]	.32*	.31*
74. Often misses "slow down" or "back off" signals from baby during face-to-face play.	−.34*	−.30*
88. Often seems to forget baby is present in the room during interaction with visitor.	−.42**	
18. Structures environment considering baby's *and* own needs.	.36*	
45. Encourages baby's initiatives in feeding.	.35*	
5. Notices when baby is distressed, cries, fusses, or whimpers.	.34*	
37. Comments are generally positive when speaking about baby.		.63**
38. Displays affection by touching.		.58**
80. Seldom speaks to the baby directly.		−.53**
3. Often interprets baby's signals according to own wishes and moods.		−.51**
81. Makes frequent use of playpen/crib in order to permit carrying out normal household/ hospital chores.		−.50**
79. Frequently repeats words carefully and slowly to the baby as if teaching meaning or labeling an activity or object.		.50**
61. Seems to be aware of baby even when not in the same room.		.48**
78. Nap times are determined by mother's convenience rather than the immediate needs of the baby.		−.48**
6. Interactions appropriately vigorous and exciting as judged from baby's responses.		.46**
87. Seems awkward and ill at ease when interacting directly with the baby face-to-face.		−.46**
41. Flat affect when interacting with baby.		−.45**
60. When baby is distressed, mother is able to quickly and accurately identify the source.		.45**
15. Aware of how her moods affect baby.		.44**
30. Plays games with baby such as peek-a-boo, patty-cake.		.43**
35. Points to and identifies interesting things in baby's environment.		.43**
36. Predominantly positive mood about baby.		.43**
76. Sometimes will break off from the child in midinteraction to speak to visitor or attend to some other activity that suddenly comes to mind.		−.43**
69. Seems overwhelmed, depressed.		−.42**
10. Greets baby when reentering room.		.40**
33. Creates interesting environment.		.40**
73. Content and pace of interactions with the baby seem to be set by mother rather than according to baby's responses.		−.40**
27. Seems "long suffering" in her attitude about maternal duties.		−.39**
66. Arranges her location so that she can perceive baby's signals.		.39**
71. When baby is in a bad mood or cranky, mother often will place baby in another room so that she will not be disturbed.		−.39**
1. Notices when her baby smiles and vocalizes.		.38*
25. Idealizes baby—does not acknowledge negative aspects.		.38*
77. Often "parks" the baby in front of the television in an attempt to keep him/her entertained.		−.38*
44. Balances task and baby's activities when changing diapers.		.36*
46. Cues baby and waits for response in feeding.		.36*
12. Interprets cues correctly as evidenced by baby's response.		.35*
14. Scolds baby.		−.34*
19. Perceives baby's negative behavior as a rejection of her, takes misbehavior "personally."		−.34*
21. Is delighted over baby.		.34*
29. Slows pace down, waits for baby's response in face-to-face interactions.		.34*
23. Respects baby as individual, i.e., able to accept baby's behavior even if it is not consistent with her ideal.		.33*
84. Sometimes seems to treat baby as an inanimate object when moving her/him around or adjusting her/his posture.		−.33*

Table 1 (*continued*)

Item	Correlational analysis: Study 1 Home	Correlational analysis: Study 2 Hospital
89. Very alert to "dirty diaper"; seems to change diapers as soon as indication of need.		.33*
56. Very concerned that baby is well-dressed and attractive at all times.		.32*
39. When holding, cuddles baby as a typical mode of interaction; molds baby to self.		.31*
62. Preoccupied with interview—seems to ignore baby.		−.31*

Note. Items are from Appendix B in "A Categorical Description of Infant–Mother Relationships in the Home and Its Relation to Q-Sort Measures of Infant–Mother Interaction," by D. R. Pederson and G. Moran, in E. Waters, B. E. Vaughn, G. Posada, and K. Kondo-Ikemura (Eds.), "Caregiving, Cultural, and Cognitive Perspectives on Secure-Base Behavior and Working Models: New Growing Points of Attachment Theory and Research" 1995, *Monographs of the Society for Research in Child Development, 60*(2–3, Serial No. 244), pp. 247–254. Copyright 1995 by the Society for Research in Child Development, Inc. Reprinted with permission. Because 90 correlation coefficients per study were obtained, we investigated the probability of getting 21 items (Study 1) and 57 items (Study 2) significantly associated with security by chance. In a simulation analysis, we conducted 10,000 trials for each study and correlated our data sets with a random criterion sort. The probability of obtaining 21 and 57 items by chance was less than .001.

[a] Item 43 included affectionate kisses on the infant's face. Thus, this interpretation of the item is different from that which refers only to "pecks" on the infant's head.

$^{*}p < .05$. $^{**}p < .01$.

Method

Participants

Participants were 43 mother–child dyads from an extremely poor sector of Bogota. All mother–child pairs came from Sectors 1 and 2, the poorest sectors of the population in the city, according to governmental classification (DANE, 1991). Participants were contacted during children's hospitalization. The number of days children were hospitalized ranged from 3 to 15 (M = 5.7 days). Children were hospitalized due to moderate-to-serious illnesses such as bronchitis, pneumonia, vomiting, and diarrhea. There were 23 boys and 20 girls who were between 12 and 60 months of age (M = 26.27 months). Thirty children lived with both parents, and 13 lived without their fathers. Mothers' ages ranged from 17 to 43 years (M = 25.64), and their education ranged from none (3 mothers) to a high school degree (only 2 mothers had completed high school). All mothers declared themselves to be the child's principal caregiver. Fathers' ages ranged from 21 to 54 years (M = 30.67), and their education ranged from incomplete elementary school to a high school degree (only 6 fathers had completed high school).

Procedure

When children were hospitalized, their mothers were approached by a clinical psychologist who was a member of the hospital staff to invite them to participate in the project. Details about participation in the study were explained, and interested mothers filled out a sociodemographic form. We collected data on mothers' behavior when interacting with their children at the hospital as well as on children's secure-base behavior at home. The hospital in which we obtained information about maternal behavior required parents to visit their child daily, preferably early in the morning, and to feed, clean, administer medications, and play with the child. Children were hospitalized as a strategy of the health authorities in the neighborhood to guarantee that children's illnesses were being treated properly.

This emergency situation provided us with a fitting context in which maternal caregiving behaviors could be expected to be elicited naturally. As in Study 1, we used Q methodology to describe both maternal and child behavior. Mothers were observed while taking care of their children during the hospital routine described above. Two observers described maternal behavior independently on two separate occasions. A description of each child's secure-base behavior was obtained on a separate occasion by having mothers provide a Q description of their child's behavior at home.

Assessment

Maternal caregiving behavior. Two observers conducted two 2-hr observations of maternal behavior in a hospital when mothers were visiting their children. They observed mothers in activities such as waking, bathing, feeding, and playing with the child. After each observation period, observers independently described the mother's behavior with the Maternal Behavior Q-Set (Pederson & Moran, 1995; see Study 1 for reports that supported the validity of this instrument). Interobserver reliability (calculated from the agreement between the Q descriptions for each hospital visit) ranged from .57 to .98 (M = .92). The descriptions were then averaged into a Q composite description. We obtained a global maternal sensitivity score by correlating that composite description with a criterion sort that describes an optimally sensitive mother (Pederson & Moran, 1995). As in Study 1, we used the individual Q-set items to investigate the relevance of more specific aspects of maternal caregiving behavior.

Children's secure-base behavior. Children's secure-base behavior at home was assessed with the Attachment Q-Set (Waters, 1995). This instrument was created for use with infants and preschool children (Cicchetti, Cummings, Greenberg, & Marvin, 1990; Waters & Deane, 1985), and it has been successfully used with children between 1 and 5 years of age (e.g., Lay, Waters, Posada, & Ridgeway, 1995; Park & Waters, 1989; Posada, Gao, et al., 1995; Posada, Waters, et al., 1995; Vaughn & Waters, 1990; Waters & Deane, 1985). This time, children's behavior at home was described by their mothers. A research assistant read the Q items to the mothers in advance and also carefully instructed them as to how to use the Q set (e.g., first divide all the items into three piles and then into nine piles of 10 items each). Mothers were encouraged to ask questions about any of the items to clarify concepts and terms not understood at any time or about any aspect of the sorting task that was not clear. In addition, they were accompanied while doing the Q-sort description and assisted if they requested any help (e.g., answering questions about the Q items or their child's behavior; in three cases all the items were read to the mother) to ensure correct completion of the task. The investigator reminded several of the mothers how to proceed when forming the piles in the Q description (e.g., only placing 10 items

in each pile) and answered questions they had about the items (most mothers asked questions about various items). Mothers who are given adequate training in the Q-sort task at hand have been found to be successful in providing Q descriptions of their child (Posada, Gao, et al., 1995; Teti & McGourty, 1996; White & Feldstein, 1994). A global security score for each child was obtained by correlating that description with a security criterion sort that describes the theoretically secure child.

Results

The mean for the global scores on maternal sensitivity was .40, with a standard deviation of .40; the scores ranged from −.40 to .82. This mean was significantly lower than that of the middle-class sample in Study 1, $t(82) = 5.13$, $p < .01$. The mean for the global scores on attachment security was .30, with a standard deviation of .24; the scores ranged from −.54 to .70. This mean was comparable to means reported in studies in which participants came from a poor sector of the population (e.g., Posada, Gao, et al., 1995), and it is significantly lower than the mean security score for the middle-class sample in Study 1, $t(82) = 2.56$, $p < .05$. Because the age range for the children in this sample was broad (12–60 months), we conducted analyses to determine if there were differences associated with age both for maternal sensitivity and attachment security. Four age groups were created (12–23 months, $n = 20$; 24–35 months, $n = 11$; 36–47 months, $n = 9$; and 48–60 months, $n = 3$). One-way analyses of variance indicated no significant differences among the groups for either maternal sensitivity or child attachment security, $Fs(3, 39) = 0.61$ and 1.10, respectively (*ns*). Analyses dividing the sample into two groups of children only (12–35-month-olds vs. 36–60-month-olds) also showed nonsignificant results. In addition, correlational analyses indicated that neither maternal sensitivity nor security was significantly related to child's age ($rs = -.16$ and .01, respectively, *ns*).[1]

A Pearson correlation index indicated that the global scores on maternal sensitivity and attachment security were significantly and positively associated ($r = .55$, $p < .001$). As in Study 1, the sample was divided into two age groups (younger, $n = 21$, and older, $n = 22$, children) by means of a median split ($Mdn = 24$), and then correlational analyses were conducted. Results indicated that sensitivity and security were significantly associated in both groups (i.e., for younger and older children, $rs = .59$ and .60, respectively, $ps \leq .01$). To study and describe relevant and more specific aspects of maternal caregiving behavior in relation to security, we conducted, as in Study 1, correlational analyses at the item level. Results indicated that 57 items regarding maternal behavior at the hospital were significantly associated with security. Of these 57, 17 items had also been found to be significantly associated with security in Study 1 (see Table 1).

Discussion

Maternal sensitivity in an emergency situation at a hospital was significantly associated with children's attachment security at home in a sample of very poor families in Colombia. Mothers who were described as sensitive to their children's signals and communications in an emergency situation had children who were described as secure at home. Thus, although other factors could be influencing security of attachment differently in samples of low socioeconomic status (SES; De Wolff & van IJzendoorn, 1997), these results indicate that the relation between sensitivity and attachment security proposed by attachment theory holds for samples other than middle-class ones.

In exploring more specific aspects of mothers' behavior that are related to security, we found many significant associations at the item level. In brief, the results indicated that the more that children's secure-base behavior at home resembled the theoretical description of the secure-base phenomenon—therefore indicating that the children were secure—the more their mothers at the hospital were aware of, interpreted correctly, and responded promptly, accurately, and consistently to their child's signals and communications. These characteristics of maternal behavior are what Ainsworth et al. (1978) called maternal sensitive care. Also, the more that mothers monitored their children, let them know of their comings and goings, positioned themselves in locations where they could perceive their children's signals, and the less they ignored the child, placed the child in the crib, used the TV set to entertain the child, and placed the child in a different room when the child was cranky during their hospital visits, the higher their children's security scores were. In sum, the more accessible and available mothers were, the more secure their children were. Further, the more that mothers were described as being comfortable in face-to-face interactions, displaying affection by touching, molding their children to themselves when holding them, being careful when adjusting their children's posture, interacting appropriately (according to their children's response), and letting their children set the content and pace of interactions, the more secure the children were. Thus, appropriate physical contact and cooperation with children's behavior were associated with attachment security.

Finally, the higher the scores that mothers obtained on behaviors such as being animated and having a positive mood toward their children, displaying less anger and resentment in interaction, (not) scolding their children, talking positively about their children, speaking to, playing with, and creating an interesting environment for their children at the hospital, the higher their children's security scores were. That is, the more accepting that mothers were and the more they enriched the child's environment, the more secure their children were. In summary, mothers' awareness of children's signals, their prompt and appropriate responses, availability, participation in close harmonious interactions, lack of irritation and anger, and enrichment of the environment for the child while at a hospital were all related to attachment security.

General Discussion

One of the foundations of attachment theory is the notion that early care plays a key role in determining the quality of child–caregiver attachment relationships. Indeed, maternal sensitive caregiving behavior in both everyday circumstances and in an emergency situation was found to be significantly associated with children's attachment security. These findings support the hypoth-

[1] Correlational analyses conducted in Study 1 also indicated that the associations between maternal sensitivity and infant security with age were not significant ($rs = .07$ and −.03, respectively, *ns*).

esis that quality of early care is an important determinant of infant security. The results also resemble those reported by Pederson et al. (1990), Moran et al. (1992), and Pederson and Moran (1995, 1996). A difficulty in interpreting those authors' results is that descriptions of the behavior of both mothers and children were obtained by the same observers and during the same observational periods. In the studies reported here, not only were mothers and children observed on different occasions, but the observers varied (i.e., different observers in Study 1, and observers and mothers in Study 2). Thus, these results corroborate and expand on the findings by Pederson, Moran, and their colleagues.

We believe that the size of the associations found in these two separate studies could be due to a conceptualization and operationalization of caregiving and secure-base behavior similar to those of Ainsworth et al. (1978); in addition, we also used a methodology that captured meaningful variation in mothers' and children's interactive behavior in naturalistic settings. The use of measures consistent with the conceptualization of the constructs, relatively extensive periods of observation, and naturalistic contexts permitted us to describe a broad and likely representative range of behavior in both mothers and children. Those contexts and long periods provided observers with the opportunity to witness maternal and child behavior in a wide array of circumstances (e.g., feeding the baby, playing with baby, changing and cleaning the baby, and putting the baby down for a nap) and to capture many important target behaviors that occur at low frequencies.

Analyses indicated that neither maternal sensitivity nor attachment security was related to children' age. Moreover, the relation between the constructs, when the samples were divided into two (i.e., younger and older children), remained significant for both groups. These results, however, do not mean that age is unimportant when studying the relations between sensitivity and security as the child grows older. Behaviors, activities, and interactions change with development, but the relationship between the constructs, according to the results presented, remains significant.

It is possible that the use of Q methodology to assess both maternal sensitivity and attachment security (as opposed to combining different methods, e.g., frequency counts, the strange situation, and Q sorts) may be a contributing factor to the association found. Studies in which this methodology is used to assess both constructs (see Moran et al., 1992, Pederson & Moran, 1995, and the studies reported here) have found higher correlation coefficients than those in which different methods are used to assess mother and child behavior. There exists the possibility of some shared variance due to the similarity of formats to report observations or to the similarity of situations on which the two Q sets focus during the observation periods. However, the fact that we used different observers to report on child and mother behavior, separate observation times for each kind of report, and different situations to describe mother and child behavior makes shared method variance a less plausible concern.

The Sensitivity–Security Hypothesis in Different Contexts

Attachment theory also assumes that the relation between early care and infant security holds across a wide range of ordinary and stressful contexts, socioeconomic groups, and across cultures. First, as predicted by the Bowlby–Ainsworth perspective, results from the present studies indicate that the association between maternal sensitivity and infant security holds in both ordinary and stressful contexts. Attachment security has been assessed for the most part in an emergency situation that is increasingly stressful to the child (i.e., the strange situation). Thus, the question of whether the association between the constructs is especially relevant in the context of emergency situations or whether its relevance extends to ordinary life circumstances is one researchers have asked but not directly tackled (Belsky, 1997; Waters, Kondo-Ikemura, Posada, & Richters, 1991). Our findings indicate that sensitivity and security are significantly associated in ordinary and emergency situations, and thus they lend support to the idea that the attachment system can be thought of as continuously active (Bretherton, 1985) and not only relevant in emergency situations.

Second, the relationship found both in a middle-class and in a very poor sample indicates that the association between maternal sensitivity and infant security is not specific to middle-class sectors of the population. Attachment research has typically been conducted with White middle-class samples, which raises the question of whether the phenomenon found for this sector of the population generalizes to other groups. The data presented here suggest that the sensitivity–security association is also found in poor sectors of the population. It is important to note that mean scores for both maternal sensitivity and attachment security were different in each study. Mean scores of the low SES sample were lower than those of the middle-class sample, which perhaps reflects the fact that living conditions in low SES groups are not as conducive as those of middle-class groups to the provision of sensitive caregiving and the formation of secure attachment relationships. Despite these differences in mean scores, the constructs were significantly associated in both groups. Finally, the associations between maternal sensitivity and infant security found in two different Colombian samples present evidence in support of the hypothesis that the relation between the constructs holds in cultures other than North American.

Caregiving Behavior and Context

In addition to predicting a significant relation between quality of care and infant security across contexts, the Bowlby–Ainsworth perspective also suggests that specific sensitive caregiving behavior varies according to context. Thus, we determined specific aspects of maternal behavior significantly associated with attachment security at home and in the hospital. Analyses at the item level revealed a common as well as a unique set of correlates for those contexts. Specifically, 17 items of maternal behavior were found to be significantly related to security in both samples; in addition, 4 other items in the home sample and 40 in the hospital sample were significantly associated with security. As expected, sensitive mothers both at home and at the hospital were available, aware of, and appropriately responsive to signals, participated in close face-to-face interactions, and exhibited less anger and resentment toward their children. In addition, sensitive mothers at the hospital displayed another set of behaviors associated with

attachment security: They molded their sick children to themselves when holding them, were careful to adjust their children's posture either when carrying or repositioning them in the crib or play area, displayed affection by touching, and slowed down the pace in face-to-face interactions in response to their children's signals. They were alert to dirty diapers and to having their child appropriately dressed. These maternal behaviors probably indicate that sensitive mothers responded to their children's precarious health status by being careful in exchanges that involved close physical contact and making sure that children were comfortable; in doing so, sensitive mothers provided their children with experiences that helped alleviate some of the discomfort of their situation and afforded them some relief.

Also, sensitive mothers tailored the content and pace of their exchanges to the child's responses, letting the child lead the way and going along with the child's desires. They were prone to allowing the child to determine what and how interactions transpired and also were appropriately exciting in interactions with the child. Moreover, mothers' sensitive care involved behavior that made their children's hospitalization more tolerable and fun by actively enriching and making their surroundings more stimulating. In doing this, they talked to their children directly, repeated words slowly and carefully, identified and labeled objects, played games, created an interesting environment for their sick children, and did not use the TV set as the principal mode of entertainment; even when the children were cranky, these mothers stayed with and accepted them instead of placing them back in their crib. Such maternal behavior is likely to have contributed to children's experiencing their mothers as a source of pleasant exchanges, comfort, and security in this emergency situation. Finally, sensitive mothers kept a positive emotional tone toward their children, spoke positively about them, and idealized them somewhat during their hospitalization.

Thus, in addition to sensitive caregiving behavior common to both home and hospital settings, sensitive care at the hospital involved specific maternal behavior that likely contributed to children's sense of well-being and security during their hospitalization. Far from being a set of fixed attributes or skills that mothers may display in all situations, specific maternal sensitive behavior seems to be tailored to the particular situation and condition of the child. Further, these findings suggest that studying maternal sensitivity in naturalistic emergency situations that tax mothers' resources may provide a broader variety of behavioral referents about the manifestations of maternal sensitivity. If this is so, then studying the constructs under regular circumstances, as is usually the case when doing naturalistic observations (e.g., researchers visit families when mothers have time to accommodate visitors in their schedule, when the child is healthy, etc.), may provide us with an underrepresentation of behavior. It is important to note, however, that the difference in the number of significant correlations between security and specific items of maternal caregiving behavior at home and in the hospital may in part be due to the use of observers as informants in one study and mothers in the other. Also, although the common and unique sets of significant correlates found for the two contexts provide evidence in line with the notion that maternal behavior is context sensitive, this between-subjects comparison cannot be taken as definitive. A more stringent test of the hypothesis would include within-subject comparisons of maternal behavior in both contexts.

Attachment security was found to be associated with the quality of maternal caregiving behavior by Ainsworth 25–30 years ago. Subsequent studies have not used the intensive methodology she used in studying these constructs, yet most of them have found significant associations. In our studies, we investigated both constructs in naturalistic settings, during longer periods of time (though for periods by no means as long as those Ainsworth used), and with instruments that reflected closely the definition of the constructs Ainsworth proposed. We found significant associations between maternal sensitivity and children's attachment security in samples from two different social classes—poor and middle-class—and from a culture different from that of the White, American, middle-class samples used in most studies. Furthermore, we studied the association between the constructs in ordinary and emergency situations, and in both cases they were found to be related. Also, because we observed maternal caregiving behavior in an emergency situation and at home in ordinary circumstances, we were able to pinpoint independent as well as common aspects of maternal behavior related to infant security in those contexts. Comparisons about specific maternal behavior associated with infant security in the two studies provided evidence for the context sensitivity of early care.

The findings presented are encouraging in that they suggest that research involving observations in naturalistic settings in which the phenomenon takes place is important in order to understand and study further the associations between maternal sensitivity and attachment security. New available methodologies present reasonable alternatives to Ainsworth's intensive approach and suggest possible ways to study the relation between sensitivity and security as infants grow older, a forgotten task that needs to be addressed in the future.

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