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Maternal secure base support and preschoolers' secure base behavior in natural environments

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Abstract

Bowlby and Ainsworth's theory of attachment poses that concurrent caregiving behavior is a key factor in influencing and maintaining a child's organization of secure-base behavior, and ultimately, security throughout childhood. Empirical demonstrations of the relation between the constructs after infancy are relatively scant and research is needed to examine the relation between the variables across a wide range of contexts, over longer observational periods, and in developmentally appropriate ways. Two studies of preschoolers and their mothers were conducted in naturalistic settings. Fifty child-mother middle-class dyads, predominantly Caucasian, participated in Study 1 and 40 in Study 2. The mean age for children was 52 months (Study 1) and 36 months (Study 2). In Study 1, a home and a playground visits were conducted. In Study 2, two home and a playground visits were conducted. Observers used the Maternal Behavior for Preschoolers Q-Set to provide age-relevant descriptions of maternal behavior, and the Attachment Q-Set to provide descriptions of child behavior. Overall, findings indicated that maternal secure base support was significantly related to the organization of child secure base behavior ($r = .31$ and $.49$ for Study 1 and Study 2, respectively). Results are discussed in terms of the importance of specifying caregiving domains and contexts of assessments, and their implications for attachment theory.

Keywords: *Attachment security, child–mother attachment relationships, maternal care, secure base behavior, secure base support*

Introduction

Attachment security is hypothesized to stem from the history of child–caregiver interactions (Bowlby, 1969/1982). The contributions of caregiving to the organization of children's secure base behavior, from which security is inferred, is at the core of attachment theory. Ainsworth's naturalistic research on infant–mother interactions in Uganda (Ainsworth, 1967) and Baltimore (Ainsworth, Blehar, Waters, & Wall, 1978) provided initial empirical support for this hypothesis. Most ensuing studies have confirmed the association between the quality of maternal caregiving and security during infancy (see review by De Wolff & van IJzendoorn, 1997).

Attachment researchers hypothesize that maternal caregiving continues to be a central factor in shaping and maintaining the organization of secure-base behavior throughout childhood (e.g., Ainsworth, Bell, & Stayton, 1974; Bowlby, 1988, 1991; Marvin & Britner, 1999; Thompson, 2000; Waters & Cummings, 2000; Waters, Kondo-Ikemura, Posada, &

Richters, 1991). Surprisingly, the topic has remained relatively unexplored (see George & Solomon, 1989, 1999) and much research remains to be done. Empirically demonstrating the hypothesized association between quality of caregiving and children's security in early childhood will substantiate claims from the theory about the importance of caregivers' concurrent and continuous support of child attachment security (Pianta, Sroufe, & Egeland, 1989; Sroufe, 1979, 1988; Thompson, 2000; Waters et al., 1991). This could also help to dispel claims about attachment as a theory that gives undue weight to early experience during infancy in determining later attachment outcomes (Breur, 1999; Lewis, 1997). Although experiences during infancy are important and influential in development (Bowlby, 1969/1982; Sroufe, 2002; Sroufe, Egeland, & Kreutzer, 1990; Vereijken, Riksen-Walraven, & Kondo-Ikemura, 1997), they do not by themselves determine later outcomes. Ultimately, the study of relations between quality of care and attachment security during childhood will help build a developmental framework to understand relationships.

A review of the empirical literature indicates that comparatively few studies have assessed the association between caregiving and attachment security during early childhood. Specifically, maternal interactive behavior observed during relatively short intervals (e.g., under 60 minutes) at home and in laboratory settings (Achermann, Dinneen, & Stevenson-Hinde, 1991; Barnett, Kidwell, & Leung, 1998; Stevenson-Hinde & Shouldice, 1995; Teti & Gelfand, 1997; Teti, Nakagawa, Das Eiden, & Wirth, 1991; Teti, Sakin, Kucera, Corns, & Das Eiden, 1996) has been shown to be associated with children's organization of attachment behavior in the expected direction. Overall, these studies provide summary indices (e.g., sensitive responding) of maternal behavior observed in semi-structured situations.

Evidence for the concurrent association between quality of maternal care and attachment security beyond 18 months with both constructs assessed in naturalistic settings during long intervals is even more scarce. This type of research is important to understand age-relevant manifestations of both maternal secure base support and child's secure base behavior beyond infancy in the contexts where the phenomenon unfolds. The scant evidence comes from two observational studies of mothers and children. Vereijken et al. (1997) tested the hypothesis that maternal sensitivity continues to be an important influence on children's attachment security in a longitudinal study of Japanese mother-child dyads. Both maternal sensitivity and attachment security were observed at participants' homes when children were 14 and 24 months of age. Findings indicated that sensitivity and security were significantly associated at both points in time. Moreover, the 24-month assessment of sensitivity continued to exert an influence on security at 24 months of age, after controlling for the 14-month sensitivity assessment. Thus, although participation in secure-base relationships early in infancy appears to influence later outcomes, concurrent caregiving input may be equally important for security during the second year. Significant associations between caregiving and attachment security were also obtained in a naturalistic observational study conducted in Colombia. Posada and colleagues (1999) studied children, who ranged in age from 12 to 60 months, in a low-income sample and found that the association between the quality of maternal caregiving behavior observed in a real-life emergency situation (i.e., hospitalization of the child) and attachment security at home was significant regardless of age group. That is, older children (36–60 months, $N=12$), as well as younger children (12–35 months, $N=31$), displayed similar and robust relations between sensitivity and security, $r = .60$ and $.59$, respectively.

Taken together, these findings suggest that concurrent sensitive caregiving is an important influence on children's attachment security during early childhood. Further research needs to broaden our understanding of the association between sensitivity and security by specifying age appropriate caregiving domains (beyond the global notion of sensitivity) that

may help explain the associations reported, and assess the constructs in contexts where the mother–child attachment relationship is naturally being shaped. This report addresses these issues.

Two studies of child–mother interactions with 3- to 5-year-olds were conducted. They involved observations of both maternal and child behavior during relatively long periods of time (4–5.5 hours) that allowed researchers to provide descriptions of overall quality of care as well as specific domains of maternal care that are likely to be salient to the organization of preschoolers' secure base behavior. Those observations were conducted in two naturalistic contexts, home and playground. This latter setting was included because it provides a more open and less predictable context than that of home, and one in which both secure base support and secure base behavior may be more easily observed. It has been argued elsewhere (George & Solomon, 1999) that observations of the secure base phenomenon only conducted at home may not be sufficient to tap into differences in the organization of behavior during child–mother interactions at this age.

Based on predictions from the theory and initial empirical evidence, we expected a general index of quality of care (i.e., maternal sensitivity) to be significantly and positively related to child security in naturalistic contexts when children were 3–5 years old. Much as Bowlby proposed (1969/1982, 1973), and Ainsworth and colleagues found for infant–mother pairs (Ainsworth, Bell, & Stayton, 1971; Ainsworth et al., 1978), we hypothesized that the quality of secure base relationships during the preschool years is influenced and maintained by maternal behavior in interactions that is, overall, harmonious and cooperative with that of the child, and that creates a partnership climate in which the child's activities and needs are responded to appropriately. Thus, in addition to expecting overall sensitivity and security to be associated, we predicted that specific maternal behavior that contributes to smooth dyadic transactions would be significantly associated with the organization of secure base behavior.

Further, because preschoolers are increasingly proficient in exploring their environment and learning from their transactions with it, more physically able, cognitively and linguistically sophisticated and capable of participating in give-and-take exchanges with their caregivers and others, changes in caregiving behavior at this age are expected (Ainsworth et al., 1974; George & Solomon, 1999; Sroufe, 1979, 1988; Thompson, 1997, 2000; Waters & Cummings, 2000; Waters et al., 1991). Thus, we were interested in investigating age-salient domains of maternal behavior that have been proposed to be important in the relation between caregiving and security outcomes during early childhood. Specifically, we studied domains concerned with maternal provision of secure-base support, supervision, and limit setting.

Providing appropriate secure base support for children's explorations from and retreats to their mother is suggested to be important in child–mother relationships as far as consolidation of secure base behavior during childhood is concerned (Marvin & Britner, 1999; Waters & Cummings, 2000; Waters et al., 1991). Offering secure base support entails not only providing a haven of safety for the child in situations where he is distressed, but also encouraging and aiding the child in his explorations away from mother by enhancing and optimizing the child's exchanges with his surroundings. We expected that maternal secure base support and children's organization of secure base behavior would be significantly related.

Supervision or monitoring of children has also been suggested to be an important aspect in mothers' ability to behave as a secure base at this age (George & Solomon, 1999; Waters et al., 1991). At 3–5 years, the child–mother relationship becomes more diverse in part due to children's increased mobility, dexterity, and interest in exploring their environment. To be able to keep track of a child, anticipate problematic situations, intervene when necessary,

and enhance a child's experiences caregivers need to appropriately supervise and monitor their children's whereabouts and activities over longer distances and time intervals. Thus, we hypothesized that the quality of maternal supervision would be associated with children's organization of secure base behavior.

Finally, an important issue in child–mother relationships during the preschool years that we investigated concerns the provision of limits and boundaries around a child's activities (Ainsworth et al., 1974). The way parents set limits and boundaries and whether this is done in the context of child–parent interactions that respond to the needs of both members of the dyad, is likely to be related not only to the quality of the child–parent attachment relationship, but also to the internalization of norms and rules that parents are trying to instill in their children (see Waters et al., 1991). Here, we were interested in whether an approach to limit setting and discipline issues that take into consideration the child's needs and wants would be related to the organization of the child's secure base behavior. We expected that mothers who negotiate rules and behavioral alternatives in an understanding manner, yet behave firmly and warmly when disciplining their children, would have children deemed secure.

In brief, the two studies presented in this report empirically tested the hypothesis that the overall quality of maternal caregiving behavior (i.e., sensitivity) and the organization of child secure base behavior (as indexed by a security score) in naturalistic contexts during the preschool years are significantly associated. In addition, a set of more specific hypotheses were tested: (1) specific maternal behavior that contributes to smooth child–mother interactions and creates a partnership climate in child–mother exchanges is significantly related to the organization of children's secure base behavior; and (2) maternal secure base support, supervision, and limit setting (three theoretically relevant domains of caregiving behavior during the preschool years) are significantly related to the organization of children's secure base behavior.

Study 1

We investigated the concurrent associations between maternal quality of care and the organization of preschoolers' secure base behavior. Children were 3–5 years old and from a university town in the USA. Child and mother behavior were both observed at home and on the playground. The playground visits were 1.5 hours on average and the home visits were 2.5 hours on average.

Method

Participants

Participants were 50 mother–child dyads from intact families recruited through daycare and preschool settings. Children were 25 boys and 25 girls and had a mean age of 52 months at the time of the first visit. All children were from a non-clinical population. The sample was predominantly Caucasian (78%), 6% of the children were African American, and 16% were of mixed ethnicity. Mothers' mean age was 33.7 years (range 23–47); 44% were full-time homemakers, 10% worked part-time, and 46% worked full-time. All mothers but two had completed high school and 76% had a bachelor's degree or above. Fathers' mean age was 36 years (range 25–60) and all worked full-time. All fathers but one had completed high school and 74% had a bachelor's degree or above. The mean and median annual family income were 73,000 and 70,000 USD, respectively.

Procedures

Mothers who responded to a flyer distributed at daycare and preschool settings were called by a research assistant who explained the project in detail and scheduled the first visit. Two visits were conducted, one at a playground and one at home. Maternal and child behavior were observed in those settings. The playground visit lasted 1.5 hours on average and the home visit lasted 2.5 hours on average. The lapse of time between visits was 38.5 days on average.

The first visit scheduled was an outdoor visit to a playground with a “jungle gym” that provided ladders, swings, slides, bridges, monkey bars, and balance beams among other play structures. Dyads were met at their homes and everyone walked or drove to the playground of the parent’s choice. During the first 15–20 minutes of the visit, while still at home, mothers were interviewed about demographic data. Mother–child dyads were videotaped with a SONY digital Handycam DCR-VX2000 48x zoom lens. Mothers and children were fitted with small portable microphones to allow freedom of movement while capturing audio data. Mothers were instructed to play as usual at the playground and observers interacted with mothers and children in a natural manner (mothers were not told to pretend that we were not there, and observers did not take notes). After leaving the playground, research assistants returned to the laboratory and independently described either maternal behavior with the Maternal Behavior for Preschoolers Q-Set (MBPQS; Posada, Moreno, & Richmond, 1998) or child behavior with the Attachment Q-Set (AQS; Waters, 1995). In no case did the same observer code both maternal and child behavior from the same dyad. Observers had been trained in each of the q-sets. Training consisted of familiarizing and discussing each of the items, learning the q-sorting technique, and obtaining inter-observer reliability of at least .70 in three consecutive training tapes prior to going on visits.

After completion of the playground visit, participants were visited once in their homes. Home visits were unstructured for the most part and mothers were told to interact as usual. The only semi-structured activities consisted of asking mothers and children to read a book that observers brought to the visit and to solve an etch-a-sketch task. This typically took between 5 and 15 minutes. Research assistants observed child and mother behavior. In no case did the same observer code maternal behavior and child behavior at home in the same dyad. Moreover, descriptions of child and maternal behavior were independent across contexts. That is, no observer coded both child and maternal behavior from the same dyad across the playground and home contexts (i.e., coded maternal behavior at home and child behavior at the playground or coded child behavior at home and maternal behavior at the playground). Thus, observers reporting on child and maternal behavior were independent. After completion of the home visit, observers returned to the lab and independently completed a description of the mother or the child with the same instruments as were used for the playground visits.

Assessment

Maternal caregiving behavior. The quality of maternal behavior in interactions with children was assessed with the MBPQS (Posada et al., 1998). This is a new measure that contains 90 behavioral referents of maternal behavior. It was created based on theoretical and empirical work on attachment relationships in infancy (Ainsworth et al., 1974, 1978; George & Solomon, 1999; Pederson & Moran, 1995; Pederson, Moran, Sitko, Campbell, Ghesquire, & Acton, 1990) and early childhood (Bowlby, 1969/1982; Greenberg,

Cicchetti, & Cummings, 1990; Waters & Gao, 1998; Waters et al., 1991), and using interviews and observations of mothers of preschoolers.

Although the need for measures after infancy that stay connected to the theory while capturing the developmental level of the child has been emphasized (e.g., Cicchetti, Cummings, Greenberg, & Marvin, 1990), assessment tools that describe caregiving behavior relevant to security outcomes in naturalistic settings during early childhood are scant. Thus, we undertook the development of this q-set to describe caregiving behavior during the preschool years (3–5 years) in everyday contexts. Specifically, in constructing the new measure, we created a pool of items that included behavior observed or referred to by mothers of preschoolers, and some of the behavioral referents in the Maternal Behavior Q-Set (Pederson & Moran, 1995) and in the Parental Secure Base Support and Supervision Q-Set (Waters & Gao, 1998).¹ Items were written and modified so that most of them refer to behavior in context. Most of the items refer to specific domains of maternal behavior investigated here: Contribution to harmonious interactions, secure-base support, supervision, and limit setting (see below this section). Some of the final 90 items contain descriptions concerning general characteristics of the quality of caregiving described by Ainsworth and colleagues (1971, 1974, 1978), operationalized further by Pederson and Moran (1995), and that still apply to preschoolers; for example, “Interactions appropriately vigorous and exciting as judged from child’s response” and “Responds consistently to child’s signals.”

The new q-set provides an overall index of the quality of caregiving, i.e., maternal sensitivity. Also, because a focus of the two studies was the investigation of specific maternal behavior that contributes (or not) to smooth child–mother interactions, a subset of items refer to maternal participation in dyadic exchanges, and a scale reflecting this domain was constructed. The “contribution to harmonious interactions” scale consisted of 20 items and its Cronbach’s alpha coefficient was .89. The items in this scale include both behavioral and affective involvement in the transactions of a mother with her child. Example items are, “Participates in play with child, e.g., plays in the sand, runs with child,” “Mother behaves as part of a team, exchanges with child are harmonious,” “Is over-controlling, intrusive, in interactions with child, e.g., provides excessive instructions, or physically re-orient child” (reverse scored), and “When child expresses positive affect, mother joins in.”

The q-set also contains a set of 22 items that tap the “secure-base support” domain. These items refer to the mother providing a haven of safety (i.e., maternal behavior in response to a child’s returns to mother, signals of distress, or child accidents when they occur), and support of exploration (i.e., behavior regarding a child’s exploration away from mother, the balance between interactions at a distance and those in close proximity, and the enhancement of a child’s activities and experiences in ways that make the child feel effective and emotionally pleased with his transactions with the environment). Internal consistency, Cronbach’s alpha, for this scale was .89. Example items include: “When child goes back to mother, she is unresponsive or business-like in acknowledging child’s returns” (reverse scored), “When child cries or signals, mother delays in responding or checking what’s going on” (reverse scored), “Makes sure that child explores available toys or activities (including peers),” “Smoothly facilitates explorations away from and returns to her,” and “When child shows her something he is playing with, mom asks about it, comments positively on it, encourages child to do something with it.”

Another subset of eight items formed the “supervision/monitoring” scale. This scale refers to a caregiver’s ability to keep track of the child, anticipate problematic situations, and balance the tasks of monitoring and participating in the child’s activities. Its Cronbach’s

alpha coefficient was .74. Examples of items in this scale are “Follows or moves to a better location to supervise/monitor as child moves from place to place,” “Is two steps ahead of child, anticipates conflictive situations and does something to prevent escalation,” and “Balanced in her role as supervisor of and participant in child’s activities.”

Finally, the scale “limit setting” refers to how a mother sets rules and boundaries for her child’s activities, whether she considers the child’s wants and desires, and how she handles violations of those rules. This scale is comprised of five items and its Cronbach’s alpha coefficient was .81. Examples of items in this scale are “In limit setting, mother negotiates with child until a mutually satisfying solution is achieved,” “When setting rules and prohibiting an activity to child, explains reasons,” and “Enforces rules she sets.”

Final composite descriptions of maternal behavior on which analyses were performed were obtained from descriptions provided by three different observers in 2 cases, by two different observers in 25 cases, and by one observer in 23 cases (in this latter case the same observer described maternal behavior in both contexts). Observers rated the items by initially placing each of them into one of three piles, “characteristic of the mother,” “neither characteristic nor uncharacteristic,” and “uncharacteristic of the mother.” Subsequently, they further divided those three piles into 9 piles of 10 items each, ranging from “most characteristic” of the mother (pile 9) to “most uncharacteristic” (pile 1). An item score corresponds to the pile number where it was finally placed. Inter-observer reliability (calculated from the agreement between the q-descriptions) for maternal behavior was obtained from 20% of the visits. Mean inter-observer reliability was .83 (range .69–.93). After reliability was computed, individual items discrepant by more than three points were discussed and revised as appropriate. Revised descriptions were averaged to create a Q-composite description of maternal behavior. A global sensitivity score for each mother was obtained by correlating that description with the sensitivity criterion sort that describes the prototypically sensitive mother. The correlation between these two descriptions is a mother’s sensitivity score.

To obtain the criterion sort (see Block, 1978), four judges (professionals with a PhD degree in developmental psychology) knowledgeable in attachment theory sorted the MBPQS items to reflect the behavior of a prototypically sensitive mother of a preschooler. Using the same procedure described above, the experts placed the 90 items in 9 piles from “most characteristic” to “most uncharacteristic” of the prototypically sensitive mother. Inter-observer reliability among the experts was satisfactory; all pair-wise correlations $> .86$. A criterion sort was created by averaging these descriptions of the prototypically sensitive mother of a 3- to 5-year-old child.

In addition to the global sensitivity score, scores on each of the scales mentioned above (i.e., contribution to harmonious interactions, secure base support, supervision/monitoring, and limit setting) were calculated for each mother. Item scores were averaged for those items pertaining to a scale. The resulting mean was a mother’s score in each scale.

Secure base behavior. The quality of children’s attachment toward mothers (i.e., security) was inferred from descriptions of children’s secure base behavior using the AQS (Waters, 1995). The AQS was designed to describe children’s secure base behavior in naturalistic settings for relatively long periods of time and has been used successfully with children 1 to 5 years old (e.g., Lay, Waters, Posada, & Ridgeway, 1995; Park & Waters, 1989; Pederson et al., 1990; Posada, Gao, et al., 1995; Posada, Waters, Crowell, & Lay, 1995; Symons, Clark, Isaksen, & Marshall, 1998; Vaughn & Waters, 1990). Studies using the AQS have reported mean inter-observer reliabilities ranging from .72 to .95 (Solomon & George, 1999). The validity of the AQS has been documented in various reports (e.g., Pederson & Moran, 1996;

Posada, Carbonell, Alzate, & Plata, 2004; Posada et al., 1999; Vaughn & Waters, 1990; Waters & Deane, 1985). Recently, findings from a meta-analysis of 139 studies supported the validity of the AQS (van IJzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004).

Descriptions of child's secure base behavior in the playground and home were completed by four different observers (two for each visit) in 14 cases, by three different observers in 24 cases, by two different observers (one for each visit) in 8 cases, and by one observer in 4 cases (two of these latter dyads only had one visit due to scheduling problems; one of the dyads had a playground visit and the other dyad had a home visit). Observers rated the items in the same manner as observers for the mother did. Thus, the items were ultimately placed into 9 piles of 10 items each, ranging from "most characteristic" of the child (pile 9) to "most uncharacteristic" (pile 1). Inter-observer reliability (calculated from the agreement between the Q-descriptions) for child behavior was obtained in 79% of the visits. Mean inter-observer reliability was .75 (range .51-.92). In two cases, descriptions of child behavior from the playground visit were unreliable (i.e., reliability < .50) and an independent coding of the child (by two different coders) from the videotape was obtained. The new descriptions resulted in adequate reliability. As in the case of maternal behavior, individual items discrepant by more than three points were discussed and revised as appropriate. Revised descriptions were averaged to create a Q-composite description of child behavior. A global security score for each child was obtained by correlating that description with the security criterion sort that describes the prototypically securely attached child (Waters, 1995). The correlation between these two descriptions is a child's security score.

Results

The mean sensitivity score for descriptions of maternal behavior was .65, scores ranged from -.33 to .83 ($SD = .23$). The mean security score for descriptions of children's secure-base behavior was .47, scores ranged from -.14 to .73 ($SD = .20$). Means, standard deviations, and range of scores for the scales "contribution to harmonious interactions," "secure-base support," "supervision/monitoring," and "limit setting" are presented in Table I. Analyses of distribution normality indicated that sensitivity and security were significantly ($p < .01$) and negatively skewed, Shapiro-Wilk's $W = .71$ and $.91$, respectively. Similar analyses for each of the scales showed that they were also significantly and negatively skewed. Because the variables were not normally distributed, we used the Spearman's rho correlation procedure to study their associations.² Correlations among the scale scores are presented in Table II.

Table I. Descriptive statistics for domains of maternal behavior.

Domain	Study 1			Study 2		
	Mean	SD	Range	Mean	SD	Range
Harmonious interactions	6.96	.86	3.83-8.00	6.64	1.08	4.07-7.88
Secure base support	6.42	.82	2.98-7.40	6.44	.98	4.06-7.39
Supervision/monitoring*	6.54	.81	3.13-7.75	5.74	.85	3.36-6.97
Limit setting	6.07	1.12	2.10-8.10	6.07	.78	3.57-7.79

*Means for Study 1 and Study 2 are significantly different (Mann-Whitney $U = 262$, $Z = -5.62$, $p < .01$).

Table II. Associations among domains of maternal behavior and of each domain with child security.

Domain	2	3	4	Security
Study 1				
1. Contribution to harmonious interactions	.80**	.60**	.07	.30*
2. Secure-base support		.55**	.02	.25*
3. Supervision/monitoring			-.02	.24*
4. Limit setting				.07
Study 2				
1. Contribution to harmonious interactions	.82**	.65**	.48**	.45**
2. Secure-base support		.57**	.58**	.47**
3. Supervision/monitoring			.48**	.40*
4. Limit setting				.49**

* $p < .05$, ** $p < .01$, one-tail tests.

Neither maternal sensitivity nor child security scores were significantly associated with mothers' age, education, occupation, and family income. Also, maternal sensitivity and child security scores were not significantly different for dyads with boys and dyads with girls. Observations of maternal sensitivity at home and park were significantly related ($r = .48$, $p < .01$); similar results were found for observations of secure base behavior ($r = .42$, $p < .01$). To determine whether maternal sensitivity and child security were associated, we conducted a correlational analysis between composite scores for maternal and child behavior. A Spearman's rho correlation index indicated that both constructs were significantly and positively associated ($r = .31$, $p < .05$). Analyses of the associations between sensitivity and security within and across settings indicated that maternal sensitivity at the park was significantly related to security both at the park ($r = .39$, $p < .01$) and at home ($r = .35$, $p < .01$); maternal sensitivity at home was significantly related to child security at home ($r = .27$, $p < .05$), but not to security at the park ($r = .10$, ns).

Next, we studied whether the domains of caregiving behavior proposed were significantly associated with the organization of secure base behavior. Correlational analyses showed that to be the case; scores on the scales "contribution to harmonious interactions," "secure base support," and "supervision/monitoring" were positively and significantly related to security (see Table II). "Limit setting" was not found to be significantly associated with children's secure base behavior in this study.

Conclusion

Maternal sensitivity and attachment security in 4-year-olds were found to be significantly related. These results provide evidence in line with the notion that concurrent quality of care plays an important role in children's security outcomes during the preschool years. The more mothers were described as sensitive to their children's signals and communications both at the playground and home, the more their children used them as a secure base to go to, and from which to explore. The only exception to this in the set of results presented was the cross-setting association between maternal sensitivity at home and child security at the playground. In specifying different domains of caregiving behavior and their relations to security, contributing to smooth interactions, providing secure base support, and supervising or monitoring a child's activities were all found to be significantly associated

with 4-year-olds' organization of secure base behavior. Setting limits was not related to security in this sample.

Study 2

As in Study 1, we investigated whether the quality of maternal care was related to the organization of secure base behavior. Children were 3–4 years old and from a mid-size city. Methodologically, there were the following differences: First, the observation time was longer than in Study 1, 5.5 hours on average. Specifically, we conducted three visits: two home visits (maternal and child behaviors at home were observed in separate visits) and one playground visit. This was deemed important to observe behavior that typically occurs at low rates. Second, all observations of both mothers and children's behavior were done at least by two independent observers.

Method

Participants

Participants were 40 mother–child dyads from intact families recruited through a department subject pool. Children were 23 boys and 17 girls and had a mean age of 36 months at the time of the first visit. All children came from a non-clinical population, and were predominantly Caucasian (70%), 5% of the children were African American, and 25% were of mixed ethnicity. Mothers' mean age was 33.3 years (range 20–42 years) at the time of the first visit; 42.5% were full-time homemakers, 40% worked part-time, and 10% of mothers worked full-time (data not available on 7.5% of cases). All mothers but one had completed high school and 62.5% had a bachelor's degree or above. Fathers' mean age was 35.6 years (range 23–48 years) and all worked full-time. All fathers had completed high school and 65% had a bachelor's degree or above (information on one case was missing). The mean and median family income were 94,000 and 60,000 USD, respectively.

Procedures

Mothers were called, the project was briefly described, and they were invited to participate. If they were interested, the study was explained in greater detail and a visit was scheduled. Maternal and child behavior were observed at a playground and at participants' homes. The playground visit lasted 1.5 hours on average and was videotaped. The two home visits, one to observe child behavior and the second to observe maternal behavior, lasted 2 hours on average (in the case of two families, only one home visit was conducted). The lapse of time between visits was 32.5 days on average.

The first visit scheduled was an outdoor visit to a playground with the same characteristics described in Study 1. Due to bad weather, two families attended an indoor play area, Discovery Zone and McDonald's Playland. These settings had similar facilities to the "jungle gym" in the outdoor playgrounds. Two to four observers and a mother–child dyad went to a playground close to the family's home. Mother–child dyads were videotaped with a SONY 8mm, 72x zoom lens camcorder. Mothers and children were fitted with small portable microphones. Mothers were instructed to play as usual at the playground and observers interacted with mothers and children in a natural manner. If only two research assistants went to the playground, one of them described maternal behavior and the second

observer described child behavior. When three observers were at the playground, two of them described maternal or child behavior. When four observers were at the playground, two observed maternal behavior and two observed child behavior. After leaving the playground, research assistants returned to the laboratory and independently described either maternal behavior with the MBPQS (Posada et al., 1998) or child behavior with the AQS (Waters, 1995). In no case did the same observer code both maternal and child behavior from the same dyad. Observers were trained as described in Study 1.

After completion of the playground visit, participants were visited twice in their homes for a 2-hour period. Home visits were unstructured for the most part, i.e., mothers were told to interact as usual. The only semi-structured activity consisted of asking mothers to read a book, which observers brought to the visit, to their child. This typically took between 5 and 15 minutes. The procedure was similar for both home visits. Two research assistants observed child behavior during the first home visit (only one observer was present during the visit for five families due to scheduling difficulties), and two different research assistants observed maternal behavior during the second home visit (in eight families, only one observer was present due to scheduling difficulties). In no case did the same observer code maternal and child behavior at home for the same dyad. Moreover, observations of child and maternal behavior were independent across contexts. That is, no observer coded both child and maternal behavior from the same dyad across the playground and home contexts. Thus, observers reporting on child and maternal behavior were independent.³ After completion of the home visits, observers returned to the lab and independently completed a description of the child with the AQS (first home visit), or the mother with the MBPQS (second home visit).

Assessment

Maternal caregiving behavior. As in Study 1, the quality of maternal behavior in interactions with children was assessed with the MBPQS (Posada et al., 1998). We obtained a general index of maternal sensitivity, and scores for the scales “contribution to harmonious interactions” (Cronbach’s alpha coefficient .95), “secure base support” (Cronbach’s alpha coefficient .91), “supervision/monitoring” (Cronbach’s alpha coefficient .81), and “limit setting” (Cronbach’s alpha coefficient .72). Inter-observer reliability (calculated from the agreement between the Q-descriptions) for maternal behavior at the playground was obtained in 28 of the 40 child–mother dyads. Mean inter-observer reliability was .85 (range .67–.96). Inter-observer reliability for the home visits was obtained for 32 cases. Mean inter-observer reliability for maternal behavior in the home was .76 (range .57–.92). Individual items discrepant by more than three points were discussed and revised as appropriate. Revised descriptions were averaged to create a Q-composite description of maternal behavior, and a sensitivity score for each mother was obtained by correlating that description with the sensitivity criterion. Also, scores on each of the scales were calculated for each mother (see Study 1 for more details).

Secure base behavior. The organization of children’s secure base behavior was assessed with the AQS (Waters, 1995; see Study 1). Inter-observer reliability (calculated from the agreement between the Q-descriptions) for child behavior at the playground was obtained in 34 cases. Mean inter-observer reliability was .72 (range .52–.92). In three cases, descriptions of child behavior from the playground visit were unreliable (i.e., reliability < .50) and an independent coding of the child by two different observers from the

videotape was obtained. Due to technical failure, one child could not be re-coded from the tape and this observation was dropped from the analyses. The new descriptions resulted in adequate reliability. Inter-observer reliability for child behavior at home was obtained in 35 cases. Mean inter-observer reliability at home was .73 (range .57–.87). In one case, reliability was less than .50 when describing the child. This family was visited again and acceptable reliability was obtained. Items discrepant by more than three points were discussed and revised. Revised child descriptions were averaged to create a Q-composite description of child behavior. A security score for each child was obtained by correlating that description with the security criterion sort (Waters, 1995).

Results

The mean sensitivity score for descriptions of maternal behavior was .56, scores ranged from $-.25$ to $.83$ ($SD = .29$). The mean security score for descriptions of children's secure-base behavior was .36, scores ranged from $-.15$ to $.65$ ($SD = .18$). Means, standard deviations, and range of scores for the scales "contribution to harmonious interactions," "secure base support," "supervision/monitoring," and "limit setting" are presented in Table I. Analyses of distribution normality indicated that sensitivity was significantly and negatively skewed, Shapiro-Wilk's $W = .78$, $p < .01$; also, each of the scales for maternal behavior except limit setting was found to be significantly and negatively skewed. Associations among those domains are presented in Table II. Since most variables were not normally distributed, we used the Spearman's rho correlation procedure.² The domains were all significantly related to each other. A comparison of scores obtained in this study and those of Study 1 indicated that both sensitivity (Mann-Whitney $U = 567$, $Z = -2.96$, $p < .01$) and security (Mann-Whitney $U = 576$, $Z = -2.88$, $p < .01$) were significantly different. Scores in this study were lower. As the scales were concerned, the only significant difference was found for the supervision/monitoring scale (Mann-Whitney $U = 262$, $Z = -5.62$, $p < .01$).

Neither maternal sensitivity nor child security scores were significantly associated with mothers' age, occupation, education, and family income. Also, maternal sensitivity and child security were not significantly different for dyads with boys and girls. Observations of maternal sensitivity at home and park were significantly related ($r = .37$, $p < .01$); similar results were found for observations of secure base behavior ($r = .27$, $p < .05$). These correlation coefficients were not significantly lower than the ones found in Study 1. To determine whether maternal sensitivity and child security were associated, we conducted a correlational analysis between composite scores for mother and child behavior. A Spearman's rho correlation index indicated that both constructs were significantly and positively associated ($r = .49$, $p < .01$). Analyses revealed that this correlation index was not significantly different from the one obtained in Study 1. Analyses of the associations between sensitivity and security within and across settings indicated that maternal sensitivity at the park was significantly related to security both at the park ($r = .60$, $p < .01$) and at home ($r = .27$, $p < .01$); maternal sensitivity at home was significantly related to child security at the park ($r = .43$, $p < .01$), but not to security at home ($r = .09$, ns).

The next set of analyses investigated whether the scales of caregiving behavior were significantly associated with attachment security. Correlational analyses showed that "contribution to harmonious interactions," "secure base support," "supervision/monitoring," and "limit setting" were all significantly and positively related to attachment security in preschoolers (Table II). Further, analyses showed that the size of the

correlation indices between each scale and security for Study 1 and Study 2 was not significantly different, except for the “limit setting” scale (Study 1, $r = .07$; Study 2, $r = .49$, $p < .05$).

Conclusion

Overall, findings about the relation between quality of care and secure base behavior from Study 2 were very similar to those from Study 1. This was so despite the fact that both sensitivity and security scores were significantly lower in this sample than those obtained in the sample for Study 1. Maternal sensitivity in naturalistic settings was positively and significantly related to preschoolers’ attachment security. Five out of six correlation coefficients indicated so; the only exception was the association between maternal sensitivity and child security at home. Again, these outcomes highlight the importance of concurrent caregiving input into the organization of preschoolers’ secure base behavior. In exploring separate domains of maternal caregiving, we found that the higher the scores mothers obtained in participating and contributing to smooth child–mother interactions, providing a haven of safety and a base from which to explore, supervising and monitoring their preschool children, and setting limits in ways that take the child’s wishes and needs into account, the higher their children’s security scores.

When comparing Studies 1 and 2, four out of five correlation indices between maternal scores (sensitivity score and specific domains of caregiving behavior) and child security corresponded as statistical significance is concerned. Overall quality of caregiving, contribution to harmonious interactions, secure base support, and supervision/monitoring were all related to attachment security. Different from Study 1, the association between setting limits and security was significant in Study 2.

Discussion

One of the cornerstones of attachment theory is the notion that caregiver sensitivity is an important factor influencing a child’s organization of secure base behavior and his feelings of security. Thus, theoretical accounts hypothesize that concurrent caregiving behavior continues to be important in maintaining (or not) security after infancy (e.g., Ainsworth et al., 1974; Bowlby, 1988; Greenberg et al., 1990; Marvin & Britner, 1999; Pianta et al., 1989; Waters et al., 1991). Results from two separate studies presented here provide empirical support for this hypothesis. The overall quality of concurrent maternal caregiving behavior was found to be significantly related to preschoolers’ attachment security in naturalistic settings. These results are similar to those of research in infancy (e.g., De Wolff & van IJzendoorn, 1997) and, in conjunction with those findings, they indicate that concurrent maternal caregiving behavior continues to play an important role in the organization of secure base behavior during early childhood.

The findings presented are also consistent with Ainsworth’s assertion (Ainsworth et al., 1971) that the underlying characteristic of maternal behavior associated with child security is the ability to establish an atmosphere of harmony and cooperation in interactions with the child. In both studies, the more mothers’ behavior contributed to smooth child–mother transactions, the more secure their children were. That is, attachment security is directly tied to what transpires in child–mother interactions. Also, it is important to note that maternal behavior was clearly interlocked with that of the child, and that children’s contributions to establishing harmonious child–mother interactions (e.g., actively participating in activities with their mothers, exploring away and returning to mother,

and following mothers' suggestions and agreements established) were as important. That is, child behavior was important in facilitating the different caregiving tasks. Longitudinal studies that investigate child–mother interactions in childhood will provide much needed evidence about the increasingly important role played by the child in the construction and maintenance of the relationship. This would validate Bowlby's notion of a child–mother goal-corrected partnership.

Furthermore, the present study investigated age relevant aspects of maternal caregiving behavior in an effort to understand the sensitivity–security link by identifying important domains of care that may impact a child's secure base organization. Maternal secure-base support, supervision, and limit setting have been hypothesized as relevant caregiving issues in child–mother attachment relationships during early childhood (Ainsworth et al., 1971, 1974; George & Solomon, 1999; Marvin & Britner, 1999; Waters & Cummings, 2000; Waters et al., 1991). Information gathered indicated that the quality of maternal behavior in those domains was significantly associated with the child's use of the mother as a secure base. Children's developmental changes (e.g., becoming more mobile and skillful, increased sophistication of his cognitive and language abilities as well as interactional skills) require corresponding changes in caregiving in order to respond appropriately to children's initiations and signals. Results indicated that providing a secure base by supporting a child's increasing departures away from the caregiver and by enhancing a child's experiences in his surroundings, as well as providing a haven of safety by facilitating a child's returns, and being readily responsive in stressful situations, are important to foster a child's sense of security. If it is true that at the end of the first year the secure base phenomenon is emerging and that it actually consolidates during childhood (Waters et al., 1991), it then makes sense to hypothesize that in order to maintain a secure base organization at 3–5 years of age, concurrent caregiver secure base support is needed, as much as it was early on during infancy. It is appropriate and consistent support of children's explorations away and retreats to caregivers that provide children with the confidence in the availability and sensitive responsiveness of their caregivers. In those daily exchanges, children construct and maintain their trust on their caregivers as a secure base. The data presented are consistent with this notion.

Also, as children develop, a more diverse and complex caregiver–child relationship ensues. Among other issues,⁴ supervision of children's activities, and setting and enforcing limits are at the center of child–caregiver interactions during childhood. Our observations indicated that not only did we now have a very active child in going away and coming back to mother, but also, in the context of this phenomenon, issues of keeping track of the child's whereabouts and activities, and anticipating problematic situations (e.g., being attentive to intervene when necessary), were salient in child–mother interactions. How mothers went about these issues (e.g., whether mothers kept track of their child's whereabouts and were balanced in their role as supervisors and participants in their activities) was significantly related to attachment security. The evidence for limit setting was mixed however. While there was not a significant association with child security in Study 1, the data in Study 2 indicated that negotiating plans and rules for activities, and dealing with the consequences when a child did not comply with a previously accorded rule (e.g., not to throw toys or books around, not to jump on the slide) were salient issues in child–mother interactions as far as the organization of secure base behavior is concerned. How mothers went about these issues (e.g., negotiating with the child in a flexible manner such that the child is satisfied vs. imposing a strict rule unilaterally, or whether they enforced the rules set) was significantly correlated with attachment security

in Study 2. The difference between studies at the level of the association (there were no mean differences on how mothers in both studies were described about their limit setting behavior) might indicate that this is a relevant domain in child–mother attachment relationships for younger preschoolers. Regardless, the differences reported demand more research on the issue.

In general, the results presented underscore the importance of conducting observations of child–mother interactions in different naturalistic contexts and for relatively long periods. During the last decade, research employing this strategy has consistently reported robust associations between maternal sensitivity and attachment security (correlation indices from .45 to .61; Moran, Pederson, Pettit, & Krupka, 1992; Pederson & Moran 1995, 1996; Pederson et al., 1990; Posada et al., 1999, 2004) when compared to average values found in meta-analytic studies (De Wolff & van IJzendoorn, 1997; Goldsmith & Alansky, 1987). The correlation coefficients reported here too are higher than the mean value reported in those studies. The relatively robust relation found between maternal sensitivity and attachment security in these studies, especially in Study 2, supports the contention that it is important to examine caregiving behavior in natural circumstances where the mother cannot devote her attention exclusively to her child (e.g., Isabella, 1993; Pederson & Moran, 1995; Pederson et al., 1990; Posada et al., 1999). Observations in different naturalistic settings likely provide researchers with an opportunity to glance at a more representative sample of caregiving behavior to which a child is exposed in ordinary circumstances. Interestingly, findings revealed that when the constructs are assessed in contexts where the caregiving and/or the attachment behavioral system are taxed (e.g., playground), the relations between the constructs are readily apparent. The only two occasions (out of eight correlation coefficients) where the constructs were not significantly related involved the assessment of maternal caregiving at home.

Two important implications derive from the results presented. First, the stronger than usually reported association between sensitivity and security observed in naturalistic settings we found do not seem to be dependent upon the use of Q-methodology and the same context of assessment. If that were the case, the constructs would have also been significantly and robustly associated at home in Study 2. Second, the findings indicate that the context of assessment may be an important consideration when studying child–mother relationships during early childhood. This is in line with Solomon and George's (1999) assertion that observations at home may not be enough to elicit relevant individual differences in children's (and caregiving) behavior. Alternatively, we suggest that longer periods of observation at home may be needed to capture meaningful variation in child–mother secure-base relationships, as reported elsewhere (e.g., Pederson & Moran, 1995; Posada et al., 2004). This is consistent with Ainsworth's suggestions (Ainsworth et al., 1978) on the relevance of mothers and observers becoming familiar with each other (and thus the necessity of various visits), if observers are to capture representative and meaningful caregiving behavior to which the child is exposed.

As the new measure of maternal caregiving behavior used here is concerned, findings presented are encouraging. First, relatively high reliability estimates for the descriptions of maternal behavior obtained from inter-observer agreement were achieved in both studies. Also, internal consistency indices for the specific scales used were replicated. Further, the findings presented support the validity of the new instrument in that theoretically hypothesized associations between constructs studied were found using this assessment tool. Of course, more research is needed to further verify its validity and usefulness.

It is necessary to note some limitations of the studies presented. First, even though it is important to demonstrate concurrent significant relations between the constructs, this information is not sufficient to understand how early and concurrent dyadic experience, even at this age, interact and influence attachment relationships. The cross-sectional nature of the studies does not allow us to tackle this issue. Second, despite the great effort in terms of time and personnel involved when conducting the observations, it would still be important to conduct separate observations of maternal and child behavior in the park in future research. Related to this and especially as maternal behavior is concerned, we believe that more visits and longer observation times could be conducive to mothers behaving more naturally and at ease when in the company of researchers. Third, the samples in both studies were small and, for the most part, homogeneous. Conducting observations in more numerous and diverse samples is important to test the generalizability of findings.

In sum, we presented evidence in line with the contention from attachment theory that the quality of caregiving is associated with security outcomes during the preschool years. This is important because it supports the notion that secure base relationships continue to be co-constructed during childhood. Moreover, the studies conducted help elaborate the construct of sensitive care at this age. Thus, findings indicated that, just as in infancy, maternal behavior that contributes to harmonious interactions with the child was an important correlate of child security. This supports the idea that it is in dyadic exchanges with their primary caregiver that children build their sense of security in their relationship. In addition, evidence about the importance of providing appropriate secure base support and supervision as child secure base organization is concerned was presented. These findings are stimulating and speak to the significance of studying child–mother interactions in different naturalistic contexts with assessments tools that take into account age-relevant considerations.

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Notes

- 1 Importantly, the Maternal Behavior Q-Set is tailored to maternal behavior with infants, and the Parental Secure Base Support and Supervision Q-Set does not tap all the behaviors and domains of interest included in this study.
- 2 To normalize the variables they were transformed using Fisher's r to z (as specifically recommended for q-set data by Cohen, Cohen, West, & Aiken, 2003). The transformation did not normalize the different distribution of scores. Thus, we used the original scores obtained and employed non-parametric statistics.
- 3 Descriptions of maternal behavior in both settings, playground and home, were done by two different sets of observers in 10 cases; there was one common observer to both contexts in 23 cases; and the observers were the same in seven cases. For descriptions of child behavior, the two observers at playground and home were different in 17 cases; there was one common observer to both contexts in 19 cases; and they were the same in four cases. Thus, in all cases, at least two independent observations of the mother or the child were obtained in each context.
- 4 We acknowledge that there may be other important domains of caregiving at 3–5 years of age that we did not investigate. The domains studied are likely to be salient in understanding the associations between quality of caregiving and the secure base phenomenon, but they are not meant to be exhaustive of caregiving aspects during early childhood.

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