

25 Infant Attachment (to Mother and Father) and Its Place in Human Development

Five Decades of Promising Research (and an Unsettled Issue)

Or Dagan and Abraham Sagi-Schwartz

“There are few blows to the human spirit so great as the loss of someone near and dear,” wrote Bowlby in one of many groundbreaking papers.

Traditional wisdom knows that we can be crushed by grief and die of a broken heart, and also that a jilted lover is apt to do things that are foolish or dangerous to himself and others. It knows, too, that neither love nor grief are felt for just any other human being but for one, or a few, particular and individual human beings. The core of what I am terming an affectional bond is the attraction that one individual has for another individual. (Bowlby, 1979, pp. 83–84)

This is one of the constitutive statements of Bowlby’s attachment theory, one of the most widely researched and clinically applied theories in the field of human development. The present chapter cannot aspire to cover the breadth and depth of research and discussion surrounding attachment theory. The *Handbook of Attachment: Theory, Research, and Clinical Applications*, currently in its third edition, with more than 1,000 pages organized into 43 chapters, is now the most authoritative reference on the subject (Cassidy & Shaver, 2016).

This chapter contains a brief review of the main tenets of attachment theory and describes how infant attachment is commonly assessed both in the laboratory and in natural settings. The chapter is divided into three sections. The first section surveys five decades of theory and research focusing on the infant’s emotional tie to a single caregiver, mostly the mother. It touches on the universality and specificity of infant–caregiver attachment across cultures, and cites empirical findings that bring to light the central role that the quality of infant attachment to a caregiver plays in socioemotional, psychophysiological, and neurodevelopmental outcomes. The second section brings to the fore a key unresolved issue in the field of attachment theory and research: that of the network of infant attachments to two primary caregivers, the mother and the father. Based on the little empirical evidence available to date, we propose

a theoretical framework to better understand the joint effect of the infant's attachment to both parents on developmental outcomes. In the third section we conclude the chapter with final remarks on the important implications of attachment theory and research for practice and public policy.

25.1 One Infant, One Caregiver

25.1.1 Attachment Theory: The Centrality of the Infant–Caregiver Emotional Tie

The main tenet of attachment theory is that infants' tendency to form relationships with their primary caregivers is an *existential need*. In Bowlby's words, "mother love in infancy is as important for mental health as are vitamins and proteins for physical health" (Bowlby, 1953, p. 158). Attachment, according to Bowlby, is a strong disposition to seek proximity and contact with a specific caregiver, and to do so when one is distressed, i.e., in need of physical and psychological security (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969; Sroufe & Waters, 1977). Attachment theory thus assumes that all infants, regardless of their cultural niche, are innately biased to become attached to primary caregivers.

The second main tenet of attachment theory is that the quality of the infant–caregiver attachment relationship varies depending on the caregiving environment and specifically on the caregivers' sensitivity to the infants' proximity seeking cues and communications (Fearon & Roisman, 2017). Accumulating evidence from twin studies attests to a substantial shared environmental influence on the quality of infants' and children's attachment, and limited genetic influences (Bokhorst et al., 2003; Fearon et al., 2006; O'Connor & Croft, 2001; Roisman & Fraley, 2008). Two of these studies have found that the common environmental influences on attachment quality were correlated with the quality of maternal sensitivity, suggesting that the central environmental variable influencing attachment quality is the caregiving environment. Studies regarding the effect of single genes and their interaction with parental sensitivity produced mixed results (Fearon & Belsky, 2016; Luijk et al., 2012), bolstering the current notion that attachment quality is influenced mainly by environmental factors. Although more robust studies are still needed, findings to date provide relatively strong evidence for the proposition that variation in attachment is driven primarily by caregiving influences (Bakermans-Kranenburg & van IJzendoorn, 2016).

A third central tenet of attachment theory is that the quality of infant–caregiver attachment shapes one's future relational patterns in the form of expectations, attitudes, and beliefs regarding the self and others. These self–other schemas are also known as internal working models (Bowlby, 1969,

1973), and are thought to consist of a well-organized, yet dynamic representational structure that is hypothesized to operate primarily outside of conscious awareness (Bowlby, 1980; Bretherton, 1985; Main, Kaplan, & Cassidy, 1985). Consistent with the psychoanalytic and evolutionary roots of attachment theory, internal working models are thought to serve as defenses against threats to the psychological well-being of the individual (Bowlby, 1980; Cassidy & Kobak, 1988; Main, 1981), and as adaptation to early rearing environmental conditions ensures immediate survival and future reproduction (Belsky, 2002; Simpson & Belsky, 2016). Internal working models are assumed to influence the individual's attentional biases and to involve processes that affect memory and the interpretation of events (Pietromonaco & Barrett, 2000). As such, they tend to shape future relationships with peers and romantic partners (Bowlby, 1988; Feeney, 2008; Groh et al., 2014; Holland & Roisman, 2010), as well as with nonfamiliar others (Roisman, 2006). Later in this chapter we present in more detail some critical developmental outcomes associated with different qualities of infant attachment patterns.

25.1.2 Attachment Assessments in Infancy

In infancy, attachment strategies are assessed with a 20-minute laboratory procedure, which has become the gold standard for infant attachment assessment: the strange situation procedure (SSP; Ainsworth et al., 1978). The SSP is designed to assess infants' expectations of their parents' availability at times of need by observing their behavior when reunited with parents following brief separations. In the course of two separations and reunions with the caregiver, and having been in the room with a stranger while the parent is both present (before leaving) and absent, infants are assessed for their use of the caregiver as a secure base from which to explore their environment (Ainsworth et al., 1978). Despite the SSP being administered most widely in North America and Europe, it has been successfully used in Asia, Africa, and Central and South America; we elaborate on the SSP's cross-cultural capacity towards the end of this chapter.

The SSP is valid for assessment of infants aged 12–18 months, and is administered to both the infant and its caregiver in a setting of a room equipped with toys that encourage exploration of the environment. After introducing the room to the dyad, the caregiver is instructed to let the infant settle in and explore the room and assist the infant only if necessary. Then, a stranger is introduced and attempts to play with the infant, ensued by the parent exiting the room. The caregiver is then instructed to return to the room and reunite with the infant, while the stranger leaves quietly. A similar second round of separation and reunion is then set in motion; in this second phase, the infant is left alone in the room and the stranger enters the room after 3 minutes to stay and interact with the infant, if necessary, until reunited with its caregiver.

During episodes of separation, most infants stand in the vicinity of the door and cry. When the caregiver returns, most infants tend to seek proximity and contact with the caregiver. Infants are normally able to become soothed and comforted by their caregiver relatively quickly, and resume their exploration and play in the room. This attachment pattern has been termed *secure* attachment (type B).

Not all infants, however, show the same behavioral pattern. Some infants minimize displays of distress by avoiding the caregiver after she returns, looking away, or rejecting the caregiver's attempts at contact. These infants are classified as *insecure-avoidant* (type A) attachment. It has been argued that insecure-avoidant infants use strategies to minimize their distress so as to maintain proximity to the caregiver and not drive her away (Main & Weston, 1981), or to avoid proximity altogether (Mikulincer & Shaver, 2012). Insecure-avoidant infants are characterized by distant, self-reliant behavior when distressed in the presence of the caregiver (Ainsworth et al., 1978; Main, 2000). Infants in the third group tend to protest and show excessive distress when the caregiver leaves the room, and appear angry with the caregiver upon reunion. The caregiver then fails to soothe the infant, who often resists comforting. These infants are referred to as having *insecure-resistant* or *insecure-ambivalent* (type C) attachment. It has been suggested that these infants express anger or resistance toward the caregiver and at the same time seek her proximity to ensure more consistent attention and care (Cassidy & Berlin, 1994).

Both secure and insecure infants, the marked differences between them notwithstanding, develop what in the field of attachment is referred to as an *organized attachment* strategy; they adapt to the behavior of their attachment figures. Some infants, however, fail to develop an organized attachment pattern, and their regulatory strategy is altogether absent or compromised (Main & Solomon, 1990). These infants, referred to as *disorganized*, tend to behave oddly, display anomalous movements during the SSP, such as freezing or stilling for periods of time, or simultaneously display both avoidance and proximity-seeking (Hesse & Main, 2006). Attachment disorganization is thought to develop in the context of parental abuse or neglect, or parental behavior that is perceived as frightened or frightening. Disorganized attachment is believed to reflect an insoluble dilemma, where infants perceive their caregiver as a haven of safety and at the same time as a threat (Hesse & Main, 2006).

Although the SSP has produced massive amounts of meaningful findings, it has been criticized for its limited ecological validity. Criticism has focused mainly on the reliance of SSP on a laboratory environment, and for being restricted to the beginning of the second year of life, overlooking later developmental phases. In response, several other infant attachment evaluation methods were developed.

A common procedure that has been widely used alongside the SSP has been the Attachment Q-Set (AQS; Waters & Deane, 1985), which was designed to provide a natural-setting observation alternative to the SSP. In this procedure, administered to infants and children up to 5 years old, trained observers or parents are asked to sort 90 cards that portray various behavioral characteristics of the child. The items are sorted to evaluate the child's secure-base behaviors, reflecting such features of receiving support from an attachment figure at times of need and using the caregiver to freely explore the environment when the infant is not distressed (e.g., “[Infant] keeps track of mother's location when he plays around the house” and “[Infant] runs to mother with a shy smile when new people visit the home”). The results, collected in the course of up to three home observations of 2–6 hours each, are compared with the prototypical profile of a secure child provided by experts, leading to a security score with no specified cut-off point between secure and insecure children. The observer AQS security score (less so the parental reports) has shown convergent validity with the SSP secure versus insecure classifications, and similarly to the SSP, it displays strong predictive validity with parental sensitivity measures, a known antecedent of the quality of the child's attachment (van IJzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004).

25.1.3 The Quality of Early Infant–Caregiver Relationship Influences Developmental Outcomes

According to attachment theory, early experiences with one's caregivers are the foundations on which infants develop attachment relationships with their caregivers (Bowlby, 1988). The quality of these attachment relationships, in turn, have been hypothesized to influence short- and long-term socioemotional, psychophysiological, and neurodevelopmental outcomes.

25.1.3.1 Socioemotional Outcomes

Cumulative evidence from research over the past five decades has supported the association between the infant's quality of attachment and socioemotional outcomes in childhood. A recent programmatic synthesis of findings regarding the link between early attachment security and later developmental outcomes, assessing over 5,000 infants and children, has confirmed that children who were classified as securely attached as infants and in early childhood showed better socioemotional outcomes than did insecure children, as indicated by the quality of peer relationships, and by internalizing and externalizing behaviors (Fearon, Bakermans-Kranenburg, van IJzendoorn, Lapsley, & Roisman, 2010; Groh et al., 2014; Groh, Fearon, van IJzendoorn, Bakermans-Kranenburg, & Roisman, 2016; Groh, Roisman, van IJzendoorn, Bakermans-Kranenburg, & Fearon, 2012).

It is clear therefore that the early infant–caregiver relationship plays a crucial role in the socioemotional trajectory of the individual. Accordingly, research has moved forward to identify the explanatory physiological mechanisms that may give rise to the differential developmental trajectories that individuals follow as a result of their early attachment patterns, or at least under the influence of these patterns. Consistent with the notion that the caregiver provides a sense of safety and a secure base to which the child can retreat in times of need to alleviate negative affect and arousal (Bowlby, 1969, 1973), attachment theory conceptualized the attachment relationship as a modulator of stress, with the attachment figure serving as a co-regulator of the infant's physiological and corresponding behavioral responses to stress (Gunnar & Quevedo, 2007). Research on the mechanisms explaining the association between attachment patterns in early life and later maladaptive socioemotional outcomes has focused on children's stress responses at both the hormonal and neurodevelopmental levels. Below we briefly touch on two lines of research concerning the stress physiology of attachment: one involves the hypothalamic-pituitary-adrenal (HPA) axis, the other the neural brain circuitry.

25.1.3.2 *Psychophysiological Outcomes*

Of several stress physiology biological markers, the HPA axis has been most extensively researched. The HPA axis is a key physiological stress reactivity system, of which the hormonal product, cortisol, affects many aspects of neurobehavioral development in humans (Gunnar & Vazquez, 2006). Findings suggest that HPA axis activity in general, and levels of cortisol secretion in particular, are strongly influenced by early childhood attachment relationships (Gunnar & Hostinar, 2015; Gunnar & Quevedo, 2007). HPA axis function can be examined by assessing the diurnal rhythm of cortisol, which typically emerges at the age of several months and matures through the preschool years. The diurnal rhythm is characterized by a peak in cortisol levels in the morning, followed by a decline throughout the day (Larson, White, Cochran, Donzella, & Gunnar, 1998). Both diurnal cortisol and cortisol reactivity to stressors have been found to be affected by parental sensitivity and attachment quality (Bernard & Dozier, 2010; Pendry & Adam, 2007; Schieche & Spangler, 2005; Spangler & Grossmann, 1993; Spangler, & Schieche, 1998; van Bakel & Riksen-Walraven, 2004).

Furthermore, threats to early attachment relationships, such as early caregiving adversity in the form of neglect or placement in foster care, have been consistently linked with children's low levels of morning cortisol and blunted rhythms across the day (Bernard, Butzin-Dozier, Rittenhouse, & Dozier, 2010; Bruce, Fisher, Pears, & Levine, 2009; Carlson & Earls, 1997). Even in the absence of severe caregiving adversity, parent–child relationship quality has been associated with diurnal cortisol production. For example, in the National Institute of Child Health and Human Development Study of Early Childcare and Youth Development, insensitive maternal parenting in the first 3 years of life predicted lower morning cortisol levels at age 15 (Roisman et al., 2009).

Perhaps some of the most compelling evidence of the role of early attachment in HPA axis function and diurnal cortisol regulation comes from studies of attachment-based parenting interventions, which showed higher morning cortisol and steeper morning-to-evening rhythms in children who received attachment-based interventions compared with control children (Bernard, Dozier, Bick, & Gordon, 2015; Bernard, Hostinar, & Dozier, 2014; Slopen, McLaughlin, & Shonkoff, 2010). These findings suggest that the quality of early attachment relationship and its correlates, such as parental sensitivity, significantly affect stress regulation, as indicated by cortisol secretion patterns and reactivity in infants and children.

25.1.3.3 *Neurodevelopmental Outcomes*

In the past two decades, new evidence has emerged regarding the role of early attachment relationship quality in stress responses, as observed in the developing brain, drawing attention to the brain circuitry underlying the observed behaviors (Coan, 2016; Tang, Reeb-Sutherland, Romeo, & McEwen, 2014). Consistent with a fundamental assumption of developmental psychology, according to which early experiences with one's caregivers "get under the skin" to cause persistent alterations in the organization of the underlying neural circuitry (Gunnar & Quevedo, 2007; Kolb et al., 2012), studies have demonstrated the influence of persistent stressful caregiving environments, on the programming of circuitry underlying emotion processing (Perry, Blair, & Sullivan, 2017).

Specifically, early experiences of stress that occur in association with attachment insecurity influence neural development in sensitive brain regions responsible for emotion encoding and regulation, including the amygdala (Gunnar & Quevedo, 2007; Lupien, McEwen, Gunnar, & Heim, 2009). The amygdala is sensitive to signs of threat (Johansen, Cain, Ostroff, & LeDoux, 2011), and therefore particularly vulnerable to the effects of early caregiving quality. One measure of affective neurodevelopment in the context of attachment and its correlates has been amygdala volume. For example, youths with a history of early parental neglect or little parental caregiving, experiences attesting to insensitive caregiving and typically associated with insecure attachment (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003), have exhibited enlarged amygdala volumes (Lupien et al., 2011; Mehta, Cowan, & Cowan, 2009; Tottenham et al., 2010).

Early attachment insecurity has been shown to also influence amygdala function and functional connectivity to the medial prefrontal cortex (mPFC), a brain region highly involved in emotion processing and regulation (Coan & Allen, 2004; Ray & Zald, 2012). For example, insecure infant attachment (as assessed with the SSP) was found to be associated with both greater amygdala volumes (Lyons-Ruth, Pechtel, Yoon, Anderson, & Teicher, 2016; Moutsiana et al., 2015) and emotion regulation processes (Moutsiana et al., 2014; Quevedo et al., 2017) in early adulthood. Taken

together, these findings suggest that early experiences with one's caregivers have a lasting effect on brain circuitry long after childhood years, and consequently on psychological and socioemotional functioning later in life (Vantieghem et al., 2017).

25.1.4 Sociocultural Contexts: Universality and Specificity

Bowlby (1969, 1982) suggested that the attachment relationship infants form with their caregivers is the outcome of an innate evolutionary bias. The universality of the infants' bias to become attached, regardless of the cultural niche to which they happen to belong, is a core element of attachment theory. This assumption has been extensively tested and confirmed in North American and European samples, but much fewer studies exist in non-Anglo-Saxon and non-European cultures. Below we briefly present four main universal hypotheses derived from attachment theory, and some evidence of their cross-cultural validity. Of note, all of the studies we present employed standardized methods to assess infant attachment patterns (i.e., SSP and AQS), with the exception of one study (Kermoian & Leiderman, 1986); in this study, a modified SSP was implemented (i.e., one separation–reunion episode with the mother, a nonparental caretaker that is familiar with and responsible for the care of the infant, and a stranger) to better adjust to the multiple caregivers' rearing environment common in the Gusii culture.

Across cultures, attachment security also depends on childrearing antecedents, in particular sensitive and prompt responses to the infants' attachment signals, as the "sensitivity hypothesis" postulates (van IJzendoorn, 1990). In a large sample of 1,150 Asian families living in the United States, with 87% of participants born in Asia, maternal sensitivity showed a significant correlation with infant attachment security (Huang, Lewin, Mitchell, & Zhang, 2012). The sensitivity hypothesis is further confirmed by findings showing a strong correlation between maternal beliefs about the ideal sensitive mother and attachment theory's descriptions of such mothers in 26 cultural groups from 15 countries (Emmen, Malda, Mesman, Ekmekci, & van IJzendoorn, 2012; Mesman et al., 2016).

Furthermore, there is evidence that the rates of contingent responding are rather similar across cultures, but also that responsiveness is channeled through culture-dependent modalities (Kärtner, Keller, & Yovsi, 2010). In some cultures, for example, touching or stroking the infant is considered an appropriate response to vocalization; in others, imitating the sound that the infant made or smiling at the infant would be considered more appropriate (Kärtner et al., 2010; Keller et al., 2009). Similarly, the ways in which infant distress is attended to differ widely across cultures. Soothing by nursing or feeding, for example, is far more common in non-Western than in Western cultures (e.g., Ainsworth et al., 1978; True, Pisani, & Oumar, 2001).

According to the “universality hypothesis” (van IJzendoorn, 1990), all infants without severe neurophysiological impairment become attached to one or more caregivers. The universality hypothesis has received strong support from cross-cultural studies. The three organized attachment patterns – secure, avoidant, and resistant – have been observed in studies conducted in Africa, East Asia, and Latin America, in a variety of samples, including hunter-gatherer societies characterized by high levels of alloparental care, alongside urban environments, both affluent and deprived (Mesman, van IJzendoorn, & Sagi-Schwartz, 2016).

At the same time, when considering the caregiving arrangements, culture-specific patterns and local customs must be taken into account. For example, studies have found securely attached infants attach not only to their mother, but to nonmaternal caregivers as well (Goossens & van IJzendoorn, 1990; Kermoian & Leiderman, 1986; Sagi-Schwartz & Aviezer, 2005; Sagi-Schwartz et al., 1995; van IJzendoorn, Sagi, & Lambermon, 1992). Furthermore, infants’ exploration behaviors and their ways of expressing attachment needs have been found to vary depending on cultural norms and customs. Hausa caregivers, for example, generally restrict infants physically in their locomotion. As result, the infants are less free to explore the environment by themselves (Marvin, VanDevender, Iwanaga, LeVine, & LeVine, 1977); instead, they do so in visual and manipulative ways, only when they are close to an attachment figure, and cease to do so as soon as the caregiver leaves. It is clear, however, that Hausa infants use adult caregivers as secure bases from which to explore, and they differentiate between attachment figures and strangers (Marvin et al., 1977).

Attachment theory also predicts that in environments that do not inherently threaten human health and survival, most infants are securely attached. This is known as the “normativity hypothesis” (van IJzendoorn, 1990). There is strong cross-cultural evidence for the normativity hypothesis, and nearly all cross-cultural studies have classified most infants as securely attached (Mesman et al., 2016). But although secure attachment appears to be the norm in most cultures, the rates of secure attachment reported in the studies outside the Anglo-Saxon world and Europe vary. For example, compared to the average secure attachment rates in Western cultures’ samples (46%; Bakermans-Kranenburg & van IJzendoorn, 2009), the rates of secure attachments were particularly low in a poor rural Mexican sample (32%; Gojman et al., 2012) and in an undernourished Chilean sample (7%; Valenzuela, 1997). These findings attest to the important role that socioeconomic conditions play in shaping family life and parenting patterns; these findings are consistent with the Family Stress Model, which suggests that unfavorable economic circumstances can be an obstacle to optimal parenting because of parental stress, which has negative effects on child development.

Cross-cultural variations also appear in the distribution of attachment classifications within the insecure category, which may be due to differences in common insensitive parenting practices (Mesman et al., 2016). For example, the insecure-avoidant attachment pattern, which is generally associated with

unresponsive parenting, is less prevalent in cultures where highly proximal and indulgent parenting is common. In these cultures, insensitive care is more likely to be intrusive than unavailable, which generally fosters resistant rather than avoidant attachment (Jin, Jacobvitz, Hazen, & Jung, 2012).

Last, according to the “competence hypothesis” (van IJzendoorn, 1990), infant secure attachment leads to positive child outcomes in a variety of developmental domains. A study conducted among the Gusii tribe (Kermorian & Leiderman, 1986) found that the nutritional status of the secure infants was better than that of the insecure ones, a result replicated in Chile with undernourished infants (Valenzuela, 1997). Despite the remarkable finding of an association between attachment and health status, the cause–effect relation between attachment security and nutritional status is not entirely conclusive. It is not unreasonable to assume that healthier infants induce more care in general, and in particular more sensitive care, especially if economic deprivation compels parents to be selective in their investment of time and energy (Finerman, 1995).

In sum, cross-cultural attachment research suggests that the attachment phenomenon is universal in nature, and at the same time that its universal characteristics may manifest in unique ways depending on the cultural norms. Universality and specificity of attachment patterns across cultures are both essential constituents of attachment theory, attesting to its cross-cultural validity. More research is needed in populous countries such as India, Islamic countries, and large parts of Africa, Asia, and Latin America to fully characterize the contextual components and universalist aspects of the attachment phenomenon.

25.2 One Infant, Two Caregivers

25.2.1 Infant Attachment Network to Mother *and* Father: An Unsettled Issue

Although researchers have long recognized the important role both parents play in their children’s upbringing and development, most studies were based on the underlying assumption that there is a primary attachment figure, usually the mother. In recent decades, however, expectations concerning gender roles and parenting have changed the normative patterns of early childhood care, which nowadays often involves both parents to various degrees (Cabrera, Volling, & Barr, 2018). This has resulted in the inclusion of fathers in infant attachment theory and research (Bretherton, 2010), which in turn has stimulated research focusing on early attachment patterns to both parents. Because many children are raised by both mothers and fathers, assessing attachment patterns to both parents rather than examining the effects of a single attachment relationship can provide a more ecologically valid understanding of the individual’s developmental trajectory (Belsky, 1981).

About a quarter of a century ago, van IJzendoorn et al. (1992) addressed the issue of infants' independent attachment relationships with mothers and fathers, and raised the following question: Given that infants form simultaneously independent attachments to mothers and fathers (Easterbrooks & Goldberg, 1984; Grossmann et al., 2002; Grossmann, Grossman, Huber, & Wartner, 1981; Main & Weston, 1981; Sagi-Schwartz & Aviezer, 2005), how can infant attachment *to only one caregiver*, usually the mother, predict developmental outcomes? Several studies have assessed the degree to which two early parental attachment relationships act *jointly* to influence developmental outcomes (known in the literature as “the integrative hypothesis,” van IJzendoorn et al., 1992). These studies sought to extend the scope of attachment theory to include cultures in which children are raised by more than one caregiver, and to enhance the predictive power of early attachment patterns on later outcomes, which was shown to be modest in size when assessed with only one caregiver.

To shed light on the role that infants' attachment to mothers and fathers jointly plays in predicting developmental outcomes, the authors (Dagan & Sagi-Schwartz, 2018) reviewed the published work in the field and assessed the four possible attachment configurations: infants who are insecure with both mother and father (I-I), secure with mother and insecure with father (S_M-I_F), insecure with mother and secure with father (I_M-S_F), and secure with both mother and father (S-S). They identified two main questions that call for further assessment, framed them as empirical questions, and based on this empirical evidence, offered two competing hypotheses presented as potential answers to each issue (Figure 25.1).

The first question is: *Does the number of secure attachments matter in predicting developmental outcomes, or is one secure attachment sufficient for optimal development?* Some studies suggest that the integration of the infant's parental attachment patterns is best described by what the authors term the *additive hypothesis*. According to this hypothesis, a linear correlation exists between the number of secure attachment patterns and developmental outcomes, so that a larger number of secure relationships formed by an infant results in better developmental outcomes. The additive hypothesis draws support from studies showing that infants who are securely attached to both parents have the best outcomes, followed by those who are securely attached to only one parent, and finally by those who are insecurely attached to both parents. For example, infants who were securely attached to both parents were more ready (or less inhibited) to engage positively with an unfamiliar person in a clown costume at age 12 months (Main & Weston, 1981), and to resolve conflicts more autonomously during play with peers at age 5 (Suess, Grossmann, & Sroufe, 1992), than were infants who were securely attached to only one parent. Infants who exhibited more secure patterns of parental attachment also scored higher on socioemotional (preschool peer play behavior) and cognitive (IQ index) outcomes (Sagi-Schwartz & Aviezer, 2005; van IJzendoorn et al., 1992).

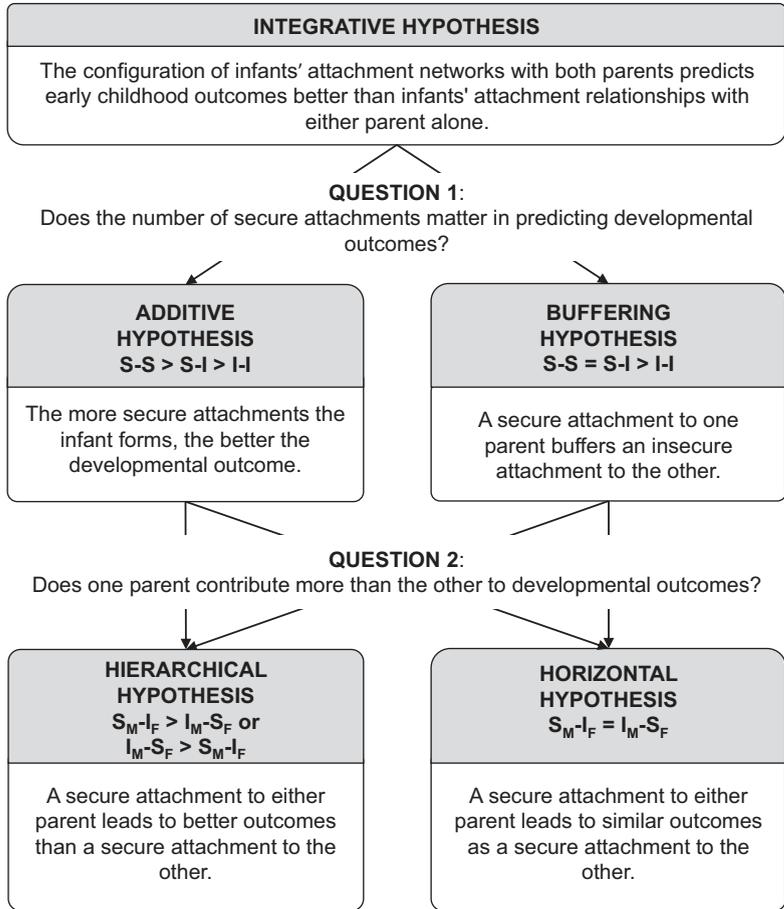


Figure 25.1. Four competing hypotheses ordered according to the issue they address.

Note: $S-S$ = secure with mother and father; $I-I$ = insecure with mother and father; S_M = secure with mother; S_F = secure with father; I_M = insecure with mother; I_F = insecure with father.

Source: Based on Dagan and Sagi-Schwartz (2018).

Other studies, however, support what the authors term the *buffering hypothesis*, according to which early secure attachment to one parent offsets the risks posed by insecure attachment to the other. Some studies have shown that the developmental outcomes of infants who are securely attached to only one parent are not worse than those of infants who are securely attached to both parents, and both types of infants have significantly better outcomes than those who are insecurely attached to both parents. For example, infants who were securely attached to only one parent showed as little internalizing and externalizing behaviors as those who were securely attached to both parents, and less than infants who were insecurely attached to both parents (Kochanska & Kim, 2013; Suess et al., 1992).

To reach a more nuanced description of the differences between infants who are securely attached only to their mothers and those who are securely attached only to their fathers the authors formulated a second question regarding the infant attachment network to mother and father: *Does one parent contribute more than the other to developmental outcomes, or do they matter equally?* This question gains expression in the *hierarchical hypothesis* (Bowlby, 1969; Bretherton, 1985; van IJzendoorn et al., 1992), according to which one parent influences the developmental outcomes of the child more than the other. Studies supporting this hypothesis (Main & Weston, 1981; Suess et al., 1992) found that infants who were securely attached only to their mothers were more ready (or less inhibited) to engage positively with a stranger in a clown costume at age 12 months than were infants who were securely attached only to their fathers, and resolved conflicts with other children more autonomously at age 5 than did children who as infants were securely attached only to their fathers.

By contrast, what the authors termed the *horizontal hypothesis* suggests that infants with secure attachment to either parent have developmental outcomes similar to those with secure attachment to the other parent. Some studies supporting this hypothesis reported that children who had only one secure attachment in infancy, to either their fathers or their mothers, exhibited a similar degree of externalizing behaviors at age 8 (Kochanska & Kim, 2013), and comparable severity of abnormal behaviors at age 5 (Suess et al., 1992).

For future research, the authors (Dagan & Sagi-Schwartz, 2018) proposed to combine the two pairs of dichotomized hypotheses (additive vs. buffering and hierarchical vs. horizontal) into four mutually exclusive models that capture the various relations between the attachment network configurations: *additive-hierarchical*, *additive-horizontal*, *buffering-hierarchical*, and *buffering-horizontal* (Table 25.1). Each model offers predictions that simultaneously answer the two questions raised earlier, and each model explains one or more outcomes, but no two models explain the same outcome.

To conclude, little attention has been paid to the integrative effect of attachment relationships to both mothers and fathers on developmental outcomes, and the question has remained unanswered for a long time (Thompson, 2000; Thompson & Raikes, 2003). The authors propose an organizational framework from which investigators can embark on research to inform and expand attachment theory and research, toward a better understanding of the role of early attachment relationships in individuals' development. Early infant network of attachment models may function as more complex, more thoroughly elaborated, and more ecologically valid predictors of developmental outcomes than the ones that have been conceptually and empirically formulated. In addition, understanding infant attachment as part of an attachment network may broaden the scope of attachment theory to include non-Westernized cultures in which a common rearing practice includes nonparental caregivers (e.g., grandparents, siblings, and other relatives).

25.3 Implications of Attachment Theory and Research on Practice and Public Policy

Attachment research continues to grow and develop in multiple and promising directions. But similar to other clinical scientific theories, it bears little significance if it does not seek to influence public policy; if attachment theory and research advance the understanding of the crucial role that early infant–parent interactions play in the individual’s physiological and psychological well-being, one must consider the ways in which this knowledge may be disseminated through channels that are readily accessible to those in need.

Attachment research has clearly established the importance for child development of the early experiences of infants with their parents. Yet, many parents enter parenthood without sufficient understanding of the importance of sensitive and responsive caregiving for the development of a healthy child (Cassidy et al., 2013). It is important that researchers and practitioners work together to develop future parent curricula that can be implemented as part of high school and university education. Although there are several empirically supported parent training programs based on attachment research (Berlin, Zeanah, & Lieberman, 2016), they are yet to be made a part of general education.

In addition, many parents are struggling to balance work and family responsibilities, and to find quality care for their children while they are at work. There is a need, therefore, to develop policies that will ensure high standards of group care. It has been well established that the quality of early group care matters, and that low-quality settings produce negative developmental outcomes (Love et al., 2003; Sagi, Koren-Karie, Gini, Ziv, & Joels, 2002). There is also a need to formulate family policies that would enable more flexible work arrangements that recognize childcare as a prime societal concern. This includes reexamination of parental leave policies that often require parents to return to work too soon after childbirth, either because of company policy or because of financial necessity (for a review of family policies in various countries, see Robila, 2014).

In some extreme cases, such as child maltreatment, children are removed from their biological parents by the welfare system, and placed in out-of-home group care arrangements. In both small and large group settings, also known as institutionalized care settings, forming secure attachment with a caregiver is significantly less likely than in all other home-based settings (Ahnert, Pinquart, & Lamb, 2006; Dozier, Zeanah, Wallin, & Shauffer, 2012). A secure attachment with at least one parental figure during the first year of life is not only possible in nonparental, family-based arrangements such as foster care and adoption (Raby & Dozier, 2018; van den Dries, Juffer, van IJzendoorn, & Bakermans-Kranenburg, 2009), but is also crucial in reducing and even preventing problematic behaviors and interpersonal difficulties (Dobrova-Krol, Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2010; McLaughlin, Zeanah, Fox, & Nelson, 2012).

In this regard, a consensus statement on group care for children and adolescents, which has been endorsed as a statement of policy by the American

Table 25.1 *Model-based outcome predictions*

Integrative model	Prediction ^a	Brief description
(a) Additive-hierarchical	$S-S > S_M-I_F > I_M-S_F > I-I$ OR $S-S > I_M-S_F > S_M-I_F > I-I$	Secure attachment to only one parent (but not the other) leads to better outcomes than insecure attachment to both parents, but poorer outcomes than secure attachment to both parents
(b) Additive-horizontal	$S-S > S_M-I_F = I_M-S_F > I-I$	Secure attachment to either parent (but not the other) leads to better outcomes than insecure attachment to both parents, but poorer outcomes than secure attachment to both parents
(c) Buffering-hierarchical	$S-S = S_M-I_F > I_M-S_F > I-I$ OR $S-S = I_M-S_F > S_M-I_F > I-I$	Secure attachment to only one parent (but not the other) leads to as good outcomes as secure attachment to both parents
(d) Buffering-horizontal	$S-S = S_M-I_F = I_M-S_F > I-I$	Secure attachment to either parent (but not the other) leads to as good outcomes as secure attachment to both parents, all better than insecure attachment to both parents

^a All models assume that the I-I group has poorer outcomes than the other three configuration groups.

Note: Greater than symbols represent better developmental outcomes. S-S = secure with mother and father; I-I = insecure with mother and father; S_M = secure with mother; S_F = secure with father; I_M = insecure with mother; I_F = insecure with father.

Source: Adapted from Dagan and Sagi-Schwartz (2018).

Orthopsychiatric Association, declared that due to its inherent detrimental effects on the development of children, group care should be used only when therapeutic mental health services cannot be delivered in a less restrictive setting (Dozier, Kaufman et al., 2014). Supporting the consensus statement on group care for children is a large body of literature showing that group care has harmful effects on the development of young children (Dozier et al., 2012). Negative outcomes include structural and functional brain abnormalities (Nelson III, Bos, Gunnar, & Sonuga-Barke, 2011), vulnerability to attachment disturbances, and lasting clinical disorders of attachment (e.g., reactive attachment disorder and disinhibited social engagement disorder; Nelson, Fox, &

Zeanah, 2014; Rutter et al., 2007; Zeanah & Gleason, 2015; Zeanah, Smyke, & Dumitrescu, 2002). By contrast, placement in adoptive or foster families has been shown to be the optimal solution for children at risk of suffering from the harming effects of abusive caregiving or lack of parental availability. Such placement has been reported to lead to the formation of secure attachments (Smyke, Zeanah, Fox, Nelson, & Guthrie, 2010) and reduced likelihood to experience subsequent psychopathology or problematic peer relations (Dobrova-Krol et al., 2010; McLaughlin et al., 2012).

Another childcare policy matter of considerable importance pertains to the issue of an increasing number of children who grow up with divorced parents (McIntosh, 2011). Among a host of issues arising with regard to optimal post-divorce parental practices, one question that is strongly tied to attachment theory and research is whether young children should spend post-divorce time (including overnights) predominantly in the care of the same parent (usually the mother) or divided more evenly between the two parents. Given the evidence we present in the previous section of this chapter, according to which infants develop independent attachment relationships with both parents, it is reasonable to expect that post-divorce practices should include both parents, to the extent that this is possible (i.e., that both parents are deemed reasonably adept in child-rearing practicing). In the case of infants who may still be in the process of developing attachment relationships with their parents, continuing post-divorce relationships with two parents increases their chances of developing at least one secure attachment, known to lead to better developmental outcomes than having no secure attachment relationships with either parent. Furthermore, depriving young children of overnights with their fathers leads to dissatisfaction regarding the amount of post-divorce contact they have with their fathers (Hetherington & Kelly, 2002; Kelly, 2012; Warshak & Santrock, 1983), and may also compromise the quality of developing father–child relationship (Fabricius & Luecken, 2007; Warshak, 2014).

Based on the available albeit not robust research on the subject, a consensus statement endorsed by 110 international experts from various countries called for policy making that would enforce consistent day and night parental availability of both parents in the child's life after divorce (Warshak, 2014). To maintain high-quality, secure attachment relationships with their children, parents must have regular interaction with them (e.g., bedtime and waking rituals, transitions to and from school, and extracurricular and recreational activities; Lamb, Sternberg, & Thompson, 1997). The degree to which these child–parent interactions are accomplished, however, should be flexibly tailored to the various needs and circumstances of the child concerned, including implementing appropriate intervention in the case of an insecure child–parent attachment relationship (rather than restricting the development of this relationship).

Finally, attachment theory has also inspired the clinical arena and the field of intervention to aid children and families that are exposed to adversity (for a review of attachment-based interventions, see Steele & Steele, 2018). To date, various attachment-based interventions designed to target the quality

of high-risk child–parent interactions, such as Attachment and Biobehavioral Catch-up (ABC; Dozier, Meade, & Bernard, 2014) and Circle of Security (Marvin, Cooper, Hoffman, & Powell, 2002), have shown to be effective in increasing parental sensitivity, leading to enhanced attachment security (Bakermans-Kranenburg et al., 2003; Facompré, Bernard, & Waters, 2017). In integrating such interventions into common clinical practice, especially with children who are exposed to high levels of environmental stress and are at risk of poor social, academic, and mental health outcomes, it is necessary to ensure that children receive the best parental caregiving possible, which would establish them early on a healthy developmental path.

The growing number of evidence-based interventions that have been shown to improve outcomes for children in the child welfare system (Fisher, Gunnar, Dozier, Bruce, & Pears, 2006; Steele & Steele, 2018) underscores the compelling need to expand child protection from its traditional narrowed concern with physical safety and custody, to include a broader focus on the emotional, social, and cognitive costs of maltreatment. Early implementation of such clinical interventions will substantially add to the current effort to change the health care system from an acute sick-care model to a preventative well-care model (Shonkoff et al., 2012). By following this approach, the origins of deleterious developmental outcomes, including insecure and disorganized infant–caregiver attachment relationships and their correlates, can be identified and addressed early in life rather than treated later, promoting the well-being of children and setting them on a healthy trajectory for adulthood.

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