
CHAPTER 13

Precursors of Attachment Security

R. M. PASCO FEARON

JAY BELSKY

Why do some infants develop secure attachments to their primary caregivers, whereas others establish insecure relationships? That is the central question addressed in this chapter. Even though John Bowlby was deeply concerned with the consequences of variation in the quality of early attachments, Mary Ainsworth brought the topic of the origins of individual differences in infant–parent attachment to center stage. Bowlby (e.g., 1944) originally focused his thinking on evolution, species-typical development, and the effects of major separations from parents early in life, whereas Ainsworth (1973) was the first to devote considerable empirical and theoretical energies to the determinants of secure and insecure attachments in normal, nonclinical populations.

Central to Ainsworth's extension of Bowlby's attachment theory was the contention that a sensitive, responsive caregiver is of fundamental importance to the development of a secure attachment bond during the opening years of life. Thus, a caregiver capable of providing security-inducing, sensitive, responsive care understands the child's individual attributes; accepts the child's behavioral proclivities; and is thereby capable of consistently orchestrating harmonious interactions between self and child, especially, though not exclusively, those in which the soothing of distress is involved. In extending Bowlby's theory, Ainsworth never expressed the belief that the development of the relationship between infant and caregiver was determined entirely by the caregiver. Nevertheless, she was convinced that the developing relationship was not shaped equally by the two participants. Recognizing the greater maturity and power of the adult, Ainsworth attributed disproportionate influence to adult caregiver.

Nonetheless, the notion of maternal sensitivity championed by Ainsworth in her efforts to account for individual differences in attachment security was defined at least in part in terms of what the child brought to the relationship and, more specifically, how the child behaved at a particular time (i.e., the child's cues, needs, focus of attention, ongoing activities). By definition, then, care that is sensitive and theorized to promote security in the child does not take exactly the same form for all children. Nor does it take the same form across all situations in the case of a particular child.

The first part of this chapter contains a summary of research on the effects of mothering and mother–infant interaction on attachment security—the issues raised most directly by Ainsworth. Related evidence pertaining to the effects of the quality of fathering and of nonparental caregivers' care on attachment to father and to caregivers, respectively, is also considered. In addition, the issue of whether effects of sensitive care on attachment security are evident outside the Western world is considered, as this is important for understanding how universal or general these developmental processes are.

In the second part of the chapter, the broader social or ecological context of attachment and parental care is considered. An ecological perspective draws attention to the multiple levels of influence affecting care (see Belsky & Jaffee, 2006) and therefore, in principle, affecting attachment security. These influences include the psychological attributes of the mother, her relations with her partner, and the degree to which she has access to other social agents who provide instrumental and emotional support. Thus, whereas the core of attachment theory focuses on the microprocesses of development, emphasizing the daily interactional exchanges between parent and child and the developing internal working model of the child, the ecological/social-contextual perspective highlights the contextual factors and processes likely to influence these microdevelopmental processes.

THE QUALITY OF MATERNAL AND NONMATERNAL CARE

Soon after Ainsworth (1973) first advanced her ideas and evidence regarding the role of maternal sensitivity in fostering the development of a secure attachment relationship, what might be regarded as a “cottage industry” developed within the field of developmental psychology seeking to replicate—or refute—her findings. Child temperament was the major focus of those initially seeking to disconfirm Ainsworth's theory and evidence (Chess & Thomas, 1982; Kagan, 1982), and in previous editions of this chapter (in 1999 and 2008) it was difficult to consider the role of maternal sensitivity and the quality of maternal care more generally without devoting some attention to the influence of this particular infant characteristic. But the field has moved on from this focus, no doubt because of the absence of evidence—reviewed in

earlier editions of this volume—substantiating this claim. In fact, even the proposition that variation in the manifestation of insecurity—resistance vs. avoidance—might reflect effects of temperament (Belsky & Rovine, 1987) has not been persuasively supported (Vaughn, Bost, & van IJzendoorn, 2008). Rather than review the relevant research, we refer the interested reader to Bakermans-Kranenburg and Van IJzendoorn (2012) and to previous chapters by Belsky and Fearon (2008) and Vaughn and associates (2008) in the preceding edition of this volume (see also Vaughn & Bost, Chapter XX, this volume).

Even if temperament, especially difficult temperament and proneness to distress, has not proven to be a major contributor to attachment security, it would be mistaken to presume that challenges to Ainsworth's sensitivity hypothesis have been abandoned. As the next subsection makes clear, researchers have now turned to the role of genetics in shaping attachment. We consider this new body of research before considering evidence implicating sensitivity and the quality and nature of care that children receive more generally as an important determinant of attachment security.

The Role of Genes

Two distinct approaches to addressing this issue are considered here, one quantitative-genetic in orientation, relying on twin designs, and the other molecular-genetic in character and focused on measured genes. A more in-depth treatment of the behavioral genetics of attachment is provided by Bakermans-Kranenburg and colleagues, Chapter xx, this volume.

Twin Studies

Four studies assessing infant–mother attachment in samples of monozygotic (MZ) and dizygotic (DZ) twins have proved strikingly similar in their results. In a sample of 157 MZ and DZ twins seen in the Strange Situation at 12 months, Bokhorst and colleagues (2003) found 60% correspondence in MZ twins and 57% in DZ twins. In genetic modeling, 52% of the variance in attachment security within the organized categories was attributable to shared environmental effects, whereas the remainder was estimated to be due to nonshared environment and measurement error. When disorganization was considered, no genetic or shared environmental effects were detected, and all of the variance was attributable to nonshared environment and measurement error. Broadly convergent results have been reported by O'Connor and Croft (2001) in an older sample of preschoolers using the MacArthur modified Strange Situation (see also Ricciuiti, 1992, for an early small-scale study yielding comparable findings). More recently, Roisman and Fraley (2008) reported similar results from a relatively large ($N = 485$) twin study of 2-year-olds using a shortened version of the observer-reported Attachment Q-Sort, finding 53% of the variance in security attributable to shared environment, 36% to non-shared environment and

measurement error, and a non-significant 17% to genes. Bucking this limited-or-no-genetic-influence trend is Finkel et al.'s (2000) investigation; they documented significant genetic effects (25%) and no shared environmental effects on attachment security. This surprising result appeared to be due to the low DZ correspondence (compared to other DZ samples or fraternal siblings) of 48%, rather than a high correspondence among MZ twins (which was 66%). Conceivably, these researchers' reliance on a non-standard separation-reunion procedure originally designed to assess temperament could explain why their results are so different from the other four investigations.

Despite the relatively modest sample sizes of each of these studies, the cumulative picture is quite consistent, suggesting a significant role for shared and nonshared environmental effects and apparently little role for genetics, at least in the low-risk populations studied. This conclusion is buttressed by results from the only genetic study of infant–*father* attachment, which relied on AQS security scores derived from mother sorts of infant behavior vis-à-vis the father (Bakermans-Kranenburg et al., 2004): Genetic modeling revealed that attachment was explained virtually exclusively by shared environmental (59%) and unique environmental (41%) factors. Moreover, these results are consistent with data indicating that the attachment security of infants placed in foster care is predictable from the adult attachment status of the genetically unrelated foster caregiver (Dozier et al., 2001), as well as the fact that infants can show different patterns of attachment to their mothers and fathers (e.g., Steele et al., 1996). The apparent preeminence of the environment—and of the shared environment in particular—is a remarkable confirmation of a key hypothesis of attachment theory.

Molecular Genetic Research

Molecular genetic studies represent an alternative methodology for investigating the role of genes in the development of attachment. Much of this work was stimulated by Lakatos and colleagues' (2000, 2002) ground-breaking investigation linking disorganized attachment with a polymorphism of the *DRD4* dopamine receptor gene (Exon III 48-bp VNTR). Of 17 disorganized infants, 12 had the 7-repeat allele of this gene (which has been found to confer lower dopamine neurotransmission than the more common 4-repeat allele), compared to 21 of 73 nondisorganized infants. Quite a number of efforts to replicate this genotype-phenotype association have failed to reproduce the finding. Indeed, Bakermans-Kranenburg and Van IJzendoorn's (2007) relevant meta-analysis revealed a weighted effect size for the association of $d = .05$ ($N = 542$), which was not significant. And in the time since their report, five additional studies have proven consistent with this early multi-study analysis (Frigerio et al., 2009; Luijk et al., 2011 [involving two independent cohorts]; Raby et al., 2012; Spangler et al., 2009).

Although the association between attachment and the *DRD4* gene has proved unreliable, several other gene variants have been examined in relation to attachment security and insecurity, mostly with respect to gene-X-environment (GXE)

interactions (though see Spangler et al., 2009, for a genotype-phenotype study). Bakermans-Kranenburg and van IJzendoorn (2006), for example, found that unresolved loss in mothers ($N = 85$) was more strongly associated with disorganized attachment among *DRD4/7+* infants relative to *DRD4/7-* infants, suggesting greater susceptibility to the effects of unresolved maternal loss in the former. Spangler and colleagues ($N = 106$; Spangler et al., 2009) examined the *DRD4* gene and parental responsiveness, detecting no GXE interaction (or main effect of *DRD4*), but did find (in addition to a genetic main effect) an interaction with the *5HTTLPR* (serotonin transporter) gene: Infants with less responsive maternal care and the short-form of the *5HTTLPR* gene were more likely to be disorganized. Similar results were reported by Barry and colleagues (Barry et al., 2008; $N = 88$): Overall insecurity in the SSP (rather than disorganization specifically) was predicted by the combination of low responsiveness and the short-form of the *5HTTLPR* gene. When examining attachment security at both 12 and 18 months, Raby and colleagues (Raby et al., 2012; $N = 154$) failed to find a genetic main effect of *5HTTLPR* (as did Frigerio et al., 2009, and Barry et al., 2008) or an interaction between the *5HTTLPR* gene and responsiveness of maternal care, although it is notable that this study did not include codes for disorganized attachment. Perhaps most important are the results of a recent report from Luijk and colleagues (2011), indicating that no main genetic effects or GXE interactions proved replicable across two large samples, the Dutch Generation R study ($N = 506-547$) and the American NICHD Study of Early Childcare and Youth Development ($N = 478-522$), especially as all the candidate genes implicated in the attachment literature were considered (*DRD4*, *5HTTLPR*, two oxytocin receptor genes, and *COMT*), along with their interaction with parental sensitivity in relation to security and disorganization. (Although one genetic main effect – of the *COMT* gene – was significant for disorganization in both samples at the uncorrected 5% level, it would not survive corrections for multiple hypothesis testing.)

A conservative interpretation of all the genetic data reviewed is that environmental effects are well substantiated, but genetic effects are not. It would nevertheless be hasty to exclude the role of genes given the current corpus of evidence. Data from psychiatric genetics clearly indicates that single gene effects tend to have extremely small, but cumulatively significant, effects on psychopathology (see Kendler, 2013), and the same may prove true for other domains of development, including attachment (see Bakermans-Kranenburg & van IJzendoorn, this volume). Larger-scale studies capable of detecting small genetic effects and GXE interactions will be necessary to address these issues in the future. Furthermore, we lack large-scale twin studies of attachment that are properly powered to detect moderate or small genetic effects on disorganized attachment in particular, which is typically present at relatively low frequencies, especially in low-risk samples. Finally, current research has focused almost exclusively on the first three years of life. We cannot assume that attachment security measured in later development will show the same profile of environmental influence as that seen in infants and toddlers. Indeed, a recent relatively large twin study of adolescents ($N = 551$ twin pairs) using a

representational measure of attachment, the Child Attachment Interview, found that nearly 40% of the variance in security-insecurity and narrative coherence was attributable to genes, and the influence of the shared environment was estimated to be zero (Fearon, et al., 2014). These striking findings suggest that the causal influences on attachment organization may change with development, perhaps particularly as attachment security shifts from a predominantly behavioral and relational construct in very early childhood to one that is generalized (not relationship-specific) and representational in middle childhood and beyond. Whether similar patterns of heritability will be observed in adulthood remains to be seen.

The Role of Maternal Care

There can be little doubt, in accord with Ainsworth's (1973) original theorizing and her intensive research on just 26 mother–infant dyads, that variation in observed maternal sensitivity in the first year is linked to security in the Strange Situation. This is revealed in studies of middle-class U.S. (e.g., Braungart-Reiker et al., 2001; Fish & Stifter, 1995 [girls only]; Isabella, 1993; Kochanska, 1998; Teti et al., 1995), Canadian (Pederson & Moran, 1996), and German (Grossmann, et al., 1985) families, as well as economically disadvantaged, often single-parent families (Egeland & Farber, 1984; Krupka et al., 1996; Susman-Stillman et al., 1996). Furthermore, security is associated with prompt responsiveness to distress (Crockenberg, 1981; Del Carmen et al., 1993), moderate, appropriate stimulation (e.g., Belsky et al., 1984), and interactional synchrony (Isabella & Belsky, 1991; Isabella et al., 1989), warmth, involvement, and responsiveness (e.g., Bates et al., 1985; NICHD Early Child Care Network, 1997) as well as autonomy support (Bernier et al., 2014) and mutually responsive interactions (e.g., Kochanska et al., 2005). In contrast, insecure-avoidant attachments are related to intrusive, excessively stimulating, controlling interactional styles, and insecure-resistant attachments to an unresponsive, underinvolved approach to caregiving (Belsky et al., 1984; Harel & Scher, 2003; Isabella et al., 1989; Lewis & Fiering, 1989; Malatesta, et al., 1986; Smith & Pederson, 1988; Vondra et al., 1995).

In addition to such associations from studies using the Strange Situation procedure, similar contemporaneous and time-lagged relations have emerged in North American research using the AQS to assess attachment security (Krupka et al., 1996; Moran et al., 1992; Pederson et al., 1990; Scholmerich et al., 1995; note that this latter study used the mother-completed AQS, which appears less valid than those completed by objective raters, see van IJzendoorn et al., 2004) and in related research conducted in Japan (Vereijken, Riksen-Walraven, & Kondo-Ikemura, 1997). All this is not to say that there have been no failures to replicate such theoretically anticipated results (e.g., Notaro & Volling, 1999; Schneider-Rosen & Rothbaum, 1993), but rather that the preponderance of evidence is more rather than less consistent with the sensitivity—or at least quality-of-care hypothesis.

It must be noted, however, that the strength of the discerned association between quality of rearing (e.g., sensitivity) and attachment security is not large. De Wolff and van IJzendoorn, drawing upon data from 66 investigations involving some 4,176 infant–mother dyads, discerned an overall effect size of 0.17 between attachment security and various measures of mothering and of mother–child interaction (e.g., sensitivity, contiguity of maternal response, physical contact, cooperation). These studies collectively produced highly heterogeneous effect sizes, suggesting substantial systematic differences between studies. When the meta-analysis was restricted to only the subset of 30 investigations that measured sensitivity ($n = 1,666$), the effect size was somewhat larger (0.22). And when the 16 studies ($n = 837$) that relied on Ainsworth’s original sensitivity rating scales were considered, the effect size was larger still (0.24)—and was no longer heterogeneous; that is, variation in effect sizes produced by these studies was no greater than would be expected by chance. Nevertheless, effect sizes across investigations that relied upon different operationalizations of mothering and mother–infant interaction were more similar than different. And, moreover, the magnitude of the discerned effects was not influenced (i.e., moderated) by the length of observations of mother–child interaction. Whether one regards the magnitude of the effect of maternal care as weak or moderate, it is indisputable that Ainsworth’s core theoretical proposition linking maternal sensitivity with attachment security has been empirically confirmed (Belsky, 1997).

Four possibilities might account for why attachment security is less well accounted for by maternal sensitivity than many expected. The first is a “technological” gap, in that the quality, intensity, or context of measurement of sensitivity (or indeed attachment) is suboptimal. The fact that several recent studies using the Maternal Behavior Q-Set have repeatedly found substantially higher associations between sensitivity and attachment than the earlier meta-analytic average lends some credence to this first argument (Behrens et al., 2011; Pederson et al., 1998; Raval et al., 2001; Tarabulsky et al., 2005; see also Atkinson et al., 2005). The evidence that associations between attachment and sensitivity are stronger when the AQS is used to measure security (average $r = .39$, see Van IJzendoorn, et al., 2004) may also point to measurement issues, although the fact that the AQS is typically used with older children than the SSP may also be relevant. Although not measuring child attachment security directly, recent findings by Lindheim and colleagues (2011) make a critical point: When observational measurements of sensitivity were conducted repeatedly—and composited—the average correlation with maternal representations of attachment (measured with the AAI) rose quite dramatically: from $r = .37$ with just one observation, to $r = .46$ with two, $r = .51$ with four, and $r = .54$ with seven combined observations. Measurement error clearly plays a major—and generally under-appreciated—role in the strength of association between observations of sensitivity and attachment-related constructs. Furthermore, it is almost certain that measurements of attachment security are noisier than the adult attachment classifications analyzed in this study (e.g., see Piquart et al., 2013), and hence the real effects of error on the sensitivity–security association may be even greater than this research

might lead us to infer.

The second possibility—a “moderator” gap—as to why quality-of-caregiving is not as predictive of attachment security as theory presumes concerns the fact that unidentified variables may affect the sensitivity–attachment link. If this were the case and such moderation were not taken into account, it would diminish the overall meta-analytic average. This gap is addressed later in this chapter, when the proposition of differential susceptibility to rearing influences is discussed. However, it is worth noting that factors other than the child’s susceptibility to rearing influences may also moderate the sensitivity-security association. For example, middle-class samples tend to reveal larger effect sizes than lower SES samples (De Wolff & Van IJzendoorn, 1997; see also Meins et al., 2012). Furthermore, Atkinson and colleagues (2005) have presented suggestive evidence that sensitivity may interact with parental attachment representations—indicating either that sensitive interactions may attenuate, if not eliminate, anticipated effects of parental insecure attachment representations on child-parent attachment organization, or that sensitivity may have differential effects on child security depending on the parent’s representations of attachment. Such possibilities highlight the need to consider the role that parental characteristics may play in the extent to which quality of rearing affects child attachment.

The third and fourth possibilities for why effects of sensitivity emerge as small-to-modest in magnitude are that the most predictive elements of parenting behavior have perhaps not been identified and fall outside the definition of sensitivity (i.e., a “domain” gap), and that other factors unrelated to parental behavior contribute to attachment security and mediate the association (a “third-variable” gap) (Belsky, 2005b). Some examples of such possibilities are considered later in this chapter, in the discussion of broader ecological influences on attachment security when personal/psychological resources of mothers are examined—particularly the constructs of “mind-mindedness” and “reflective functioning.”

In any event, two recent trends are worthy of note. First, some recent evidence suggests that sensitivity may relate more strongly to attachment security when it is restricted to an assessment of the parent’s sensitivity to the child’s distress, rather than a broader array of cues (Leerkes, 2011; McElwain & Booth-LaForce, 2006). This is a potentially critical insight, because although it certainly was the case that Ainsworth defined sensitivity rather broadly, there are good theoretical reasons for expecting that sensitivity to attachment-related—and thus distress—cues and behaviors should be most causally influential. Having said that, the relatively strong associations between attachment and mutuality/synchrony (i.e., not clearly focused on responsiveness to distress cues) found in meta-analytic work (De Wolff & van IJzendoorn, 1997) would seem to challenge an overly simplistic acceptance of the sensitivity-to-distress proposition. Either way, what is clear is that current explanatory frameworks for why some children develop secure and others insecure attachments are limited in terms of their power to predict such variation in attachment security.

A second notable trend, which in a sense directs attention in the opposite direction, is that investigators have begun to

consider domains of parenting that are quite different, and even perhaps orthogonal to, sensitivity. For example, Bernier and colleagues (2014) recently argued that maternal support for exploration and autonomy may influence attachment organization because it supports the “exploration side” of the secure-base concept. Consistent with that claim, these scholars observed that both traditionally defined sensitivity and maternal autonomy support independently predicted attachment security, as assessed using the observer-completed AQS. Further, these researchers found that collectively these two dimensions of maternal behavior fully mediated the association between parental representations of attachment and infant security. The finding, though in need of replication, should lead future investigators to expand their measurement focus when trying to capture parenting behaviors that shape the development of attachment security. In any case, it is clear that the quest to elucidate the causal antecedents of attachment is far from over (De Wolff & van IJzendoorn, 1997).

From Correlational to Experimental Evidence

The modesty of the meta-analytically derived correlation between maternal behavior and attachment security, coupled with the logical possibility that this reliably discerned association could be a product of the effect of infant characteristics—even if not apparently temperament or genotype—on maternal interactive style, provides a basis for questioning the causal role of maternal care in fostering security or insecurity. Experimental intervention studies are the most compelling source of evidence about causation. Van den Boom’s (1990) study of 100 highly irritable infants provides perhaps the clearest example. Three home visits designed to foster mothers’ “contingent, consistent, and appropriate responses to both positive and negative infant signals” were administered to 50 mothers randomly assigned to an experimental group. The home visitor/intervenor “aimed to enhance mothers’ observational skills . . . [and] assisted mothers to adjust their behaviors to their infant’s [*sic*] unique cries” (p. 208). Control group mothers were simply observed in interaction with their babies. Importantly, the two groups of mothers were equivalent in terms of maternal behavior prior to the implementation of the intervention.

Impressively, not only did post-intervention observations reveal that maternal sensitivity was greater in the experimental group, but results of Strange Situation evaluations 4 months after the termination of the intervention were strongly consistent with predictions derived from attachment theory: Whereas a full 68% (34 of 50) of the infants in the control group were classified as insecure, this was true of only 28% (14 of 50) of the experimental subjects. No doubt these findings resulted from the fact that “experimental mothers respond[ed] to the whole range of infant signals (during post-intervention home observation), whereas control mothers mainly focus[ed] on very negative infant signals” (van den Boom, 1990, p. 236). More specifically, in the insecurity-producing control group,

mildly negative infant behaviors like fussing are ignored for most of the time or are responded to ineffectively. Positively toned attachment behaviors, on the contrary, are ignored for the most part. And infant exploration is either ignored or interfered with. The program mothers' infants' negative actions boost maternal positive actions. Maternal anger is not observed. . . . Positive social infant behaviors are also responded to in a positive fashion. And program mothers are attentive to the infant's exploration, but they do not interfere in the process. (van den Boom, 1990, p. 236)

These findings chronicling a causal—not just correlational—impact of the quality of maternal care on attachment security are, in the main, in accord with those of other experimental investigations. In a key meta-analysis on the subject, Bakermans-Kranenburg and colleagues (2003) showed that interventions are effective in enhancing maternal sensitivity, and that in particular, short-term interventions (like van den Boom's) are the most effective in promoting the development of a secure attachment. Indeed, the combined effect size for 10 studies that sought to promote security by focusing specifically on sensitivity was 0.39 (Bakermans-Kranenburg et al., 2003; for additional discussion of attachment-based interventions, see Berlin, Zeanah, and Lieberman, Chapter XX, this volume).

Parental Behavior and Disorganized Attachment

A related body of work has also sought to illuminate the role, if any, of relational experience in determining whether a child develops a disorganized attachment. Early studies documenting links between child maltreatment and disorganized attachment—which a recent meta-analysis substantiates (Cyr et al., 2010)—gave birth to Main and Hesse's (1990) hypothesis that fear in the attachment relationship serves as the driving force behind disorganization. Research testing this proposition provides the clearest example of the need to move beyond sensitivity in seeking to understand the interactional determinants of attachment. This is because at least ten independent studies have found that disorganized attachment is associated with disturbances in parenting behavior that could be considered frightening to the infant (rather than insensitive) or in other ways atypical (Abrams et al., 2006; Goldberg et al., 2003; Kelly et al., 2005; Lyons-Ruth et al., 1999; Madigan et al., 2011; Madigan et al., 2006; Schuengel et al., 1999; Tomlinson et al., 2005; True et al., 2001). In fact, a 2006 meta-analytic review of the evidence (Madigan et al., 2006) revealed the overall association between anomalous parental behavior and disorganized attachment to be equivalent to a correlation of $r = .34$. Intriguingly, meta-analytic evidence also indicates that maternal sensitivity is only very weakly associated with disorganized attachment (van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999), a result which also emerges in more recent work focused on very preterm/very low birth-weight infants (Wolke, Eryigit-Madzwamuse, & Gutbrod, 2013). In fact, three studies chronicle the effects of frightening/atypical maternal behavior on disorganization even when maternal sensitivity is statistically controlled (Moran et al., 2008; Schuengel et al., 1999; Schuengel et al., 1998; True et al., 2001).

A number of studies have sought to broaden the domain of inquiry from an emphasis on frightening/frightened/dissociative (FR) behavior to disconnected and extremely insensitive parenting (Out et al., 2009), and to disturbances in parental affective communication (Lyons-Ruth et al., 1999). The latter category subsumes FR behavior but also includes less obviously frightening atypical maternal behavior, such as affective communication errors (e.g., contradictory cues), role confusion (e.g., role reversal or sexualized behavior), and withdrawal (creating physical or verbal distance from the infant; see Lyons-Ruth et al., 1999). Empirically, both of these broader sets of maternal behaviors have been found to be associated with disorganized attachment (Abrams et al., 2006; Goldberg et al., 2003; Lyons-Ruth et al., 1999 [see also Lyons-Ruth et al., 2005, on the same sample]; Madigan et al., 2006; Out et al., 2009; see Lyons-Ruth & Jacobvitz, Chapter XX, this volume, for a review of studies of affective communication errors and disorganization).

What currently cannot be discerned from this body of research is whether disrupted affective communication and disconnected or extremely insensitive parenting contribute additional predictive power over and above that accounted for by FR behavior, as little research has evaluated this possibility; nor, indeed, has there been any examination of whether there is variable discriminative power within the domains of FR behavior itself. There are hints in the literature that dissociative behavior may be particularly important (Abrams et al., 2006; Madigan et al., 2006; Schuengel et al., 1999) but this is currently based on a limited and mixed evidence base. Quite apart from whether available measures of maternal behavior have greater or lesser predictive power, a critical question that no correlational study has addressed directly is whether any of the associations detected are truly causal, though one investigation has linked *change* in atypical maternal behavior with *change* in attachment disorganization from 12 to 24 months (Forbes et al., 2007). Interestingly, Juffer, Bakermans-Kranenburg, and van IJzendoorn (2005) presented a re-analysis of data from their earlier sensitivity-based intervention study, reporting that the intervention reduced disorganized attachment. Intriguingly, despite the focus of the intervention, the intervention effect on disorganization was not mediated by changes in sensitivity. The investigators speculated that the intervention may have indirectly reduced FR behavior, perhaps by increasing parents' attention to and awareness of their child's behavior and the impact of their own behavior on the child. In any event, the positive impact of sensitivity-based interventions on disorganized attachment has been confirmed in a meta-analysis of 15 intervention studies, ones not originally designed to reduce FR behavior (Bakermans-Kranenburg et al., 2005). Notable, too, are the positive results of Bernard et al.'s (2012) and Moss and associates' (2011) intervention efforts designed to lower rates of disorganized attachment and increase those of secure attachment among maltreated children by fostering nurturing parental care. Collectively, these results indicate that disorganization is susceptible to environmental remediation, but how these changes take place is an important remaining question for clinicians and scientists alike.

Cultural Variation

Cross-cultural variation in parenting can shed further light on the nature of the interactional antecedents of attachment security (see also Mesman, van IJzendoorn, & Sagi-Schwartz, Chapter xx, this volume). One might wonder, for example, whether the association between sensitivity and attachment emerges in non-U.S. or non-European samples, where cultural norms for raising infants may be quite different. To address this issue Posada and associates (2004) conducted an intensive investigation of patterns of parenting behavior in 30 Colombian families. Data were gathered via standardized assessments of maternal sensitivity (using the Maternal Behavior *Q*-Sort [MBQS]) and open-ended ethnographic transcripts of parenting behavior. There was considerable correspondence between the domains of parenting identified through ethnographical analysis and those originally developed by Ainsworth and refined by Pederson and colleagues. Furthermore, both maternal sensitivity identified by the MBQS and the ethnographically derived parenting parallel to sensitivity correlated significantly with infant attachment security as measured with the AQS. Similar results were obtained by Zevalkink, Riksen-Walraven, and Van Lieshout (1999) with a Sudanese–Indonesian sample and by Peterson et al. (2001) in a study of Ugandan mothers and infants. Further evidence demonstrating the expected predictive associations between sensitivity and attachment is provided by Ding et al. (2012) in a sample of Chinese dyads and by Jin et al. (2012) in a sample from South Korea. Tomlinson and colleagues (2005) also detected robust associations between attachment and various indices of parenting quality (sensitivity, intrusiveness, coerciveness, remoteness) in a sample of extremely impoverished black South African mother–infant dyads. These authors were also able to show that disorganized attachment was associated with a modified measure of maternal FR behavior administered when the infants were 2 months of age. True and colleagues (2001) further found infant disorganization to be correlated with observed maternal FR behavior in a sample of Malian infants and mothers, whereas broader measures of sensitivity were only marginally correlated with security. Studies also tend to chronicle associations between sensitivity and attachment in samples of differing ethnicity within Western populations (e.g., Candelaria et al., 2011; Dexter et al., 2013). Notably, using data from the NICHD Study of Early Child Care, Bakermans-Kranenburg, van IJzendoorn, and Kroonenburg (2004) examined whether patterns of association between attachment and sensitivity were similar between European-American and African-American families. The associations proved to be highly consistent across groups, and the significantly lower mean attachment security score (measured via the observer-reported AQS) in the African-American group was fully accounted for by differences in socioeconomic status (SES).

Clearly, then, there is reasonably consistent evidence that the theoretically anticipated relation between quality of parenting and attachment security is observed across a wide range of cultural contexts, which is not to say that culture

does not matter. Consider in this regard Carlson and Harwood's (2003) evidence that Puerto Rican mothers used more physically controlling tactics in caregiving than European American mothers, and that more such behavior was associated with secure attachment in the Puerto Rican group, but with greater avoidance in European-American infants (see also Huang et al., 2012). Although the small sample and imperfect matching of the two groups limit interpretation of these findings, they do underscore the need for additional research on culture-specific associations between parenting and attachment. A recent book on the cultural anthropology of attachment provides a number of other intriguing examples of apparently marked differences in child-rearing practices, which, while generally not strongly contesting the main thrust of current attachment theory, may help to refine our understanding of the culturally variable and universal aspects of parental behavior involved in the development of secure and insecure attachment (Otto & Keller, 2014).

Nonmaternal Care

Even though attachment theory is often cast as a theory of the infant–*mother* relationship, most attachment scholars consider attachment to be involved in emotionally close child–*adult* relationships more generally. Indeed, Bowlby made it clear that in writing about the mother, he was assuming that mothers are usually the primary caregivers. If, as is now widely recognized, infants and young children can establish relationships with more than a single individual (neither Bowlby nor Ainsworth argued otherwise), a theoretically important question is whether the interactional processes highlighted as important to the development of secure relationships with mothers also operate with other adults. The few available studies of fathers and of non-parental caregivers indicate that this is indeed the case.

Infant–Father Attachment

In fact, even though the majority of investigations that have examined the relation between quality of paternal care and infant–father attachment security have individually failed to document a significant effect of fathering on attachment security (e.g., Belsky, 1983; Braungart-Reiker et al., 2001; Schneider-Rosen & Rothbaum, 1993; Volling & Belsky, 1992), a different picture emerges when the results of studies are subjected to meta-analysis. The most recent meta-analysis of 16 studies ($N = 1355$) found an average, highly significant, correlation of $r = .12$, which was homogeneous and showed little sign of publication bias (Lucassen et al., 2011). The association, though robust, is clearly smaller than that generally found for mothers, although whether methodological or substantive factors account for this difference is unclear; this is clearly a topic warranting more research in the future. One recent report calls attention to the potential utility of taking into account quantity of fathering (i.e., paternal involvement) when evaluating effects of quality of fathering (i.e., sensitivity). Brown

and associates (2012) found that the anticipated adverse effect of low sensitivity was attenuated when father involvement was high. Indeed, it was when sensitivity and involvement were both low that security vis-à-vis father was lowest.

Infant–Caregiver Attachment

Ahnert, Pinquart, and Lamb's (2006) meta-analysis of 40 investigations involving almost 3,000 children (average age = 29.6 months) reveals a great deal about the security of children's relationships with non-parental caregivers. First, attachments to nonparental providers were less likely to be secure than attachments to parents (in studies that measured both) when assessed by means of the Strange Situation, but equally secure attachments were more likely when *Q*-sort methods were used. Second, the security of children's relationships with their mothers and fathers was significantly related to the security of their attachment to their care providers. Third, secure attachment to caregivers was more likely in home-based than in center-based care, more likely for girls than for boys, and more likely when children had been with particular caregivers for longer periods. The fact that secure attachments to caregivers were more likely to be detected in older than in newer studies across the quarter century of research covered by the meta-analysis suggests that this trend may be the result of the ever-increasing emphasis on education (i.e., literacy, numeracy) in child care, at the expense of emotional development.

Most important from the standpoint of the current chapter was evidence addressing the influence of caregiver sensitivity on security of attachment to caregiver. Making a distinction between sensitivity to individual children (as always investigated in the case of parents) and sensitivity to a group of children, Ahnert and colleagues (2006) found that setting mattered: Whereas care providers' sensitivity to individual children predicted attachment security in the small groups that characterize home-based settings (and more so when the number of children being cared for was smaller), sensitivity to the group as a whole best predicted security of attachment to caregivers in larger groups (i.e., centers), though individual sensitivity was also related to security.

Evidence from an intervention study suggests, at least in the case of home-based care, that the relations detected in the meta-analysis are causal. When Galinsky et al. (1995) improved the care of home-based caregivers via a training program, security of infant–provider attachments improved. Unfortunately, no such research has been carried out in groups to document either indisputably causal relations or differential effects of individual versus group sensitivity in the development of secure attachment to care provider. These comments notwithstanding, the evidence reviewed suggests that relationship processes somewhat similar to those delineated in studies of parenting appear relevant to the development of secure relationships with others with whom a child is expected to develop a close, affectional bond. (See Howes & Spieker, Chapter xx, this volume, for additional discussion.)

Summary of the Evidence

When considered in its entirety, the evidence summarized in this section pertaining to mothering, fathering, and the care provided by some other consistent caregiver offers support for Ainsworth's (1973) extension of Bowlby's theory of attachment. Individual differences in attachment security, whether measured with the laboratory-based Strange Situation or the home-based AQS procedure, are systematically related to the quality of the care that an infant or toddler experiences with a particular caregiver; this is true of both the role of sensitivity in fostering security and of FR or atypical parental behavior in fostering disorganization. What makes the former (and some of the latter) evidence particularly convincing is that it is both correlational and experimental in nature; longitudinal as well as cross-sectional; apparently cross-culturally generalizable; and derived from studies of fathers and child care providers as well as of mothers. Finally, the evidence currently indicates that genes and temperament play a rather limited role in the development of attachment security at least in early childhood.

Differential Susceptibility

However theoretically important the data linking adult–infant interaction to attachment security may be, the fact remains that associations between rearing and attachment are only modest in magnitude. Recent evolutionary theorizing highlights one possible reason—referred to above as a “moderator” gap—for this less than strong association. Moreover, intriguing evidence is offered that temperament may be important to attachment in ways that have not heretofore been appreciated.

Elsewhere, Belsky (1997; Belsky & Pluess, 2013) notes that because the future is uncertain, it makes biological sense for children to vary, particularly within a family, in their susceptibility to rearing influence (see also Ellis et al., 2011). If all children are equally influenced by parental care, then there may be—or would have been in the environment of evolutionary adaptedness—the risk that when the future does not prove consistent with parents' (not necessarily conscious) expectations, presumed to guide (often in unconscious ways) their rearing practices, then all children within a family may be led into a literal or at least a reproductive dead end.

Perhaps one way that natural selection has reduced the likelihood of this pitfall in the course of shaping human development is by increasing the probability that parents will conceive children who vary in their tendencies to be influenced by their rearing experiences, with some being more and others less susceptible. “Fixed strategists” may develop along lines established principally by their biological makeup, whereas “plastic strategists” may navigate the ship of development according to prevailing (rearing) winds (in line with general evolutionary terminology, the term “strategist” in no way implies conscious intent on the part of a child).

If differential susceptibility to rearing represents an evolved characteristic of our species, then research efforts failing to distinguish infants/children along these lines may both over- and underestimate effects of rearing, including studies of rearing influences on attachment security. Research may overestimate rearing influences for fixed strategists and underestimate them for plastic ones. Not only does some evidence (both correlational and experimental) suggest that highly negatively emotional infants/toddlers may be especially susceptible to rearing influence, especially with regard to developmental outcomes related to self-control and socioemotional development (for a review, see Belsky, 2005c); this is also true in the case of studies of parenting and attachment. Consider first the fact that the intervention study documenting perhaps the largest indisputably causal effect of rearing on attachment was carried out on a sample preselected for being highly negatively emotional (van den Boom, 1994). Consider next the fact that when Klein-Velderman and colleagues (2006) formally tested Belsky's (1997) differential-susceptibility hypothesis by means of their experimental intervention, they found support for it: Attachment security proved most susceptible to intervention-induced changes in maternal sensitivity among infants who were highly negative. Although a second sensitivity trial failed to replicate this effect (Van Zeijl et al., 2006), a third more recent intervention trial in the United States did (Cassidy et al., 2011).

In light of these intriguing results, it is interesting to note that studies of gene-environment interaction have generally failed to find genetic variants that could explain differential susceptibility effects related to attachment, and remarkably few studies have reported on sensitivity x temperament interactions in non-experimental studies in this domain. It may be that such observational studies have generally failed to find such interactions because of constraints on the range of sensitivity (or temperament) often observed in normative samples, and because sensitivity provides only a partial picture of the key interactional determinants of attachment security. Both these limitations may severely limit statistical power. Intervention studies, by targeting at-risk groups and by experimentally changing sensitivity, may yield greater power to detect differential susceptibility effects, and may also induce changes beyond that captured by sensitivity. There is a need for more attachment-focused interventions of sufficient scale and mechanistic focus to deepen our understanding of the causal influences on attachment and the populations of infants (or parents) most amenable to effective intervention.

For further consideration of the contribution of evolutionary theory to thinking about attachment and human development see Simpson and Belsky's chapter (Chapter xx) in the present volume.

PSYCHOLOGICAL AND SOCIAL-CONTEXTUAL DETERMINANTS

Having considered the interactional determinants of attachment security, we now consider the role of more "distal" factors implicated by an ecological perspective: in particular, parental personality and related psychological attributes, excluding

parental state of mind regarding attachment, as this topic is addressed in another chapter in this volume (see Hesse, Chapter xx), and the marital/partner relationship.

Parental Psychological Resources and Personality

Because the provision of security-inducing sensitive care requires the accurate reading of, and timely and empathic responding to, a child's affective and behavioral cues, there are theoretical grounds for expecting the caregiver's psychological attributes to be related to the child's security of attachment. Moreover, much theory and evidence indicate that both mothers' and fathers' psychological health and well-being affect the quality of care that parents provide (see Belsky & Jaffee, 2006). Evidence from both normal and clinical samples underscores the importance of parental psychological makeup vis-à-vis infant attachment security.

Non-Selected Samples

Cross-sectional studies and longitudinal ones (in which personality is measured prior to attachment security) indicate that in non-selected populations, secure attachment relationships are more likely to develop when mothers are psychologically healthy. Maslin and Bates (1983) found, for example, that mothers of secure infants scored higher than mothers of insecure infants on a series of personality subscales measuring nurturance, understanding, autonomy, inquisitiveness, and dependence, and lower on a subscale assessing aggressiveness. Subsequently, Del Carmen and colleagues (1993) reported that mothers who scored higher on prenatal anxiety were more likely than their lower-scoring counterparts to have insecure 1-year-olds; and O'Connor (1997) observed that mothers of secure infants were likely to describe themselves as self-confident, independent, cheerful, adaptable, and affectionate. In the largest study to date, involving more than 1,100 infants, maternal personality was assessed when infants were 1 month of age, and it was found that mothers of infants classified as secure at 15 months of age scored higher on a composite index of psychological adjustment (agreeableness + extraversion – neuroticism – depression) than mothers of insecure infants (NICHD Early Child Care Network, 1997). Atkinson and colleagues' (2000) meta-analysis revealed, moreover, that across 13 studies maternal stress was significantly associated with attachment insecurity (mean effect size = 0.19). It is notable that findings like these are not restricted to economically advantaged families, but also emerge in research on high-risk, low-SES households (Jacobson & Frye, 1991; Sims et al., 1996), as well as in countries outside North America (Scher & Mayseless, 2000).

Not all relevant investigations, however, provide evidence of statistically significant associations between parental personality and attachment security (e.g., Belsky et al., 1995; Levitt et al., 1986; Zeanah et al., 1993). Perhaps more

noteworthy, though, is the lack of any evidence indicating that parents of secure infants are *less* psychologically healthy than other parents.

In addition to focusing upon maternal personality and psychological distress, research on attachment has considered other aspects of maternal psychological functioning in an effort to better understand what van IJzendoorn (1995) has labeled the “transmission gap”—the fact that measured sensitivity does not fully account for the link, as some anticipated it might, between a mother’s own state of mind regarding attachment and infant attachment security. Meins and colleagues (2001, p. 638) have focused on “mind-mindedness,” which they define as a mother’s readiness “to treat her infant as an individual with a mind, rather than merely as a creature with needs that must be satisfied.” Support for their hypothesis that mind-mindedness contributes to attachment security comes from work showing that mothers of secure infants are more likely than mothers of insecure infants to make appropriate mind-minded comments when interacting with their infants, an association now multiply replicated (Laranjo et al., 2008; Lundy, 2003; Meins et al., 2012; Meins et al., 2001). Meins and colleagues (2001) also found that the effect of mind-mindedness was independent of the significant contribution of maternal sensitivity to the prediction of attachment security, though it has not yet been reported that this fills the “transmission gap.” Slade et al. (2005) reported similar results upon measuring a construct seemingly related to “mind-mindedness” labeled “reflective functioning” (RF; Fonagy et al., 1991), even showing in a pilot study that it mediates some of the effect of adult attachment on infant attachment. Stacks et al. (2014) also recently found RF to be predictive of attachment security, an effect partially mediated by maternal sensitivity and negativity. Oppenheim, Koren-Karie, and Sagi (2001), examining a different but closely related construct, found that mothers’ insightfulness when discussing their child, particularly coherence, richness, and insight regarding the child’s thoughts, feelings, and motives, is associated with secure attachment. Collectively, these studies provide compelling evidence that parental personal characteristics related to the capacity to think coherently and insightfully about the child’s feelings and thoughts may be an important factor in determining the security of the child-parent attachment relationship, albeit via parenting behaviors that themselves remain in need of better identification and measurement.

Clinical Samples

Depression in its various manifestations—unipolar and bipolar—is the clinical disorder most often studied in relation to attachment security. On the basis of evidence linking both unresponsive/detached and intrusive/rejecting mothering with maternal depression (see Belsky & Jaffee, 2006, for a review), there are strong grounds for expecting children of depressed mothers to be at heightened risk of insecure attachment. Perusal of the available evidence reveals seemingly inconsistent findings, however. Whereas some research fails to find the expected significant association between maternal

depression and elevated rates of insecurity (Frankel et al., 1991; Lyons-Ruth et al., 1986; Sameroff et al., 1982; Stacks et al., 2014; Tharner et al., 2012), other investigations do document such a link (Campbell et al., 1993; D'Angelo, 1986; Das Eiden & Leonard, 1996; DeMulder & Radke-Yarrow, 1991; Gaensbauer et al., 1984; Gravener et al., 2012; Hayes et al., 2013; Hopkins et al., 2013; Lyons-Ruth, 1988; Murray et al., 1996; Radke-Yarrow, 1991; Radke-Yarrow et al., 1985; Spieker & Booth, 1988; Teti et al., 1995; Tomlinson et al., 2005).

Martins and Gaffan (2000) conducted a meta-analysis of 7 studies that compared rates of attachment insecurity in samples of mothers with a clinical diagnosis of unipolar depression versus nondepressed controls. They statistically documented significant variability across studies in the rates of infant-mother attachment insecurity associated with depression. When one study outlier was removed, significantly higher levels of insecurity emerged in depressed samples than controls—although when another outlying sample was removed, this effect was diminished to non-significance. For a homogeneous set of studies that broadly found an association with attachment, rates of infant disorganization and avoidance were significantly elevated in depressed populations, but rates of resistance were not.

In a broader meta-analysis of depression and attachment that included 15 studies of clinical and nonclinical samples, Atkinson and colleagues (2000) discerned a significant overall association between depression and attachment (effect size $r = 0.18$), with clinical samples yielding a stronger effect size than nonclinical ones (0.27 vs. 0.09). Like Martins and Gaffan (2000), Atkinson and colleagues also noted significant variability within the group of clinical samples, but they could detect no reliable predictor of effect size. Importantly, further meta-analytic work by van IJzendoorn and colleagues (1999) indicates that in non-clinical samples maternal depressive symptoms may have a rather limited association with disorganized attachment, with the overall meta-analytic correlation being $r = -.01$, compared to $r = .13$ in clinical samples.

In sum, the relation between depression and insecurity and, to a lesser extent, disorganization, emerges repeatedly, though not in every study, suggesting that it is likely to be dependent upon a variety of factors. Some work raises the prospect that in addition to whether a sample comprises clinical or nonclinical cases, parental attachment security (McMahon et al., 2006) and degree of exposure to maternal depression may matter for the infant (i.e., chronicity of depression), though this latter prospect was not substantiated in the Atkinson and colleagues (2000) meta-analysis. In any event, evidence linking depression with insecurity and/or disorganization is likely to be driven by the effect of depression on the quality of care that mothers provide, as it is presumably when sensitive behavior is disrupted or FR behavior is manifested that links would be expected to emerge. This analysis is consistent with the mediational thinking informing this entire chapter, which stipulates that even though maternal psychological well-being, as well as a mother's marital/couple relationship and social support, may directly affect attachment insecurity (through some unspecified process), most of the effect of such distal factors will likely flow through their impact on the quality of care the mother actually provides.

Perhaps the best evidence of such a mediational process involving maternal psychological well-being comes from a recent report addressing parental depressive symptoms in relation to attachment security measured with the AQS in a large ($N = 796$) sample of 4-year-olds. It revealed multiple mediating pathways—and most notably ones involving observed insensitivity of interactions and self-reported hostile-coercive parenting (Hopkins et al., 2013; see also Benn, 1986).

The Marital/Couple Relationship

An abundance of evidence indicates that a supportive relationship with a spouse or partner during the infancy and toddler years is correlated with the very kinds of parenting theorized (and found) to predict attachment security (e.g., Tarabulsy et al., 2005; Tomlinson et al., 2005; for narrative reviews, see Belsky & Jaffee, 2006, and Grych, 2002; for a meta-analytic review, see Krishnakumar & Buehler, 2000). Given data linking relationship quality with many of the aspects of parenting found to be predictive of attachment security (De Wolff & van IJzendoorn, 1997), there are strong grounds to expect a relation between marital/couple functioning and infant–parent attachment security. The fact that a mediational perspective leads to such a prediction does not preclude the possibility that relationship quality may affect attachment security directly, rather than exclusively via parenting-mediated processes. Not only does Davies and Cummings's (1994) emotional security hypothesis lead to such a prediction, but Owen and Cox's (1997) failure to find evidence of a parent-mediated linkage is consistent with it. Especially in the case of overt conflict, it is not difficult to imagine how exposure to such aversive interactions between mother and father could foster insecurity directly.

Available evidence is consistent with both mediational and direct-effect theorizing. That is, children growing up with parents who have better-functioning couple relationships are more likely to develop secure attachments than those growing up in households where parents are less happy in their relationships. Such results emerge from cross-sectional studies carried out in the United States (Crnic et al., 1986; Goldberg & Easterbrooks, 1984; Howes & Markman, 1989; Jacobson & Frye, 1991; Lindsey et al., 2009) and in Japan (Durrett et al., 1984). Moreover, in work on poor African American mothers and infants, Sims and colleagues (1996) found that when fathers were physically violent with mothers, infants were more likely to be insecurely attached to their mothers.

More important than these results from cross-sectional research are those from several longitudinal studies. In one such investigation, Howes and Markman (1989) found that wives who prenatally reported higher levels of marital satisfaction and lower levels of spousal conflict had children who scored higher on the AQS 1–3 years later. Tracking similar middle-class families across a somewhat shorter time period, Lewis, Owen, and Cox (1988) reported that 1-year-old daughters (but not sons) were more likely to be securely attached to their mothers when marriages were more harmonious during pregnancy. Subsequently, Teti and colleagues (1995) showed that greater marital harmony before a

second child was born predicted greater security (via the observer-rated AQS) on the part of the firstborn both in the last trimester of the mother's pregnancy and up to 2 months following the birth of the younger sibling. In related work, Owen and Cox (1997) found that more marital conflict (observed prenatally and at 3 months postpartum) predicted less secure infant–father attachments and greater disorganization in infant–mother relationships (assessed at 12 months), even after each parent's psychological maturity was controlled for. Such findings seem consistent with those reported by Belsky and Isabella (1988) indicating that relationship quality declines more precipitously across the transition to parenthood in the case of infants subsequently classified as insecurely attached to their mothers. Also noteworthy is Spieker's (1988; Spieker & Booth, 1988) research on high-risk mother–infant dyads showing that the lowest levels of spousal support measured prenatally and at 3 months postpartum characterize the marriages in families in which infants develop disorganized attachments. Especially important given mediational thinking linking distal factors with attachment security is evidence that insecure attachment and reciprocity of parent-child interactions may mediate the association between early marital distress and the child's later peer relationships (Lindsey et al., 2009).

Despite the seeming persuasiveness of the cross-sectional and longitudinal data, it would be a mistake to cite only the aforementioned research and leave the impression that all studies of marital/couple relationships and attachment present such positive and statistically significant results. Not only have a number of investigations failed to find a significant association between some index of relationship quality and infant–parent attachment security (Belsky, 1996; Belsky et al., 1995; Das Eiden & Leonard, 1996; Harrison & Ungerer, 2002; Levitt et al., 1986; Teti et al., 1991; Wong et al., 2009; Zeanah et al., 1993); one study of an unusual sample—Japanese mothers living in the United States due to their husbands' employment—actually produced results showing higher levels of marital quality to be associated with less AQS-rated security (Nakasawa et al., 1992).

A number of studies draw attention to the potential importance of indirect effects mediating between parental relationship quality and child attachment, which may help account for the fact that not all studies consistently show the predicted association. In one illuminating piece of work, Isabella (1994) found that even though no direct relation between marital quality (measured prenatally) and attachment security (at one year) could be discerned, an indirect pathway of influence did appear to exist, mediated by maternal role satisfaction. Whereas the work of Isabella (1994) underscores an indirect (and not typically studied) process by which relationship quality might affect the infant–mother attachment bond, work by Das Eiden, Teti, and Corns (1993) draws attention to the need to study relationship quality in context, and to consider moderators as well as mediators. Although Das Eiden and colleagues found that higher levels of marital quality were related to higher levels of security as measured via the AQS, further analyses revealed that this relation was restricted to families in which mothers were classified as insecure on the Adult Attachment Interview. Also illustrating interactive

mechanisms, Finger et al. (2009) studied a group of poor urban African-American mothers, fathers and their infants. The mothers of disorganized infants reported less father support, and more mother-father conflict, and showed less sensitive and more problematic (i.e., harsh, or passively withdrawn) parenting. Notably, disorganized attachment was particularly prevalent among non-co-residing families that experienced high levels of conflict. These effects were not robustly mediated by parenting, although insensitive and problematic parenting was correlated with mother-father conflict. A recent large-scale study of 4-year olds using the observer-completed AQS revealed multiple pathways mediating marital conflict and attachment security, particularly via maternal depression and self-reported hostile/coercive parenting behavior (Hopkins et al., 2013). Similarly, a study by Dickstein and colleagues (2009) found that couple relationship quality indirectly influenced attachment via the pattern of family interactions and overall family functioning (see also Holland & McElwain, 2013, for similar findings regarding co-parenting as a mediator of the marital quality-attachment association). What all these data indicate, in conclusion, is that for a full understanding of the relationship's impact on the development of secure or insecure attachment bonds, additional information about family context and family processes is useful.

One final empirical observation about inter-parental relations and attachment security merits attention—the potential effects of custody and visitation on attachment in separated families (Lamb & Kelly, 2001). Simply put, how does overnight visitation—typically with non-custodial fathers—affect early attachment, especially with mother. One longitudinal study of high-risk families has addressed this issue empirically, finding that “frequent overnights were significantly associated with attachment insecurity among infants” (Tornello et al., 2013, p. 871). Further work is clearly needed to verify these findings.

INTEGRATION AND CONCLUSIONS

Evidence considered in the first part of this chapter documented the role played by the quality of maternal and non-maternal care in fostering secure and insecure attachments to mothers and fathers/other caregivers, respectively, as well as the apparent influence of FR and atypical maternal behavior on attachment disorganization in both Western and non-Western cultural contexts. Importantly, the evidence pertaining to infant–mother attachment security is experimental—and thereby causal—as well as correlational in nature. Also considered was the possibility that effect sizes may be modest because children may vary in their susceptibility to rearing influence, with high levels of negative emotionality perhaps demarcating infants maximally susceptible to such influence. Since the last edition of this chapter, two key trends have emerged in the literature: first, questions regarding the possibility that specific genes may be implicated in the development of attachment – alone or in interaction with the caregiving environment – have not been borne out by the

weight of more, and larger, studies. Recent work continues to attest to the importance of the environment in the development of attachment, as Ainsworth would have predicted. Second, researchers have highlighted the potential importance of shifting the focus of inquiry regarding the interactional determinants of attachment beyond sensitivity, broadening out in some cases (e.g., Bernier et al., 2014), and narrowing down in others (e.g., Leerkes, 2011). Our view of the state of play of the field is that measurement issues (domains of parental behavior, contexts of observation, age-to-age changes in influential parental behaviors, and measurement unreliability) will be critically important if we are to move towards a more comprehensive understanding of the interactional determinants of attachment. Crucially, sophisticated models explaining precisely how parental behavior influences the organization of attachment are largely lacking, and have not moved much in recent years, beyond the rather general internal working models concept. These are critical challenges for the coming decades of attachment research.

In the second half of this chapter, the focus was on determinants of attachment suggested by an ecological perspective. Central to the discussion of psychological and contextual factors is the assumption that so-called “distal” influences—be they less distant, like personality, or more distant, like the marital relationship—exert most of their effects by influencing more proximal processes of parent–child interaction. Although ample evidence provides grounds for concluding that all of the factors we have considered play a role in shaping the development of a secure or insecure attachment bond, inconsistency in the evidence has been repeatedly and purposefully highlighted. Up to this point, however, these factors have themselves not been placed “in context.” By organizing the second part of the chapter around various factors, even while emphasizing mediational processes of influence, we have run the risk of leaving the impression that these sources of influence on the parent–child relationship, and thus on the child’s attachment to his or her parent, operate in isolation. Nothing could be further from the truth.

Theory and research draw attention to the need to consider stresses and supports (Belsky, 1984; Belsky & Isabella, 1988; Belsky & Jaffee, 2006)—or, in the terms of developmental psychopathology, risk and protective factors (Cicchetti, 1983; Sroufe & Rutter, 1984)—simultaneously. Central to both of these theoretical orientations are the postulates (1) that risks can be balanced by strengths; and (2) that risks of problematical developmental outcomes, including attachment insecurity, are more likely to be realized as risk factors accumulate and are not balanced by supports or compensatory factors. Consider in this regard, Belsky and Isabella’s (1988) findings that the more indications there were that a family and a specific infant–parent relationship were “at risk”—due to lower levels of parental psychological adjustment, poorer marital/couple relationship quality, more negative and less positive infant temperament, less social support, more work–family stress, and lower SES—the more likely infant–mother and infant–father relationships were to be insecure (Belsky, 1996; Belsky et al., 1995; see also Scher & Mayseless, 2000). Thus not only do processes of mediation need to be central

to our understanding of the origins of individual differences in attachment (distal factors > parent–child interaction > attachment security), but so too do moderational ones, because the impact of one source of influence is highly likely to be contingent on another. As Bronfenbrenner (1979, p. 38) so astutely noted in regard to the ecology of human development, and thus with respect to the etiology of secure and insecure infant–parent attachment bonds, “the principal main effects are likely to be interactions.”

REFERENCES

- Abrams, K. Y., Rifkin, A., & Hesse, E. (2006). Examining the role of parental frightened/frightening subtypes in predicting disorganized attachment within a brief observational procedure. *Development and Psychopathology, 18*, 345–361.
- Ahnert, L., Pinquart, M., & Lamb, M. E. (2006). Security of children’s relationships with nonparental care providers: A meta-analysis. *Child Development, 74*, 664–679.
- Ainsworth, M. D. S. (1973). The development of infant–mother attachment. In B. M. Caldwell & H. N. Ricciuti (Eds.), *Review of child development research* (Vol. 3, pp. 1–94). Chicago: University of Chicago Press.
- Andersen, P., & Telleen, S. (1992). The relationship between social support and maternal behavior and attitudes: A meta-analytic review. *American Journal of Community Psychology, 20*, 753–774.
- Atkinson, L., Goldberg, S., Raval, V., Pederson, D., Benoit, D., Moran, G., et al. (2005). On the relation between maternal state of mind and sensitivity in the prediction of infant attachment security. *Developmental Psychology, 41*, 42–53.
- Atkinson, L., Paglia, A., Coolbear, J., Niccols, A., Parker, K. C. H., & Guger, S. (2000). Attachment security: A meta-analysis of maternal mental health correlates. *Clinical Psychology Review, 20*, 1019–1040.
- Auerbach, J., Geller, V., Lezer, S., Shinwell, E., Belmaker, R. H., Levine, J., et al. (1999). Dopamine D4 receptor (D4DR) and serotonin transporter promoter (5-HTTLPR) polymorphisms in the determination of temperament in 2-month-old infants. *Molecular Psychiatry, 4*, 369–373.
- Bakermans-Kranenburg, M. J., van IJzendoorn, M. H., Bokhorst, C. L., & Schuengel, C. (2004). The importance of shared environment in infant–father attachment: A behavioral genetic study of the Attachment Q-Sort. *Journal of Family Psychology, 18*, 545–549.
- Bakermans-Kranenburg, M. J., van IJzendoorn, M. H., & Juffer, F. (2003). Less is more: Meta-analysis of sensitivity and attachment interventions in early childhood. *Psychological Bulletin, 129*, 195–215.
- Bakermans-Kranenburg, M. J., van IJzendoorn, M. H., & Juffer, F. (2005). Disorganized infant attachment and preventive interventions: A review and meta-analysis. *Infant Mental Health Journal, 26*, 191–216.
- Bakermans-Kranenburg, M. J., van IJzendoorn, M. H., & Kroonenberg, P. M. (2004). Differences in attachment security between African-American and white children: Ethnicity or socio-economic status? *Infant Behavior and Development, 27*, 417–433.
- Bakermans-Kranenburg, M., & Van IJzendoorn, M. (2012). Integrating temperament and attachment: the differential susceptibility paradigm. In M. Zenter & R. L. Shiner (Eds.), *Handbook of Temperament* (pp. 403–424). New York: The Guilford Press.

- Bakermans-Kranenburg, M. J., & van IJzendoorn, M. H. (2007). Research review: Genetic vulnerability or differential susceptibility in child development: The case of attachment. *Journal of Child Psychology and Psychiatry*, 48(12), 1160-1173.
- Barry, R. A., Kochanska, G., & Philibert, R. A. (2008). GxE interaction in the organization of attachment: Mothers' responsiveness as a moderator of children's genotypes. *Journal of Child Psychology and Psychiatry*, 49(12), 1313-1320.
- Bates, J. E., Maslin, C. A., & Frankel, K. A. (1985). Attachment security, mother-child interaction, and temperament as predictors of behavior-problem ratings at age three years. In I. Bretherton & E. Waters (Eds.), *Growing points of attachment theory and research. Monographs of the Society for Research in Child Development*, 50(1-2, Serial No. 209), 167-193.
- Behrens, K. Y., Parker, A. C., & Haltigan, J. D. (2011). Maternal sensitivity assessed during the Strange Situation Procedure predicts child's attachment quality and reunion behaviors. *Infant Behavior & Development*, 34(2), 378-381.
- Belsky, J. (1983). *Father-infant interaction and security of attachment: No relationship*. Unpublished manuscript, Pennsylvania State University.
- Belsky, J. (1984). The determinants of parenting: A process model. *Child Development*, 55, 83-96.
- Belsky, J. (1996). Parent, infant, and social-contextual determinants of attachment security. *Developmental Psychology*, 32, 905-914.
- Belsky, J. (1997). Theory testing, effect-size evaluation, and differential susceptibility to rearing influence: The case of mothering and attachment. *Child Development*, 64, 598-600.
- Belsky, J. (2005a). Attachment theory and research in ecological perspective. In K. E. Grossmann, K. Grossmann, & E. Waters (Eds.), *Attachment from infancy to adulthood: The major longitudinal studies* (pp. 71-97). New York: Guilford Press.
- Belsky, J. (2005b). The developmental and evolutionary psychology of intergenerational transmission of attachment. In C. S. Carter, L. Ahnert, K. Grossmann, S. Hrdy, M. Lamb, S. Porges, et al. (Eds.), *Attachment and bonding: A new synthesis* (pp. 169-198). Cambridge, MA: MIT Press.
- Belsky, J. (2005c). Differential susceptibility to rearing influence: An evolutionary hypothesis and some evidence. In B. Ellis & D. Bjorklund (Eds.), *Origins of the social mind: Evolutionary psychology and child development* (pp. 139-163). New York: Guilford Press.
- Belsky, J., & Pluess, M. (2013). Beyond Risk, Resilience and Dysregulation: Phenotypic Plasticity and Human Development. *Development and Psychopathology*, 25, 1243-1261.
- Belsky, J., & Fearon, R. M. P. (2008). Precursors of attachment security *Handbook of attachment: Theory, research, and clinical applications* (2nd ed., pp. 295-316). New York, NY: Guilford Press; US.
- Belsky, J., & Isabella, R. (1988). Maternal, infant, and social-contextual determinants of attachment security. In J. Belsky & T. Nezworski (Eds.), *Clinical implications of attachment* (pp. 41-94). Hillsdale, NJ: Erlbaum.
- Belsky, J., & Jaffee, S. (2006). The multiple determinants of parenting. In D. Cicchetti & D. Cohen (Eds.), *Developmental psychopathology: Vol. 3. Risk, disorder, and adaptation* (2nd ed., pp. 38-85). Hoboken, NJ: Wiley.
- Belsky, J., Rosenberger, K., & Crnic, K. (1995). Maternal personality, marital quality, social support and infant temperament: Their significance for infant-mother attachment in human families. In C. Pryce, R. Martin, & D. Skuse (Eds.), *Motherhood in human and*

- nonhuman primates* (pp. 115–124). Basel, Switzerland: Karger.
- Belsky, J., & Rovine, M. (1987). Temperament and attachment security in the Strange Situation: An empirical rapprochement. *Child Development, 58*, 787–795.
- Belsky, J., Rovine, M., & Taylor, D. G. (1984). The Pennsylvania Infant and Family Development Project: III. The origins of individual differences in infant–mother attachment: Maternal and infant contributions. *Child Development, 55*, 718–728.
- Bernard, K., Dozier, M., Bick, J., Lewis-Morrarty, E., Lindhiem, O., & Carlson, E. (2012). Enhancing Attachment Organization Among Maltreated Children: Results of a Randomized Clinical Trial. *Child Development, 83*(2), 623–636.
- Bernier, A., Matte-Gagne, C., Belanger, M. E., & Whipple, N. (2014). Taking stock of two decades of attachment transmission gap: broadening the assessment of maternal behavior. *Child Development, 85*(5), 1852–1865.
- Bokhorst, C. L., Bakermans-Kranenburg, M. J., Fearon, R. M. P., van IJzendoorn, M. H., Fonagy, P., & Schuengel, C. (2003). The importance of shared environment in mother–infant attachment security: A behavioral genetic study. *Child Development, 74*, 1769–1782.
- Bowlby, J. (1944). Forty-four juvenile thieves: Their characters and home life. *International Journal of Psycho-Analysis, 25*, 19–52.
- Bowlby, J. (1969/1982). *Attachment and loss: Vol. 1. Attachment*. New York: Basic Books.
- Braungart-Rieker, J. M., Garwood, M. M., Powers, B. P., & Wang, X. (2001). Parental sensitivity, infant affect, and affect regulation: Predictors of later attachment. *Child Development, 72*, 252–270.
- Bronfenbrenner, U. (1979). *The ecology of human development*. Cambridge, MA: Harvard University Press.
- Brown, G.L., Mangelsdorf, S.C., & Neff, C. (2012). Father involvement, paternal sensitivity and father-child attachment security in the first 3 years. *Journal of Family Psychology, 26*, 421–430.
- Burchinal, M., Follmer, A., & Bryand, D. (1996). The relations of maternal social support and family structure with maternal responsiveness and child outcomes among African American families. *Developmental Psychology, 6*, 1073–1083
- Campbell, S. B., Cohn, J. F., Meyers, T. A., Ross, S., & Flanagan, C. (1993, April). Chronicity of maternal depression and mother–infant interaction. In D. Teti (Chair), *Depressed mothers and their children: Individual differences in mother–child outcome*. Symposium conducted at the biennial meeting of the Society for Research in Child Development, New Orleans, LA.
- Candelaria, M., Teti, D. M., & Black, M. M. (2011). Multi-risk infants: predicting attachment security from sociodemographic, psychosocial, and health risk among African-American preterm infants. *Journal of Child Psychology and Psychiatry, 52*(8), 870–877.
- Carlson, V. J., & Harwood, R. L. (2003). Attachment, culture, and the caregiving system: The cultural patterning of everyday experiences among Anglo and Puerto Rican mother–infant pairs. *Infant Mental Health Journal, 24*, 53–73.
- Chess, S., & Thomas, A. (1982). Infant bonding: Mystique and reality. *American Journal of Orthopsychiatry, 5*, 213–222.
- Cicchetti, D. (1983). The emergence of developmental psychopathology. *Child Development, 55*, 1–7.
- Cochran, M., & Brassard, J. (1979). Child development and personal social networks. *Child Development, 50*, 601–616.
- Cochran, M., & Niego, S. (2002). Parenting and social networks. In M. Bornstein (Ed.), *Handbook of parenting: Vol. 4. Social conditions and applied parenting* (2nd ed., pp. 123–148). Mahwah, NJ: Erlbaum.

- Crittenden, P. M. (1985). Social networks, quality of child rearing, and child development. *Child Development, 56*, 1299–1313.
- Crnic, K. A., Greenberg, M. T., & Slough, N. M. (1986). Early stress and social support influences on mothers' and high-risk infants' functioning in late infancy. *Infant Mental Health Journal, 7*, 19–33.
- Crockenberg, S. B. (1981). Infant irritability, mother responsiveness, and social support influences on the security of infant–mother attachment. *Child Development, 52*, 857–869.
- Cyr, C., Euser, E. M., Bakermans-Kranenburg, M. J., & van IJzendoorn, M. H. (2010). Attachment security and disorganization in maltreating and high-risk families: A series of meta-analyses. *Development and Psychopathology, 22*(1), 87–108.
- D'Angelo, E. J. (1986). Security of attachment in infants with schizophrenic, depressed, and unaffected mothers. *Journal of Genetic Psychology, 147*, 421–422.
- Das Eiden, R., & Leonard, K. (1996). Paternal alcohol use and the mother–infant relationship. *Development and Psychopathology, 8*, 307–323.
- Das Eiden, R., Teti, D., & Corns, K. (1993, April). *Maternal working models of attachment, marital adjustment, and the parent–child relationship*. Paper presented at the biennial meeting of the Society for Research in Child Development, New Orleans, LA.
- Davies, P., & Cummings, E. M. (1994). Marital conflict and child adjustment: An emotional security hypothesis. *Psychological Bulletin, 116*, 387–411.
- Del Carmen, R., Pedersen, F., Huffman, L., & Bryan, Y. (1993). Dyadic distress management predicts security of attachment. *Infant Behavior and Development, 16*, 131–147.
- DeMulder, E. K., & Radke-Yarrow, M. (1991). Attachment with affectively ill and well mothers: Current behavioral correlates. *Developmental Psychopathology, 3*, 227–242.
- De Wolff, M., & van IJzendoorn, M. (1997). Sensitivity and attachment: A meta-analysis on parental antecedents of infant attachment. *Child Development, 68*, 571–591.
- Dexter, C. A., Wong, K., Stacks, A. M., Beeghly, M., & Barnett, D. (2013). Parenting and attachment among low-income African American and Caucasian preschoolers. *Journal of Family Psychology, 27*(4), 629–638.
- Dickstein, S. Seifer, R. & Albus, K.E. (2009). Maternal adult attachment representations across relationship domains and infant outcomes: the importance of family and couple functioning. *Attachment & Human Development, 11*(1), 5–27.
- Ding, Y. H., Xiu, X., Wang, Z. Y., Li, H. R., & Wang, W. P. (2012). Study of mother-infant attachment patterns and influence factors in Shanghai. *Early Human Development, 88*(5), 295–300.
- Dozier, M., Stovall, K. C., Albus, K., & Bates, B. (2001). Attachment for infants in foster care: The role of caregiver state of mind. *Child Development, 72*, 1467–1477.
- Durrett, M. E., Otaki, M., & Richards, P. (1984). Attachment and the mother's perception of support from the father. *International Journal Behavior Development, 7*, 167–176.
- Egeland, B., & Farber, E. A. (1984). Infant–mother attachment: Factors related to its development and changes over time. *Child Development, 55*, 753–771.

- Ellis, B.J., Boyce, W.T., Belsky, J., Bakermans-Kranenburg, M.J., & van IJzendoorn, M.H. (2011). Differential Susceptibility to the Environment: A Neurodevelopmental Theory. *Development & Psychopathology*, *23*, 7-28.
- Fearon, P., Shmueli-Goetz, Y., Viding, E., Fonagy, P., & Plomin, R. (2014). Genetic and environmental influences on adolescent attachment. *Journal of Child Psychology and Psychiatry*, *55*(9), 1033-1041.
- Feiring, C., Fox, N. A., Jaskir, J., & Lewis, M. (1987). The relation between social support, infant risk status, and mother–infant interaction. *Developmental Psychology*, *23*, 400–405.
- Finger, B., Hans, S. L., Bernstein, V. J., & Cox, S. M. (2009). Parent relationship quality and infant–mother attachment. *Attachment & Human Development*, *11*(3), 285-306.
- Finkel, D., & Matheny, A. P., Jr. (2000). Genetic and environmental influences on a measure of infant attachment security. *Twin Research*, *3*(4), 242-250.
- Fish, M., & Stifter, C. (1995). Patterns of mother–infant interaction and attachment. *Infant Behavior and Development*, *18*, 435–446.
- Fonagy, P., Steele, M., Moran, G., Steele, H., & Higgitt, A. (1991). The capacity for understanding mental states: The reflective self in parent and child and its significance for security of attachment. *Infant Mental Health Journal*, *13*, 200–216.
- Fonagy, P., Steele, H., & Steele, M. (1996). Associations among attachment classifications of mothers, fathers, and their infants: Evidence for a relationship-specific perspective. *Child Development*, *67*, 541-555.
- Forbes, L. M., Evans, E. M., Moran, G., & Pederson, D. R. (2007). Change in atypical maternal behavior predicts change in attachment disorganization from 12 to 24 months in a high-risk sample. *Child Development*, *78*, 955–971.
- Frankel, K., Maslin-Cole, C., & Harmon, R. (1991, April). *Depressed mothers of preschoolers*. Paper presented at the biennial meeting of the Society for Research in Child Development, Seattle, WA.
- Frigerio, A., Ceppi, E., Rusconi, M., Giorda, R., Raggi, M. E., & Fearon, P. (2009). The role played by the interaction between genetic factors and attachment in the stress response in infancy. *Journal of Child Psychology and Psychiatry*, *50*(12), 1513-1522.
- Gaensbauer, T. J., Harmon, R. J., Cytryn, L., & McKnew, D. H. (1984). Social and affective development in infants with a manic–depressive parent. *American Journal of Psychiatry*, *141*, 223–229.
- Galinsky, E., Howes, C., & Kontos, S. (1995). *The family child care training study*. New York: Families and Work Institute.
- Gervai, G., Némóda, Z., Lakatos, K., Ronai, Z., Toth, I., Ney, K., et al. (2005). Transmission disequilibrium tests confirm the link between DRD4 gene polymorphism and infant attachment. *American Journal of Medical Genetics, Part B (Neuropsychiatric Genetics)*, *132B*, 126–130.
- Gervai, J., Novak, A., Lakatos, K., Toth, I., Danis, I., Zsolt, R., et al. (2007). Infant genotype may moderate sensitivity to maternal affective communications: Attachment disorganization, quality of care, and the DRD4 polymorphism. *Social Neuroscience*, *2*, 307–319.
- Goldberg, S., Benoit, D., Blokland, K., & Madigan, S. (2003). Atypical maternal behavior, maternal representations, and infant disorganized attachment. *Development and Psychopathology*, *15*, 239–257.
- Goldberg, W. A., & Easterbrooks, M. A. (1984). The role of marital quality in toddler development. *Developmental Psychology*, *20*,

504–514.

- Goldstein, L., Diener, M., & Mangelsdorf, S. (1996). Maternal characteristics and social support across the transition to motherhood: Associations with maternal behavior. *Journal of Family Psychology, 10*, 60–71.
- Gravener, J. A., Rogosch, F. A., Oshri, A., Narayan, A. J., Cicchetti, D., & Toth, S. L. (2012). The relations among maternal depressive disorder, maternal expressed emotion, and toddler behavior problems and attachment. *Journal of Abnormal Child Psychology, 40*(5), 803-813.
- Grossmann, K., Grossmann, K. E., Spangler, G., Suess, G., & Unzner, L. (1985). Maternal sensitivity and newborns' orientation responses as related to quality of attachment in northern Germany. In I. Bretherton & E. Waters (Eds.), *Growing points of attachment theory and research. Monographs of the Society for Research in Child Development, 50*(1–2, Serial No. 209), 233–257.
- Grych, J. (2002). Marital relationships and parenting. In M. Bornstein (Ed.), *Handbook of parenting: Vol. 4. Social conditions and applied parenting* (2nd ed., pp. 203–225). Mahwah, NJ: Erlbaum.
- Harel, J., & Scher, A. (2003). Insufficient responsiveness in ambivalent mother-infant relationships: Contextual and affective aspects. *Infant Behavior & Development, 26*(3), 371-383.
- Harrison, L. J., & Ungerer, J. A. (2002). Maternal employment and infant–mother attachment security at 12 months postpartum. *Developmental Psychology, 38*, 758–773.
- Hayes, L. J., Goodman, S. H., & Carlson, E. (2013). Maternal antenatal depression and infant disorganized attachment at 12 months. *Attachment & Human Development, 15*(2), 133-153.
- Holland, A. S., & McElwain, N. L. (2013). Maternal and paternal perceptions of coparenting as a link between marital quality and the parent-toddler relationship. *Journal of Family Psychology, 27*(1), 117-126.
- Hopkins, J., Gouze, K. R., & Lavigne, J. V. (2013). Direct and indirect effects of contextual factors, caregiver depression, and parenting on attachment security in preschoolers. *Attachment & Human Development, 15*(2), 155-173.
- Huang, Z. J., Lewin, A., Mitchell, S. J., & Zhang, J. (2012). Variations in the relationship between maternal depression, maternal sensitivity, and child attachment by race/ethnicity and nativity: findings from a nationally representative cohort study. *Maternal and Child Health Journal, 16*(1), 40-50.
- Howes, C., & Markman, H. J. (1989). Marital quality and child functioning: A longitudinal investigation. *Child Development, 60*, 1044–1051.
- Isabella, R., & Belsky, J. (1991). Interactional synchrony and the origins of infant–mother attachment: A replication study. *Child Development, 62*, 373–384.
- Isabella, R., Belsky, J., & von Eye, A. (1989). Origins of infant–mother attachment: An examination of interactional synchrony during the infant's first year. *Developmental Psychology, 25*, 12–21.
- Isabella, R. A. (1993). Origins of attachment: Maternal interactive behavior across the first year. *Child Development, 64*, 605–621.
- Isabella, R. A. (1994). Origins of maternal role satisfaction and its influences upon maternal interactive behavior and infant–mother attachment. *Infant Behavior and Development, 17*, 381–388.

- Jacobson, S. W., & Frye, K. F. (1991). Effect of maternal social support on attachment: Experimental evidence. *Child Development, 62*, 572–582.
- Jin, M. K., Jacobvitz, D., Hazen, N., & Jung, S. H. (2012). Maternal sensitivity and infant attachment security in Korea: Cross-cultural validation of the Strange Situation. *Attachment & Human Development, 14*(1), 33-44.
- Juffer, F., Bakermans-Kranenburg, M. J., & van IJzendoorn, M. H. (2005). The importance of parenting in the development of disorganized attachment: Evidence from a preventive intervention study in adoptive families. *Journal of Child Psychology and Psychiatry, 46*, 263–274.
- Kagan, J. (1982). *Psychological research on the human infant: An evaluative summary*. New York: W. T. Grant Foundation.
- Kendler, K. S. (2013). What psychiatric genetics has taught us about the nature of psychiatric illness and what is left to learn. *Molecular Psychiatry, 18*(10), 1058-1066.
- Klein Velderman, M. K., Bakermans-Kranenburg, M. J., Juffer, F., & van IJzendoorn, M. H. (2006). Effects of attachment-based interventions on maternal sensitivity and infant attachment: Differential susceptibility of highly reactive infants. *Journal of Family Psychology, 20*, 266–274.
- Kochanska, G. (1998). Mother–child relationship, child fearfulness, and emerging attachment: A short-term longitudinal study. *Developmental Psychology, 34*, 480–490.
- Kochanska, G., Aksan, N., & Carlson, J. J. (2005). Temperament, relationships, and young children’s receptive cooperation with their parents. *Developmental Psychology, 41*, 648–660.
- Kochanska, G., & Coy, K. C. (2002). Child emotionality and maternal responsiveness as predictors of reunion behaviors in the Strange Situation: Links mediated and unmediated by separation distress. *Child Development, 73*, 228–240.
- Krishnakumar, A., & Buehler, C. (2000). Interparental conflict and parenting behaviors: A meta-analytic review. *Family Relations, 49*, 25–44.
- Krupka, A., Moran, G., & Pederson, D. (1996, April). *The quality of mother–infant interactions in families at risk for maladaptive behavior: A window on the process of attachment*. Paper presented at the International Conference on Infant Studies, Providence, RI.
- Lamb, M.E., & Kelly, J.B., (2001). Using the empirical literature to guide the development of parenting plans for young children. *Family Court Review, 39*, 365-371.
- Lakatos, K., Nemoda, Z., Toth, I., Ronai, Z., Ney, K., Sasvari-Szekely, M., et al. (2002). Further evidence for the role of the dopamine D4 receptor (DRD4) gene in attachment disorganization: Interaction of the exon III 48-BP repeat and the -521 C/T promoter polymorphisms. *Molecular Psychiatry, 7*, 27–31.
- Lakatos, K., Toth, I., Nemoda, Z., Ney, K., Sasvari-Szekely, M., & Gervai, J. (2000). Dopamine D4 receptor (DRD4) gene polymorphism is associated with attachment disorganization in infants. *Molecular Psychiatry, 5*, 633–637.
- Laranjo, J., Bernier, A., & Meins, E. (2008). Associations between maternal mind-mindedness and infant attachment security: Investigating the mediating role of maternal sensitivity. *Infant Behavior & Development, 31*(4), 688-695.
- Leerkes, E. M. (2011). Maternal sensitivity during distressing tasks: A unique predictor of attachment security. *Infant Behavior &*

- Development*, 34(3), 443-446.
- Levitt, M., Weber, R., & Clark, M. (1986). Social network relationships as sources of maternal support and well-being. *Developmental Psychology*, 22, 310–316.
- Lewis, M., & Feiring, C. (1989). Infant, mother, and mother–infant interaction behavior and subsequent attachment. *Child Development*, 60, 831–837.
- Lewis, M., Owen, M. T., & Cox, M. J. (1988). The transition to parenthood: III. Incorporation of the child into the family. *Family Process*, 27, 411–421.
- Lindhiem, O., Bernard, K., & Dozier, M. (2011). Maternal sensitivity: Within-person variability and the utility of multiple assessments. *Child Maltreatment*, 16(1), 41-50.
- Lindsey, E. W., Caldera, Y. M., & Tankersley, L. (2009). Marital Conflict and the Quality of Young Children's Peer Play Behavior: The Mediating and Moderating Role of Parent-Child Emotional Reciprocity and Attachment Security. *Journal of Family Psychology*, 23(2), 130-145.
- Lucassen, N., Tharner, A., van IJzendoorn, M. H., Bakermans-Kranenburg, M. J., Volling, B. L., Verhulst, F. C., et al. (2011). The association between paternal sensitivity and infant-father attachment security: A meta-analysis of three decades of research. *Journal of Family Psychology*, 25(6), 986-992.
- Luijk, M. P., Roisman, G. I., Haltigan, J. D., Tiemeier, H., Booth-LaForce, C., van IJzendoorn, M. H., et al. (2011). Dopaminergic, serotonergic, and oxytonergic candidate genes associated with infant attachment security and disorganization? In search of main and interaction effects. *Journal of Child Psychology and Psychiatry*, 52(12), 1295-1307.
- Lyons-Ruth, K. (1988, April). *Maternal depression and infant disturbance*. Paper presented at the International Conference on Infant Studies, Washington, DC.
- Lyons-Ruth, K., Bronfman, E., & Parsons, E. (1999). Maternal frightened, frightening, or atypical behavior and disorganized infant attachment patterns. *Monographs of the Society for Research in Child Development*, 64 (3, Serial No. 258), 67–96.
- Lyons-Ruth, K., Yellin, C., Melnick, S., & Atwood, G. (2005). Expanding the concept of unresolved mental states: Hostile/helpless states of mind on the Adult Attachment Interview are associated with disrupted mother–infant communication and infant disorganization. *Development and Psychopathology*, 17, 1–23.
- Lyons-Ruth, K., Zoll, D., Connell, D. B., & Grunebaum, H. U. (1986). The depressed mother and her one-year-old infant: Environmental context, mother–infant interaction and attachment. In E. Tronick & T. Field (Eds.), *Maternal depression and infant disturbance* (pp. 61–82). San Francisco: Jossey-Bass.
- Madigan, S., Moran, G., & Pederson, D. R. (2006). Unresolved states of mind, disorganized attachment relationships, and disrupted interactions of adolescent mothers and their infants. *Developmental Psychology*, 42, 293–304.
- Main, M., & Hesse, E. (1990). Parents' unresolved traumatic experiences are related to infant disorganized attachment status: Is frightened and/or frightening parental behavior the linking mechanism? In M. T. Greenberg, D. Cicchetti, & E. M. Cummings (Eds.), *Attachment in the preschool years: Theory, research, and intervention* (pp. 161–182). Chicago: University of Chicago Press.

- Madigan, S., Benoit, D., & Boucher, C. (2011). Exploration of the links among fathers' unresolved states of mind with respect to attachment, atypical paternal behavior, and disorganized infant-father attachment. *Infant Mental Health Journal, 32*(3), 286-304.
- Madigan, S., Moran, G., & Pederson, D. R. (2006). Unresolved states of mind, disorganized attachment relationships, and disrupted interactions of adolescent mothers and their infants. *Developmental Psychology, 42*(2), 293-304.
- Malatesta, C. Z., Grigoryev, P., Lamb, C., Albin, M., & Culver, C. (1986). Emotion socialization and expressive development in preterm and full-term infants. *Child Development, 57*, 316-330.
- Martins, C., & Gaffan, E. A. (2000). Effects of early maternal depression on patterns of infant-mother attachment: A meta-analytic investigation. *Journal of Child Psychology and Psychiatry, 41*, 737-746.
- Maslin, C. A., & Bates, J. E. (1983, April). *Precursors of anxious and secure attachments: A multivariate model at age 6 months*. Paper presented at the biennial meeting of the Society for Research in Child Development, Detroit, MI.
- McElwain, N. L., & Booth-LaForce, C. (2006). Maternal sensitivity to infant distress and nondistress as predictors of infant-mother attachment security. *Journal of Family Psychology, 20*(2), 247-255.
- McMahon, C. A., Barnett, B., Kowalenko, N. M., & Tennant, C. C. (2006). Maternal attachment state of mind moderates the impact of postnatal depression on infant attachment. *Journal of Child Psychology and Psychiatry, 47*(7), 660-669.
- Meins, E., Fernyhough, C., de Rosnay, M., Arnott, B., Leekam, S. R., & Turner, M. (2012). Mind-mindedness as a multidimensional construct: Appropriate and nonattuned mind-related comments independently predict infant-mother attachment in a socially diverse sample. *Infancy, 17*(4), 393-415.
- Meins, E., Fernyhough, C., Fradley, E., & Tuckey, M. (2001). Rethinking maternal sensitivity: Mothers' comments on infants' mental processes predict security of attachment at 12 months. *Journal of Child Psychology and Psychiatry, 42*, 637-648.
- Moran, G., Forbes, L., Evans, E., Tarabulsky, G. M., & Madigan, S. (2008). Both maternal sensitivity and atypical maternal behavior independently predict attachment security and disorganization in adolescent mother-infant relationships. *Infant Behavior & Development, 31*(2), 321-325.
- Moran, G., Pederson, D., Pettit, P., & Krupka, A. (1992). Maternal sensitivity and infant-mother attachment in a developmentally delayed sample. *Infant Behavior and Development, 15*, 427-442.
- Moss, E., Dubois-Comtois, K., Cyr, C., Tarabulsky, G. M., St-Laurent, D., & Bernier, A. (2011). Efficacy of a home-visiting intervention aimed at improving maternal sensitivity, child attachment, and behavioral outcomes for maltreated children: A randomized control trial. *Development and Psychopathology, 23*(1), 195-210.
- Murray, L., Fiori-Cowley, A., Hooper, R., & Cooper, P. (1996). The impact of postnatal depression and associated adversity on early mother-infant interactions and later infant outcome. *Child Development, 67*, 2512-2526.
- Nakasawa, M., Teti, D. M., & Lamb, M. E. (1992). An ecological study of child-mother attachments among Japanese sojourners in the United States. *Developmental Psychology, 28*, 584-592.
- National Institute of Child Health and Human Development (NICHD) Early Child Care Network. (1997). The effects of infant child care on infant-mother attachment security: Results of the NICHD Study of Early Child Care. *Child Development, 68*, 860-879.

- Notaro, P. C., & Volling, B. L. (1999). Parental responsiveness and infant–parent attachment: A replication study with fathers and mothers. *Infant Behavior and Development*, *22*, 345–352.
- O'Connor, M. (1997, March). *Maternal personality characteristics on the MMPI and infant attachment*. Paper presented at the biennial meeting of the Society for Research in Child Development, Washington, DC.
- O'Connor, T. G., & Croft, C. M. (2001). A twin study of attachment in preschool children. *Child Development*, *72*, 1501–1511.
- Otto, H., & Keller, H. (2014). *Different faces of attachment: cultural variations on a universal human need*. Cambridge, UK: Cambridge University Press.
- Oppenheim, D., Koren-Karie, N., & Sagi, A. (2001). Mothers' empathic understanding of their preschoolers' internal experience: Relations with early attachment. *International Journal of Behavioral Development*, *25*(1), 16–26.
- Out, D., Bakermans-Kranenburg, M. J., & van IJzendoorn, M. H. (2009). The role of disconnected and extremely insensitive parenting in the development of disorganized attachment: Validation of a new measure. *Attachment & Human Development*, *11*(5), 419–443.
- Owen, M., & Cox, M. (1997). Marital conflict and the development of infant–parent attachment relationships. *Journal of Family Psychology*, *11*, 152–164.
- Pederson, D., Gleason, K. E., Moran, G., & Bento, S. (1998). Maternal attachment representations, maternal sensitivity, and the infant–mother attachment relationship. *Developmental Psychology*, *34*, 925–933.
- Pederson, D., & Moran, G. (1996). Expressions of the attachment relationship outside of the Strange Situation. *Child Development*, *67*, 915–927.
- Pederson, D., Moran, G., Sitko, C., Campbell, K., Ghesquire, K., & Acton, H. (1990). Maternal sensitivity and the security of infant–mother attachment. *Child Development*, *61*, 1974–1983.
- Peterson, N. J., Drotar, D., Olness, K., Guay, L., & Kiziri-Mayengo, R. (2001). The relationship of maternal and child HIV infection to security of attachment among Ugandan infants. *Child Psychiatry and Human Development*, *32*, 3–17.
- Pinquart, M., Feusner, C., & Ahnert, L. (2013). Meta-analytic evidence for stability in attachments from infancy to early adulthood. *Attachment & Human Development*, *15*(2), 189–218.
- Posada, G., Carbonell, O. A., Alzate, G., & Plata, S. J. (2004). Through Colombian lenses: Ethnographic and conventional analyses of maternal care and their associations with secure base behavior. *Developmental Psychology*, *40*, 508–518.
- Raby, K., Cicchetti, D., Carlson, E. A., Cutuli, J., Englund, M. M., & Egeland, B. (2012). Genetic and caregiving-based contributions to infant attachment: Unique associations with distress reactivity and attachment security. *Psychological Science*, *23*(9), 1016–1023.
- Radke-Yarrow, M. (1991). Attachment patterns in children of depressed mothers. In C. M. Parkes, J. Stevenson-Hinde, & P. Maras (Eds.), *Attachment across the life cycle* (pp. 115–126). London: Tavistock/Routledge.
- Radke-Yarrow, M., Cummings, M. E., Kuczynski, L., & Chapman, M. (1985). Patterns of attachment in two- and three-year olds in normal families and families with parental depression. *Child Development*, *56*, 884–893.
- Raval, V., Goldberg, S., Atkinson, L., Benoit, D., Myhal, N., Poulton, L., et al. (2001). Maternal attachment, maternal responsiveness and infant attachment. *Infant Behavior and Development*, *24*, 281–304.

- Ricciuti, A. E. (1992). Child-Mother Attachment: a Twin Study. *Unpublished dissertation, University of Virginia.*
- Roisman, G. I., & Fraley, R. C. (2008). A behavior-genetic study of parenting quality, infant attachment security, and their covariation in a nationally representative sample. *Developmental Psychology, 44*(3), 831-839.
- Sameroff, A. J., Seifer, R., & Zax, M. (1982). Early development of children at risk for emotional disorder. *Monographs of the Society for Research in Child Development, 47* (7, Serial No. 199), 1-82.
- Scher, A., & Mayseless, O. (2000). Mothers of anxious/ambivalent infants: Maternal characteristics and child-care context. *Child Development, 71*, 1629-1639.
- Schneider-Rosen, K., & Rothbaum, F. (1993). Quality of parental caregiving and security of attachment. *Developmental Psychology, 29*, 358-367.
- Scholmerich, A., Fracasso, M., Lamb, M., & Broberg, A. (1995). Interactional harmony at 7 and 10 months of age predicts security of attachment as measured by Q-sort ratings. *Social Development, 34*, 62-74.
- Schuengel, C., Bakermans-Kranenburg, M. J., & van IJzendoorn, M. H. (1999). Frightening maternal behavior linking unresolved loss and disorganized infant attachment. *Journal of Consulting and Clinical Psychology, 67*, 54-63.
- Sims, B., Hans, S., & Cox, S. (1996, April). *Raising children in high-risk environments: Mothers' experience of stress and distress related to attachment security.* Poster presented at the biennial meeting of the International Conference on Infant Studies, Providence, RI.
- Slade, A., Grienenberger, J., Bernbach, E., Levy, D., & Locker, A. (2005). Maternal reflective functioning, attachment, and the transmission gap: A preliminary study. *Attachment and Human Development, 7*, 283-298.
- Smith, K. E., Landry, S. H., & Swank, P. R. (2000). The influence of early patterns of positive parenting on children's preschool outcomes. *Early Education and Development, 11*, 147-169.
- Smith, P. B., & Pederson, D. R. (1988). Maternal sensitivity and patterns of infant-mother attachment. *Child Development, 59*, 1097-1101.
- Spangler, G., Johann, M., Ronai, Z., & Zimmermann, P. (2009). Genetic and environmental influence on attachment disorganization. *Journal of Child Psychology and Psychiatry, 50*(8), 952-961.
- Spieker, S. J. (1988). Patterns of very insecure attachment forward in samples of high-risk infants and toddlers. *Topics in Early Childhood Special Education, 6*, 37-53.
- Spieker, S. J., & Booth, C. (1988). Maternal antecedents of attachment quality. In J. Belsky & T. Nezworski (Eds.), *Clinical implications of attachment* (pp. 95-176). Hillsdale, NJ: Erlbaum.
- Sroufe, L. A., & Rutter, M. (1984). The domain of developmental psychopathology. *Child Development, 55*, 17-29.
- Stacks, A. M., Muzik, M., Wong, K., Beeghly, M., Huth-Bocks, A., Irwin, J. L., et al. (2014). Maternal reflective functioning among mothers with childhood maltreatment histories: links to sensitive parenting and infant attachment security. *Attachment and Human Development, 16*(5), 515-533.
- Susman-Stillman, A., Kalkoske, M., Egeland, B., & Waldman, I. (1996). Infant temperament and maternal sensitivity as predictors of

- attachment security. *Infant Behavior and Development*, 19, 33–47.
- Tarabulsky, G. M., Bernier, A., Provost, M. A., Maranda, J., Larose, S., Moss, E., et al. (2005). Another look inside the gap: Ecological contributions to the transmission of attachment in a sample of adolescent mother–infant dyads. *Developmental Psychology*, 41, 212–224.
- Teti, D., Gelfand, D., Messinger, D., & Isabella, R. (1995). Maternal depression and the quality of early attachment. *Developmental Psychology*, 31, 364–376.
- Teti, D., Nakasawa, M., Das, R., & Wirth, O. (1991). Security of attachment between preschoolers and their mothers: Relations among social interaction, parenting stress, and mothers' sorts of the attachment *Q*-set. *Developmental Psychology*, 27, 440–447.
- Tomlinson, M., Cooper, P., & Murray, L. (2005). The mother–infant relationship and infant attachment in a South African peri-urban settlement. *Child Development*, 76, 1044–1054.
- Tornello, S.L., Emery, R., Rowen, J., Potter, D., Ocker, B., & Xu, y. (2013). Overnight custody arrangements, attachment, and adjustment among very young children. *Journal of Marriage and the Family*, 75, 871-885.
- True, M. M., Pisani, L., & Oumar, F. (2001). Infant–mother attachment among the Dogon of Mali. *Child Development*, 72, 1451–1466.
- van den Boom, D. (1990). Preventive intervention and the quality of mother–infant interaction and infant exploration in irritable infants. In W. Koops, H. J. G. Soppe, J. L. van der Linden, OP. C. M. Molenaar, & J. J. F. Schroot (Eds.), *Developmental psychology behind the dikes* (pp. 249–270). Amsterdam: Eburon.
- van den Boom, D. (1994). The influence of temperament and mothering on attachment and exploration. *Child Development*, 65, 1457–1477.
- van IJzendoorn, M. (1995). Adult attachment representations, parental responsiveness, and infant attachment: A meta-analysis on the predictive validity of the Adult Attachment Interview. *Psychological Bulletin*, 117, 387–403.
- van IJzendoorn, M. H., & Bakermans-Kranenburg, M. J. (2006). DRD4 7-repeat polymorphism moderates the association between maternal unresolved loss or trauma and infant disorganization. *Attachment and Human Development*, 8, 291–307.
- van IJzendoorn, M., & De Wolff, M. (1997). In search of the absent father: Meta-analysis of infant–father attachment. *Child Development*, 68, 604–609.
- van IJzendoorn, M. H., Schuengel, C., & Bakermans-Kranenburg, M. J. (1999). Disorganized attachment in early childhood: Meta-analysis of precursors, concomitants, and sequelae. *Development and Psychopathology*, 11, 225–249.
- van IJzendoorn, M. H., Vereijken, C. M., Bakermans-Kranenburg, M. J., & Riksen-Walraven, J. (2004). Assessing Attachment Security With the Attachment Q Sort: Meta-Analytic Evidence for the Validity of the Observer AQS. *Child Development*, 75(4), 1188-1213.
- Vaughn, B. E., Bost, K. K., & van IJzendoorn, M. H. (2008). Attachment and temperament: Additive and interactive influences on behavior, affect, and cognition during infancy and childhood *Handbook of attachment: Theory, research, and clinical applications* (2nd ed., pp. 192-216). New York, NY: Guilford Press; US.
- Vereijken, C., Riksen-Walraven, J., & Kondo-Ikemura, K. (1997). Maternal sensitivity and infant attachment security in Japan: A longitudinal study. *International Journal of Behavioral Development*, 21, 35–49.

- Volling, B. L., & Belsky, J. (1992). Infant, father, and marital antecedents of infant–father attachment security in dual-earner and single-earner families. *International Journal of Behavioral Development, 15*, 83–100.
- Vondra, J., Shaw, D., & Kevinides, M. (1995). Predicting infant attachment classification from multiple, contemporaneous measures of maternal care. *Infant Behavior and Development, 18*, 415–425.
- Waters, E., & Deane, K. E. (1985). Defining and assessing individual differences in attachment relationships: *Q*-methodology and the organization of behavior in infancy and early childhood. In I. Bretherton & E. Waters (Eds.), *Growing points of attachment theory and research. Monographs of the Society for Research in Child Development, 50*(1–2, Serial No. 209), 41–65.
- Wolke, D., Eryigit-Madzwamuse, S., & Gutbrod, T. (2014). Very preterm/very low birthweight infants' attachment: infant and maternal characteristics. *Archives of Disease in Child: Fetal and Neonatal Edition, 99*(1), F70-75.
- Wong, M. S., Mangelsdorf, S. C., Brown, G. L., Neff, C., & Schoppe-Sullivan, S. J. (2009). Parental Beliefs, Infant Temperament, and Marital Quality: Associations with Infant-Mother and Infant-Father Attachment. *Journal of Family Psychology, 23*(6), 828-838.
- Zeanah, C., Benoit, D., Barton, M., Regan, C., Hirshberg, L., & Lipsett, L. (1993). Representations of attachment in mothers and their one-year-old infants. *Journal of the American Academy of Child and Adolescent Psychiatry, 32*, 278–286.
- Zevalkink, J., Riksen-Walraven, J. M., & Van Lieshout, C. F. M. (1999). Attachment in the Indonesian caregiving context. *Social Development, 8*, 21–40.