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Maternal Sensitivity and Child Secure Base Use in Early Childhood: Studies in Different Cultural Contexts

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This study tested whether maternal sensitivity and child security are related during early childhood and whether such an association is found in different cultural and social contexts. Mother–child dyads (N = 237) from four different countries (Colombia, Mexico, Peru, and the United States) were observed in naturalistic settings when children were between 36 and 72 months of age. Maternal and child behavior during interactions at home and in the playground were described using Q methodology. Findings reveal that across cultures, concurrent maternal sensitivity and more specific behavioral domains of maternal care (e.g., contributions to harmonious interactions and secure base support) are important for children's attachment security during early childhood. Implications for the study of attachment relationships beyond infancy and in diverse contexts are highlighted.

Bowlby (1969/1982, 1988) argued that attachment relationships are a life-span phenomenon that plays a significant role in development and how we conceive of, feel, and behave in close relationships. Child–mother relationships are considered central during the first years of life. The relation between quality of care, that is, sensitivity, and child attachment security is a cornerstone of the Bowlby–Ainsworth perspective. Indeed, a great deal of research has supported the link between maternal sensitivity and attachment security during infancy; less is known about those relationships and the patterning of maternal and child behavior during interactions in the preschool years. Theoretical elaboration beyond infancy, for example, childhood, is incipient as questions regarding the developmental course of such relationships are being addressed in research. Studying child–mother relationships in contexts where they are constructed, maintained, and elaborated during the preschool years is an important step in that direction. This study addresses the hypothesis about the relation between maternal sensitivity and child security during early childhood.

Bowlby was cognizant of the many contextual and cultural variations in child–mother attachment relationships. Amid those variations, he also saw commonalities in the way children and mothers interact with each other and organize their behavior during interactions (Bowlby, 1969/1982). The universality hypotheses derived from attachment theory have been questioned in view of the diversity of ways child–mother interactions transpire in different cultural and social contexts (e.g., LeVine & Norman, 2001; Rothbaum & Morelli, 2005; Rothbaum, Weisz, Pott, Miyake, & Morelli, 2001). Empirical research explicitly testing the universality of child–mother attachment relationships is scant. The few existing studies lend initial support to the

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universality of key notions (see below), as well as to the idea that attachment relationships during infancy are sensitive to the characteristics of the ecological settings in which those relationships develop. Empirical evidence testing the universality of attachment relationships beyond infancy and into early childhood is even scarcer. In this study, we specifically examine the notion that the organization of maternal caregiving behavior (i.e., sensitivity) is significantly related to the organization of preschoolers' secure base behavior (i.e., security) both in a U.S. sample and in samples from cultural backgrounds different from that of Western industrialized societies where the phenomenon is typically studied.

The Sensitivity–Security Link in Early Childhood

Foundational research on the relation between sensitivity and attachment security was conducted by Ainsworth. Her landmark studies in Uganda and Baltimore indicated that a mother's awareness, correct interpretation, promptness, and appropriateness of response to her infant's signals and communications were significantly associated with an infant's trust in his mother's availability and response (Ainsworth, Blehar, Waters, & Wall, 1978). Her Baltimore study revealed that maternal sensitivity was significantly related to attachment security. Infants who effectively used their mothers as a secure base tended to have mothers deemed to be sensitive. Although the robustness of the sensitivity–security association reported in studies conducted after Ainsworth's is not as strong as the one she found, research has, for the most part, confirmed her findings during infancy—see De Wolff and van IJzendoorn's (1997) meta-analytic study. Furthermore, intervention studies aimed at improving parental sensitivity provide evidence of a causal link between sensitivity and security, with enhanced sensitive caregiving leading to increased infant security (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003).

Although a child's ability to use his mother as a secure base is put together during the first year, it requires continuous support during child–mother interactions in early childhood. Consolidation and elaboration of secure base use beyond infancy entails concurrent and developmentally appropriate secure base support. Thus, some researchers have emphasized the importance of maternal input for children's security outcomes past infancy (e.g., Ainsworth, 1991; Bowlby, 1969/1982; Waters, Posada, Crowell, & Lay, 1994) and hypothesize that quality of care continues to play a key role in attachment relationships. Evidence supporting the sensitivity–security link in early childhood is, however, relatively scant. Furthermore, research that characterizes maternal secure base support at this age, beyond global assessments of sensitivity and their links with security, is needed to detail the developmental course of these relationships.

Empirical support for the sensitivity–security link in early childhood is crucial to substantiate claims from attachment theory about the importance of concurrent and continuous support of child–mother attachment relationships (e.g., Pianta, Sroufe, & Egeland, 1989; Sroufe, 1988; Waters et al., 1994). Moreover, it would validate the notion that although significant, experiences during infancy alone do not determine later outcomes, and that a developmental analysis is necessary (Bowlby, 1969/1982; Sroufe, 2002; Vereijken, Riksen-Walraven, & Kondo-Ikemura, 1997). Findings from existing studies seem to indicate that sensitivity and security are indeed associated during the preschool years (e.g., Barnett, Kidwell, & Leung, 1998; George & Solomon, 2008; Stevenson-Hinde & Shouldice, 1995). The majority of these studies show that summary ratings of maternal sensitivity are significantly related to children's attachment security. However, they do not specify maternal caregiving behavior and its organization that may account for the associations reported between global ratings of sensitivity and child security. As such, maternal support relevant for secure base behavior during early childhood remains unclear.

To elaborate the construct of quality of care beyond infancy, Posada and colleagues (Posada, Kaloustian, Richmond, & Moreno, 2007) assembled a developmentally appropriate Q-sort to assess maternal sensitivity and studied four specific domains of maternal behavior during early childhood: behavior that contributes to harmonious child–mother interactions, provision of secure base support, supervision, and maternal consideration of the child's perspective when setting limits. The notion that maternal *behavior that promotes harmonious interactions* with their children is at the center of secure attachment relationships was a key outcome of Ainsworth's naturalistic study in Baltimore (Ainsworth, Bell, & Stayton, 1971; Ainsworth et al., 1978). A mother's ability to participate and contribute to positive exchanges is at the heart of secure relationships. Findings reported by Posada et al. (2007) support this idea. Furthermore, provision of appropriate *secure base support* is in all likelihood related to consolidation and skillful use of mother as a secure base from which to explore and

to which to retreat. That is, supporting children's explorations and providing a haven of safety are considered essential for the organization of secure base behavior (Marvin & Britner, 1999; Waters & Cummings, 2000; Waters, Kondo-Ikemura, Posada, & Richters, 1991). Similarly, *supervision* or monitoring of preschoolers' whereabouts has been suggested an important aspect of maternal behavior during childhood. Mothers' ability to keep track of her child, anticipate problematic situations, and intervene when necessary are all considered important aspects of sensitive maternal behavior (George & Solomon, 2008; Posada et al., 2007; Waters et al., 1991). Finally, the provision of limits and boundaries around a child's activities becomes a salient issue in child–mother relationships beyond infancy (Ainsworth, Bell, & Stayton, 1974). Sensitively responding to a child's communications involves a consideration of the child's needs and wants even when *setting limits* and boundaries. Findings from two studies (Posada et al., 2007) indicated that in addition to a general index of sensitivity, all domains, but limit setting, were significantly associated with child security. The evidence for limit setting was mixed. Although thought provoking, those findings are preliminary and need to be explored further with different samples.

Thus, we tested the hypothesis that maternal sensitivity and the organization of children's secure base behavior (as indexed by a security score) during the preschool years are significantly associated. Additionally, we investigated the specific aspects of maternal behavior in interactions with her child mentioned above and expected contributions to harmonious interactions, secure base support, and supervision to be significantly related to preschoolers' security. On the basis of previous findings, we explored whether sensitive consideration of the child's needs and wants in setting limits and boundaries was also associated with child security.

The Sensitivity–Security Link in Diverse Cultural Contexts

Bowlby (1958, 1969/1982) conceptualized child attachment and corresponding maternal caregiving behavior as species characteristic adaptations. His rationale, in accordance with modern evolutionary theory, posits the attachment and caregiving systems as products of the natural selection process leading to human evolution. These complementary systems, he argued, were selected for the survival advantages they afforded to those children who sought and maintained proximity and contact with their caregivers. He suggested that in the context of everyday interactions, infants organize an attachment behavioral system with the goal of maintaining proximity to those who care for them. Similarly, he argued that maternal caregiving is organized as a behavioral system. As evolutionary products, these systems are expected to be observable in most humans as long as the environment they inhabit is within the range of ecological conditions in which they evolved. This is not to say that patterns of behavior exhibited are stereotyped. Bowlby and Ainsworth were well aware of the existing variability in children's and mothers' behavior across context and culture (e.g., Ainsworth, 1977; Bowlby, 1969/1982). Despite this variability, they argued that patterns of behavior that result in the care of infants and in the attachment of children to parents can be discerned in almost all humans. Furthermore, they maintained that for all child–mother dyads, the overall organization of a child's attachment behavior is interlocked with the organization of her or his mother's caregiving behavior.

Accordingly, the aforementioned association between maternal sensitivity and child security is expected to be significant in different social and cultural contexts. However, explicit empirical evaluation of this hypothesis during infancy is limited and practically nonexistent during the early childhood years (see, Posada et al., 1999; van IJzendoorn & Sagi-Schwartz, 2008). To be clear, the numerous studies supporting the association between maternal sensitivity and infant security offer the impression that the universality of the link has been proven. A careful look at the existing literature, however, shows a different picture as most research has been conducted in Western industrialized countries (e.g., De Wolff & van IJzendoorn, 1997). A more recent review of studies conducted in several countries in Africa, China, Israel, and Japan (van IJzendoorn & Sagi-Schwartz, 2008) underscores the need to further investigate the issue. Research is not only scarce, but assessments of sensitivity in many cases are also limited. Specifically, of the 16 reports cited by can IJzendoorn and Sagi-Schwartz (2008), only 4, other than the 1 by Ainsworth in Uganda, assessed sensitivity directly. One of these studies, conducted in Japan, did not find maternal sensitivity significantly associated with infant security (Nakagawa, Lamb, & Miyaki, 1992), yet as van IJzendoorn and Sagi-Schwartz (2008) discussed, this study is difficult to evaluate. In the other studies cited, reported assessments of maternal sensitivity were indirect at best. For example, in a study

conducted on the Gusii society in Kenya (Kermoian & Leiderman, 1986), sensitivity was inferred via mothers' age, household size, and the birth of a new infant, or in a different study by Hu and Meng conducted in China (1996; cited by van IJzendoorn & Sagi-Schwartz, 2008), sensitivity was indirectly assessed through maternal involvement in the care of their infants. van IJzendoorn and Sagi-Schwartz concluded that more cross-cultural studies are required to settle the issue.

A Cross-Country Comparison

Cross-context studies including samples from societies different from those in industrialized countries offer an opportunity to falsify central notions in attachment theory and to test the validity of core hypotheses in contexts different from those in which they were developed. Latin American countries present a good arena to conduct such tests. Countries in Latin America include cultures with some characteristics different from those of the Anglo-American culture. Their social structure, including family organization, is largely a legacy of Spanish settlers and colonizers (Valenzuela, 1997). Latino families have been described as more socially oriented rather than individualistic, with extended family as a very important source of social contact and support (Leyendecker & Lamb, 1999; Martin & Colbert, 1997). Furthermore, they tend to hold childrearing attitudes that emphasize interdependence rather than independence (Leyendecker, Lamb, Scholmerich, & Fracasso, 1995). Thus, Latino families seem to present a different case from that of Anglo-Saxon, North American, middle-class families. The characteristics just mentioned and, apparently, different conceptions and beliefs about family relations might influence child–mother interactions. Indeed, studies have found parental beliefs linked to parenting behavior (e.g., Leadbeater & Bishop, 1994; Okagaki & Johnson-Divecha, 1993; Zuniga, 1992).

Families from different Latin American countries and social groups cannot, however, be characterized as the same; in fact, their heterogeneity has been shown to be associated with different developmental outcomes (Rivera et al., 2008). Thus, in testing the generality of core attachment hypotheses, it is important to use samples from different countries and social contexts to better capture such variability. The studies presented test the notions that maternal sensitivity and child secure base use are significantly associated during early childhood and that such an association is found in different cultural and social contexts. We took advantage of existing collaborations from different research groups and investigated the associations between maternal sensitivity and child security in samples from Colombia, Mexican immigrants to the United States, Peru, and the United States by observing maternal and preschoolers' behavior during child–mother interactions in naturalistic settings at home and playgrounds.

On the basis of the predictions from the theory and initial evidence, we expected a general index of quality of care (i.e., maternal sensitivity) to be significantly and positively related to children's security in naturalistic settings across all the samples. Also, we investigated the associations between specific domains of maternal behavior (i.e., contributions to harmonious interactions, secure base support, supervision, and sensitive consideration of the child's needs and wants in setting limits and boundaries) and preschoolers' security in each sample.

Method

Participants

A total of 237 mother–child dyads across four samples from different countries were observed at their homes and at parks. Specifically, 85 Colombian, 46 Mexican immigrants to the United States, 30 Peruvian, and 76 U.S. dyads participated. While these were samples of convenience recruited independently for studies with unique questions, data-collection techniques were similar enough (though not identical) to provide an ideal opportunity for cross-country comparisons regarding the sensitivity–security link during early childhood. They represent diverse cultural groups from the Western hemisphere; specifically, each varies in the extent to which they encompass individualist versus collectivist values (Oyserman, Coon, & Kemmelmeier, 2002), with the potential to impact parenting practices (Rudy & Grusec, 2006).

Within each culture, samples were recruited through local child-care centers, preschools, and community fliers. Colombian dyads came from sociodemographic Sectors 2, 3, and 4 (of the six sectors) in Bogotá; they were visited between 2008 and 2011. Mexican immigrant dyads came primarily from a low socioeconomic background and were recruited in a Midwestern university town between 2007 and 2009. Dyads in Peru were recruited between 2011 and 2012 from a working-class neighborhood southeast of Lima. The U.S. child–mother dyads were recruited between 2003 and 2006 from

a Midwestern university town and came from a middle-class background; 79% of the U.S. sample was non-Hispanic Caucasian. All dyads from Colombia, Mexican immigrants, and Peru were Hispanic. Overall, children were between 36 and 72 months of age (M = 50.3); means across countries ranged from 42.9 to 60.7 months. All children were healthy and came from nonclinical populations. There were 121 boys and 116 girls. Mothers were between 19 and 49 years old; the range of average maternal age across countries was 29.8–35.0 years. Mothers' years of education ranged from 1 to 24, with 1 equivalent to a year of primary schooling and 24 corresponding to a doctoral degree; mean years of maternal education across countries ranged from 9.5 to 16.5. Most (146) mothers worked outside the home; there was no employment information available for 2 Colombian mothers. Table 1 presents a summary of demographic information by sample.

Procedures

Information about maternal behavior and child secure base behavior was collected at home and in the playground. The study was explained in detail to mothers who indicated interest. If they consented, a home or a playground visit was scheduled. Home visits lasted about 2.5 hr for all samples except Peru, for which home visits lasted about 1 hr. Playground visits lasted between 60 and 75 min for all samples except the Mexican immigrant sample for which playground visits lasted about 2 hr. In the sample of Mexican immigrants, two visits per setting were conducted —maternal behavior was observed in one visit and child behavior in the other. In Colombia, two playground visits were conducted, with one to observe maternal behavior and one to observe child behavior. In all other cases (home observations in Colombia, Peru, and the United States, as well as playground observations for Peru and the United States) descriptions of maternal and child behavior were obtained from the same visit. In all samples, observers who described maternal behavior were independent from those who described child behavior; in no case did an observer describe both mother and child behavior for both members of a dyad. Observers' descriptions of maternal and child behavior were aggregated both within and across settings. All mothers also provided sociodemographic information including their age, ethnicity, education, and job within the last 3 years.

Assessment

The Maternal Behavior for Preschoolers Q-Set (MBPQS; Posada et al., 2007) and Attachment Q-Set (AQS; Waters, 1995) were used to describe mothers' and children's behavior, respectively. Home visits included some structured activities and other research tasks that varied from sample to sample; specifically, in some samples mothers were asked to have a snack, read a book, construct a puzzle, and/or play with their child. Home visits also had an unstructured part, such that mothers were told to go about their activities as they would normally. In all samples, park visits were unstructured, with mothers and children going about their regular activities. Observers were allowed to interact naturally with

Table 1
Demographic Characteristics

	Colombia	Mexico	Peru	United States
N	85	46	30	76
Children				
Gender: boy/girl	41/44	28/18	17/13	35/41
Age in months (*SD*)	42.9 (2.1)$_a$	55.5 (6.4)$_b$	60.7 (7.9)$_c$	51.5 (7.9)$_d$
Range	39–48	46–66	45–72	36–67
Mothers				
Age in years (*SD*)	31.2 (6.4)$_a$	29.8 (4.8)$_a$	35.0 (5.7)$_b$	34.3 (5.8)$_b$
Range	19–45	21–41	25–45	22–49
Education in years (*SD*)	13.4 (3.8)$_a$	9.5 (3.3)$_b$	15.3 (1.5)$_c$	16.5 (2.4)$_c$
Range	5–22	1–16	12–16	9–24
Occupation: home/out of home	26/57	24/22	10/20	29/47

Note. Information on maternal education in Peru was gathered as having completed high school (12 years) or having completed undergraduate studies (16 years). For child age maternal age, and maternal education, means in the same row that do not share subscripts differ at $p < .05$.

mother and child at home and park. After finishing a visit, observers returned to the laboratory and independently described maternal behavior and child behavior with the MBPQS and the AQS, respectively.

Mother and child behavior were reported on by observers (authors and trained graduate and undergraduate students) who were native and lived in the same country as the participants they observed, and largely matched participant ethnicity, except in cases for which no matches were available. Importantly, however, observers interacted and spoke fluently with participants in their native language (Spanish-speaking observers visited Spanish-speaking families, while English-speaking observers visited English-speaking families). Observers were trained in the use of both Q-sets. Training for each Q-set consisted of first reading and discussing the meaning of the items. This was followed by three to six practice observations and q-descriptions of maternal and child behavior during live or videotaped child–mother interactions at home. Trainees' descriptions were compared to those of an expert; an observer was considered trained when she or he obtained an interobserver reliability with an expert (i.e., correlation corrected for number of observers using the Spearman–Brown formula) of at least 0.70 in three practice observations.

Maternal Behavior

Maternal behavior during interactions with their children was described with the MBPQS (Posada et al., 2007). This Q-set assesses the organization of maternal secure base support in naturalistic settings. The MBPQS has 90 items that describe age-relevant caregiving behavior. It provides an overall summary index of the quality of care, that is, maternal sensitivity, and scores on age-salient domains of behavior concerned with maternal contributions to harmonious interactions with her child, provision of secure base support, supervision, and limit setting. Empirical support for the reliability and validity of the MBPQS and the behavioral domains has been found in two studies (Posada et al., 2007; Richmond, Posada, & Jacobs, 2001). Members of the research teams working with the Colombian, Mexican, and Peruvian samples first translated the MBPQS from English into Spanish. Research teams adapted the MBPQS to the particular Spanish terminology characteristic of their samples. The different versions were then back-translated by a different researcher. The English versions were compared to the original version and items were revised if their meaning was inaccurate.

The MBPQS was completed after each visit by one or two observers who sorted the items along a continuum from *least characteristic* to *most characteristic* using a distribution of nine piles with 10 items each. Following Q methodology, each observer initially divided the 90 items into three piles: characteristic, neither characteristic nor uncharacteristic, or uncharacteristic. The three piles were then subdivided into nine piles of 10 items each, ranging from 1 (*most uncharacteristic*) to 9 (*most characteristic*). The pile number in which an item was placed is the rating for that item. Maternal behavior was described by two observers in 125 of the 169 visits in Colombia, 42 of the 92 visits in the Mexican sample, 25 of the 60 visits in Peru, and in 47 of the 151 visits in the United States. While attempts were made to have completely independent observers report on maternal behavior across contexts (e.g., different observers for maternal behavior at the park and in the home) and this was the case for many families visited, it was not always feasible given constraints of observers' and participants' schedules. As mentioned before, however, in no case did observers of maternal behavior describe child behavior for the same dyad.

Mean interobserver reliability indices (calculated from the agreement between q-descriptions from independent observers; Block, 1978) by sample were Colombian, 0.85 (range = 0.67–0.96); Mexican immigrants, 0.82 (range = 0.61–0.94); Peru, 0.81 (range = 0.62–0.93); and U.S., 0.86 (range = 0.67–0.95). The descriptions provided by observers were averaged into a Q-composite description for each setting (home and park). Descriptions of maternal behavior for six Mexican and five Peruvian participants had low interobserver reliability (i.e., < 0.60) for one of the visits; those observations were not included when computing sensitivity scores. For each mother, sensitivity scores were computed for the home, park, and overall composite (aggregated home and park) by correlating each respective q-description with the sensitivity criterion sort that describes the prototypically sensitive mother. A sensitivity score expresses the degree of correspondence (i.e., correlation) between a mother's description and the MBPQS criterion sort (Posada et al., 2007).

Scale scores were also calculated for each setting by averaging each scale's corresponding item scores. The domain maternal *contributions to harmonious interactions* with her child consists of 21 items ($\alpha = .93$, overall sample) that refer to both behavioral and affective involvement in the exchanges of a mother with her child (e.g., "Interactions appro-

priately vigorous and exciting as judged from child's response" and "Mother behaves as part of a team, exchanges with child are harmonious"). Provision of *secure base support* (23 items; α = .91, overall sample) assesses a mother's provision of a haven of safety and support of exploration (e.g., "When child returns to her, mother is unresponsive or business like in acknowledging child's return" [reversed] and "Smoothly facilitates explorations away and returns to her"). *Supervision* consists of nine items (α = .80, overall sample) that refer to keeping track and monitoring her child (e.g., "Is two steps ahead of child, anticipates potential conflictive situations and does something to prevent escalation"). *Sensitive limit setting* (six items except for the Colombian sample for which an item had a negative association with the overall scale and thus the item was excluded in calculating the scale; α = .67, overall sample) taps into a mother's consideration of her child's desires and wants when setting limits (e.g., "In limit setting, mother negotiates with child until a mutually satisfying solution is achieved"). Cronbach's alphas for the full sample as well as for each subsample are presented in Table 2. Also, the correlations among scale scores as well as the correlations between each scale and the overall composite sensitivity score for the full sample and each subsample are presented in Table 2.

Secure Base Behavior

Children's behavior during interactions with their mothers was described with the AQS (Waters, 1995). This instrument has 90 items and assesses the organization of infants' and preschool children's attachment behavior in naturalistic settings; its validity has been documented elsewhere (e.g., Pederson & Moran, 1996; van IJzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004; Vaughn & Waters, 1990). The validity of the AQS for use in cultures other than those representing Western industrialized countries has also been supported in studies conducted in China, Colombia, Israel, Japan, Peru, and Taiwan (e.g., Posada et al., 1995; Posada et al., 2013; van IJzendoorn et al., 2004; Vereijken et al., 1997).

As in the previous case, members of the different research teams translated the AQS from English

Table 2
Composite Maternal Behavior for Preschoolers Q-Set Intercorrelations and Cronbach's Alphas

	1	2	3	4	Sensitivity
Overall sample					
1. Smooth interactions (α = .93)	—				.94***
2. Secure base support (α = .91)	.91***	—			.92***
3. Supervision (α = .80)	.73***	.70***	—		.78***
4. Limit setting (α = .67)	.51***	.47***	.46***	—	.55***
Colombia					
1. Smooth interactions (α = .90)	—				.94***
2. Secure base support (α = .89)	.85***	—			.90***
3. Supervision (α = .82)	.79***	.67***	—		.83***
4. Limit setting (α = .52)	.36***	.21*	.42***	—	.31**
Mexico					
1. Smooth interactions (α = .95)	—				.95***
2. Secure base support (α = .93)	.93***	—			.95***
3. Supervision (α = .62)	.57***	.60***	—		.70***
4. Limit setting (α = .75)	.64***	.63***	.63***	—	.71***
Peru					
1. Smooth interactions (α = .96)	—				.95***
2. Secure base support (α = .94)	.94***	—			.93***
3. Supervision (α = .83)	.78***	.76***	—		.89***
4. Limit setting (α = .62)	.50**	.51**	.48**	—	.60**
United States					
1. Smooth interactions (α = .87)	—				.87***
2. Secure base support (α = .86)	.89***	—			.89***
3. Supervision (α = .62)	.56***	.57***	—		.61***
4. Limit setting (α = .71)	.35**	.33**	.15	—	.43***

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$, one-tail tests.

into Spanish. The different versions were then translated back into English by a different researcher. The English versions were compared to the original version and items were revised if necessary. The AQS was completed after each home/park visit by one or two observers who sorted the items along a continuum from *least characteristic* to *most characteristic* using a distribution of nine piles with 10 items each. Observers followed the same procedures described for the MBPQS. Child behavior was described by two observers in 128 of the 169 visits in Colombia, 88 of the 92 visits in the Mexican sample, 28 of the 60 visits in Peru, and in 111 of the 151 visits in the United States. As in the previous case, attempts were made to have completely independent observers report on child behavior across contexts and, although this was the case for many families visited, it was not always feasible.

Mean interobserver reliability indices (calculated from the agreement between q-descriptions from independent observers) by sample were Colombian, 0.84 (range = 0.64–0.95); Mexican, 0.80 (range = 0.63–0.93); Peru, 0.79 (range = 0.64–0.94); and U.S., 0.78 (range = 0.60–0.92). The descriptions provided by observers were averaged into a Q-composite description for each setting. Descriptions of child behavior for 1 Colombian and 11 U.S. participants had low interobserver reliability (< 0.60) for one of the visits; those observations were not included when computing security scores. Home, park, and overall composite (aggregated park and home) security scores were calculated for each child by correlating each respective q-description with the security criterion sort that describes the prototypically secure child (Waters, 1995). A security score expresses the degree of correspondence between a child's description and the AQS criterion sort. The Pearson correlation coefficient between those two descriptions is the security score.

Results

Preliminary analyses revealed significant subsample differences in demographic variables (see Table 1). Specifically, differences in child age were significant for all subsample comparisons. Also, analyses of maternal age indicated that Colombian and Mexican mothers were significantly younger than Peruvian and U.S. mothers. Finally, maternal education significantly differed among the subsamples. Mexican immigrant and Colombian mothers reported significantly fewer years of education than Peruvian and U.S. mothers; also, Mexican mothers reported significantly fewer years of education than Colombian mothers. Mean composite scores, standard deviations, and range of sensitivity and security scores for each sample are presented in Table 3. The mean sensitivity score for the overall composite

Table 3
Descriptive Statistics for Maternal Sensitivity and Child Security

	Overall sample	Colombia	Mexico	Peru	United States
Sensitivity composite					
M (*SD*)	0.51 (0.32)	$0.48\ (0.29)_{a}$	$0.46\ (0.35)_{ab}$	$0.30\ (0.44)_{b}$	$0.67\ (0.20)_{c}$
Range	−0.67 to 0.86	−0.35 to 0.84	−0.65 to 0.80	−0.67 to 0.79	−0.33 to 0.86
Sensitivity home					
M (*SD*)	0.43 (0.34)	$0.43\ (0.29)_{a}$	$0.34\ (0.38)_{a}$	$0.12\ (0.43)_{b}$	$0.60\ (0.20)_{c}$
Range	−0.55 to 0.82	−0.50 to 0.80	−0.53 to 0.77	−0.55 to 0.71	−0.25 to 0.82
Sensitivity park					
M (*SD*)	0.51 (0.32)	$0.43\ (0.32)_{a}$	$0.50\ (0.32)_{ab}$	$0.46\ (0.41)_{ab}$	$0.63\ (0.23)_{b}$
Range	−0.62 to 0.84	−0.31 to 0.82	−0.61 to 0.79	−0.62 to 0.78	−0.30 to 0.84
Security composite					
M (*SD*)	0.39 (0.22)	$0.34\ (0.22)_{a}$	$0.40\ (0.20)_{ab}$	$0.31\ (0.26)_{a}$	$0.49\ (0.18)_{b}$
Range	−0.35 to 0.73	−0.25 to 0.69	−0.07 to 0.68	−0.35 to 0.68	−0.14 to 0.73
Security home					
M (*SD*)	0.34 (0.23)	$0.27\ (0.24)_{a}$	$0.38\ (0.20)_{bc}$	$0.27\ (0.25)_{ab}$	$0.43\ (0.19)_{c}$
Range	−0.38 to 0.75	−0.22 to 0.67	−0.15 to 0.64	−0.38 to 0.65	−0.16 to 0.75
Security park					
M (*SD*)	0.34 (0.23)	$0.30\ (0.19)_{a}$	$0.33\ (0.22)_{a}$	$0.26\ (0.30)_{a}$	$0.43\ (0.20)_{b}$
Range	−0.57 to 0.71	−0.29 to 0.67	−0.14 to 0.66	−0.57 to 0.63	−0.23 to 0.71

Note. Means in the same row that do not share subscripts differ at $p < .05$.

description (home and park) for the entire sample was 0.51 (SD = 0.32), with scores that ranged from −0.67 to 0.86. The mean sensitivity score at home was 0.43 (range = −0.55 to 0.82, SD = 0.34) and at the park was 0.51 (range = −0.62 to 0.84, SD = 0.32). The mean security score for the composite description was 0.39 (SD = 0.22), with scores that ranged from −0.35 to 0.73. The mean security score for child behavior at home was 0.34 (range = −0.38 to 0.75, SD = 0.23) and at the park was 0.34 (range = −0.57 to 0.71, SD = 0.23). One-way analyses of variance revealed significant sample differences in the means for both overall sensitivity and security composites. Post hoc comparisons indicated that the U.S. mothers obtained significantly higher sensitivity scores than mothers in any other sample. Also, Colombian mothers had significantly higher sensitivity scores than Peruvian mothers. In addition, post hoc analyses revealed that children in the United States had significantly higher security scores than Colombian and Peruvian children (see Table 3).

Correlation analyses investigating the associations between demographic information (i.e., mothers' age, education, and occupation and child age and gender) and sensitivity and security composites for the overall sample showed that maternal age and education were significantly related to maternal sensitivity. Older and more educated mothers received higher sensitivity scores (r = .14, $p < .05$; r = .21, $p < .01$, respectively). Analyses by sample indicated two significant associations; specifically, maternal education and child age were significantly associated with sensitivity in the United States (r = .25, $p < .05$; and r = −.26, $p < .05$, respectively). Mothers with more years of education and younger children obtained higher sensitivity scores. As security is concerned, analyses for the overall sample showed that no demographic variable was significantly associated with child security. Analyses by country indicated that child security was negatively correlated with maternal age in Colombia (r = −.22, $p < .05$). Child security was found to be associated with child gender in the sample of Mexican immigrants, with girls obtaining higher security scores than boys (r = .45, $p < .01$). No other significant associations were found. Based on these results, demographic variables significantly related to sensitivity and/or security (i.e., maternal age and education, and child age and gender) were used as covariates in all subsequent analysis.

Analyses indicated that observations of maternal sensitivity at home and park were significantly related for the total sample (r = .51, $p < .001$) and for each of the samples (Table 4); similar results were found for observations of secure base behavior in both settings (r = .51, $p < .001$, for the total sample). To test whether maternal sensitivity and child security scores were significantly associated, we conducted partial correlation analyses. We studied the relation between the constructs when each was assessed in an independent setting and at a different time from the other; that is, we considered the associations between sensitivity at home and child secure base use at the park, and between sensitivity at the park and child secure base use at home. The resultant correlation coefficients for each cross-setting analysis were converted to Fisher's z, averaged, and then converted back to a correlation coefficient. Results indicated that even when they are assessed on different times and settings, sensitivity and security were positively and significantly related for the total sample (r = .36, $p < .001$) and for each subsample studied (Table 4).

Next, we studied whether the domains of caregiving behavior were significantly associated with the organization of child secure base behavior. Again, we investigated the association between the domains and security when each was assessed in an independent setting and at a different time from the other; that is, we considered the relations between each domain at home and child secure base use at the park, and between each domain at the park and child secure base use at home. The correlation coefficients for each cross-setting analysis were converted to Fisher's z, averaged, and then converted back to a correlation coefficient. Partial correlations controlling for maternal age, education,

Table 4
Partial Correlations Between Maternal Sensitivity and Child Security

	Overall sample	Colombia	Mexico	Peru	United States
Sensitivity home—Sensitivity park	.51***	.54***	.61**	.38*	.54***
Security home—Security park	.51***	.52***	.41**	.55**	.36**
Sensitivity—Security across settings	.36***	.31**	.30*	.43**	.23*

Note. Maternal age education, child age, and gender were controlled for in all analyses.
*$p < .05$. **$p < .01$. ***$p < .001$, one-tail tests.

and child age and gender showed each domain to be significantly related to secure base behavior in the overall sample. Specifically, child security was positively and significantly related to maternal contribution to harmonious interactions ($r = .36$, $p < .001$), secure base support ($r = .31$, $p < .001$), supervision/monitoring ($r = .29$, $p < .001$), and sensitive limit setting ($r = .21$, $p < .001$). Associations by sample are presented in Table 5.

Finally, we examined the extent to which associations between maternal sensitivity and child security differed by cultural context. Moderation analyses confirmed that while there were between-country differences in security scores (as noted above), no Culture × Sensitivity interaction predicted security. That is, the sensitivity–security association did not significantly differ across countries; this was true for the cross-context associations both at the level of the sensitivity composites by context (i.e., home and park) and the level of maternal caregiving domains.

Table 5
Partial Correlations Between Maternal Behavior for Preschoolers Q-Set Subscales and Security Across Settings

	Security
Overall sample	
1. Smooth interactions	.36***
2. Secure base support	.31***
3. Supervision	.29***
4. Limit setting	.21***
Colombia	
1. Smooth interactions	.35***
2. Secure base support	.24*
3. Supervision	.23*
4. Limit setting	.07
Mexico	
1. Smooth interactions	.30*
2. Secure base support	.28*
3. Supervision	.15
4. Limit setting	.18
Peru	
1. Smooth interactions	.44**
2. Secure base support	.43**
3. Supervision	.53**
4. Limit setting	.28†
United States	
1. Smooth interactions	.19*
2. Secure base support	.19*
3. Supervision	.05
4. Limit setting	.17†

Note. Maternal age, education, child age, and gender controlled for in all analyses.
†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$, one-tail tests.

Discussion

The notion that maternal sensitivity plays a key role in the organization of a child's secure base behavior is central to attachment theory. Although the link between sensitivity and security has been clearly established during infancy, research on the associations between the constructs in naturalistic settings during early childhood is rare. This is an important developmental inquiry that needs to be addressed and is thus a primary goal of the current study.

Before discussing our main findings, we note that maternal age and education were found to be significantly and positively related to sensitivity for the entire sample. For the subsamples, however, only the association between maternal education and sensitivity was significant in the United States. The more years of education mothers reported, the more sensitive their caregiving. This finding is consistent with those reported for mothers of infants (e.g., Pederson & Moran, 1996). Child security was not significantly associated with any of the demographic variables for the overall sample. For the subsamples, however, younger mothers had more secure children in the Colombian sample, and a gender-related association was found in the sample of Mexican immigrants. More research is needed to determine whether these are sample-specific findings or whether security associations with maternal age and gender differences become evident during early childhood. Gender differences have not been typically reported in research with infants and very little information exists about them during early childhood.

Findings from the main analyses for the entire sample and each culture support our first hypothesis that sensitivity continues to be important beyond infancy and back the idea that the construction of child security in the child–mother relationship is an ongoing process that continues in early childhood. Indeed, the information presented is consistent with the idea that, far from being a closed issue in infancy, security outcomes remain linked to quality of maternal care in early childhood.

Although important, sensitivity, in all likelihood, is manifested differently at various ages. Thus, we provide evidence in support of behavioral domains hypothesized to be directly relevant to preschoolers' secure base use. Specifically, we considered maternal contributions to and participation in harmonious interactions with her child, secure base support (i.e., being there for her child when she or he wants/needs to go back, and supporting explo-

rations away from mother), monitoring and supervising her child's whereabouts, and setting limits in consideration of the child's wishes. For the total sample, these domains turned out to be significantly related to preschool children's trust in their mother's availability and response, that is, security. Results are potentially important in that they target specific aspects of mothers' behavior when interacting with their preschoolers that may help clarify the sensitivity–security link at this developmental stage. By the same token, they encourage us to go beyond the global label of "sensitivity" and study what caregivers do when interacting with their children at different developmental points.

A key hypothesis in the Bowlby–Ainsworth perspective is the idea that despite immense variability in maternal caregiving, the general organization of maternal behavior during interactions with her child, as assessed by the sensitivity construct, is related to patterns of secure base use in different social and cultural contexts and settings (Ainsworth, 1977; Bowlby, 1969/1982; Posada, Carbonell, Alzate, & Plata, 2004; Posada et al., 2002; van IJzendoorn & Sagi-Schwartz, 2008). Our second hypothesis was concerned with the generality of the sensitivity–security link in samples from four different cultural/social groups. First, a comparison among samples indicated that there were some significant differences in mean levels of sensitivity and security. Specifically, the U.S. sample had significantly higher sensitivity scores than the other samples; in addition, the Colombian sample obtained higher scores than the sample from Peru. Furthermore, the U.S. sample obtained significantly higher security scores than the samples from Colombia and Peru. Higher sensitivity and security scores in the United States may be related to the specific living conditions of the samples. Other research has shown that both sensitivity and security scores are context sensitive and related to the particular ecology of the dyads studied; for example, they are lower in samples from low-socioeconomic sectors of the population (Mesman, van IJzendoorn, & Bakermans-Kranenburg, 2012; Posada et al., 1999; Zevalkink & Riksen-Walraven, 2001), as in the case of Mexican immigrant and Peruvian dyads. As Colombian dyads are concerned, even though they came from the middle sectors of the population, previous research has shown that such sectors are not directly comparable to middle-class families in the United States (Posada et al., 2002). These results are important because they indicate that real-life conditions impact parents' ability to interact sensitively with their child and child security.

Despite those differences, however, descriptions of maternal behavior were significantly associated with the organization of children's secure base behavior in all samples. Maternal sensitivity, derived from observations of maternal behavior conducted in a different setting and at a different time from observations of child behavior, turned out to be significantly associated with child security. Thus, the association cannot be simply construed as an artifact of observations conducted on both members of the dyad in the same setting at the same time. The partial correlation coefficients between the constructs across settings indicate that this is not the case. Findings further emphasize Bowlby and Ainsworth's central ideas that it is in the context of daily mother–child exchanges that children organize and maintain their attachment relationships and that maternal and child behavior are interlocked (Ainsworth et al., 1978; Bowlby, 1969/1982). Thus, results back the hypothesis that maternal behavior indicative of awareness of the child's signals and communications, accurate interpretation of those signals, and prompt and appropriate responding plays a key role in the organization of a child's secure base behavior.

It is important to note, however, that this study was not concerned with testing differences in how diverse cultural/social groups implement maternal care or child secure base behavior. Those differences are likely to exist (e.g., Posada et al., 2013; van IJzendoorn & Sagi-Schwartz, 2008), but we argue that studies about cultural variation on these issues should state such differences in advance and test their hypotheses with data. In our case, we were interested in whether the general organization of maternal behavior in interactions with her child was related to patterns of secure base use, characterized as security. This was so in every sample studied.

Additionally, we were interested in exploring specific domains of maternal behavior that help us understand the sensitivity–security association during early childhood. Findings confirmed the notion that maternal contributions to harmonious child–mother interactions and provision of secure base support are central to secure relationships. Similarly, supervision and monitoring of child activities and sensitive limit setting seem to be potentially important factors when accounting for the relations between sensitivity and security.

A key aspect of maternal care, as far as security outcomes are concerned, is a mother's ability to establish and contribute to harmonious exchanges with her child. Much as Ainsworth emphasized the

importance of maternal behavior that contributes to smooth interactions during infancy (Ainsworth et al., 1978), we found that mothers who contribute to smooth emotional give-and-take exchanges, "work as a team" during interactions with their children, and involve themselves both behaviorally and affectively had preschool-aged children with higher security scores. Again, this was so for the total sample and for each subsample. Maternal contributions to harmonious exchanges remain a central ingredient for the construction of child attachment security during the preschool years.

Furthermore, providing secure base support is central to a child's construction of trust in her or his mother's availability and response. Being there when needed and contributing to a child's explorations are likely to build a child's feelings of security in her or his transactions with surroundings. Our inquiry about mothers' provision of a haven of safety to which to go back when upset (e.g., when having an accident or when afraid), and a secure base from which to explore and use to navigate his or her surroundings (e.g., enhancing the child's activities in ways that make him or her feel effective and pleased about transactions with the environment) indeed confirmed the link between maternal patterns of secure base support and secure base use in young children. This was so for the total sample and for each of the samples in the study. These findings support the relevance of the secure base phenomenon as a central factor when investigating and characterizing child–mother attachment relationships during childhood.

Being aware of her child's whereabouts is also essential for a mother to respond sensitively (e.g., Ainsworth et al., 1978). Conceptualized as maternal supervision and monitoring of her child (Posada et al., 2007), maternal behavior that keeps track of child activities, anticipates problematic situations, and balances the tasks of monitoring and participating in child activities was found to be significantly associated with child security scores for the overall sample. Similar associations were found for the Colombian and Peruvian samples. The association was not significant in the other two subsamples. This latter result may be due to a very restricted range of scores in these subsamples; 41 of the 46 scores in the sample of Mexican immigrants ranged from 5 to 7.5, and 73 of the 76 scores in the U.S. sample ranged from 5 to 7.75 (possible range = 1–9). Indeed, descriptive analyses indicated high kurtosis and a negatively skewed distribution in both subsamples, which may explain why this finding is at odds with findings for the Colombian and Peruvian samples and previous results (Posada et al., 2007). Further research with samples exhibiting more variability in this domain is needed. As a whole, however, maternal supervision and monitoring turned out to be significantly related to children's secure base use for the total sample.

Finally, we explored whether the way mothers go about limit setting is related to security outcomes. It has been argued elsewhere that in setting limits, a sensitive mother reasons with her child, takes into account her or his wishes, and guides and lets her child participate in decision making (e.g., Posada et al., 2007). Results for the overall sample supported this notion. Analyses within each subsample, however, indicated that the constructs were not significantly related. This finding may be attributed to the marginal internal consistency indices in each subsample for the scale representing this domain. That is, the few items comprising the scale may not provide a reliable estimate of sensitive limit setting. Once assessment issues are addressed, more research is warranted to determine whether the domain plays an important role in sensitive caregiving during early childhood. For the entire sample, however, support was provided for the hypothesis that mothers who reason with their children about rules, take into account their wishes, and guide and let their children participate in decision making when setting limits, have children who use them as a secure base.

Importantly, there are limitations in the study presented. First, although different cultural and social settings were sampled, findings are limited to the regions where the subsamples originated. That is, although the data support the hypothesis concerned with the generality of the sensitivity–security link, these findings need to be tested in cultural groups that differ from the ones studied here, for example, countries in Africa, Asia, and the Middle East. Furthermore, they need to be confirmed with different samples from the countries studied here. A greater sample size, especially in the case of the Mexican immigrant and Peruvian dyads, is desirable. Finally, sample characteristics and procedures varied somewhat from country to country; similar research protocols would facilitate comparisons across cultural groups. Recruitment of samples, personnel, time, and finances, however, are important constraints to address.

Despite some differences in sample size and length and number of observations across samples, the data gathered supported the main hypotheses and speak to the importance of the relations between sensitivity and security during early

childhood in different cultural and social settings. Findings highlight the relevance of investigating child–mother attachment relationships from dyadic and behavioral perspectives during early childhood (Bretherton & Munholland, 2008; Posada & Lu, 2011). An interperson approach acknowledges that attachment phenomena not only influence but also are influenced by interpersonal exchanges. Certainly, from a developmental point of view, it is highly likely that secure base relationships are in the process of being elaborated and consolidated during childhood. Attention to maternal (caregiver's) contributions and relationship experiences may clarify our understanding of the development of attachment relationships after infancy. A more fine-grain analysis of maternal behavior is necessary to include both general descriptions of constructs and more specific instances of how those constructs are observable during actual interactions. In doing so, the need for construct fidelity is an important consideration (De Wolff & van IJzendoorn, 1997). We also consider it essential to approach the issues at hand from a multicontextual perspective, with specific hypotheses about similarities and differences across social and cultural contexts specified beforehand and tested empirically. In accomplishing this task, the use of diverse approaches, for example, ethnographies, may be necessary to dispel possible methodological confounds. Finally, testing the universality of core hypotheses within attachment theory does not necessarily imply the use of samples from different countries, but could also accommodate the use of within culture/country groups (as in the case of immigrant Mexican dyads in the present study).

In sum, observations of maternal and child behavior during child–mother interactions at home and playgrounds in four samples from different contexts were used to test the hypothesis that maternal sensitivity is related to child attachment security in early childhood across diverse cultures. Results indicated that for the total sample as well as for each of the four groups, the constructs are significantly associated. Mothers who are sensitively responsive to their preschoolers' communications and behavior tend to have children whose behavior indicates trust in their mother's availability and response. These findings support the notions that child–mother attachment relationships continue to be constructed during childhood and that this phenomenon is commonplace in different cultural contexts.

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