

Development in Infancy

AN INTRODUCTION



FOURTH EDITION

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Social Development in Infancy

- Describe the phases of infant-parent attachment.
- How and to whom do infant attachments form?
- What is the attachment behavior system, and how does it work?
- What is security of attachment, how is it determined, and how is it typically measured?
- How stable and predictively valid are individual differences in infant attachment security?
- What factors affect the quality of parental behavior?
- What are the principal domains of parent-infant interaction?
- How stable are individual differences in characteristics of parent-infant interaction?
- Do boys and girls have different social experiences?

Attachments and Interactions

To many theorists, the development of relationships with other people (mainly parents) constitutes one of the most important aspects of social development in infancy, and in this chapter we describe stages in the development of the infant's first social relationships, commonly referred to as attachments. After considering what appear to be universal developmental stages, we review speculations concerning the origins of individual differences in attachments—differences that may be consequences of very early interactions between parents or other caregivers and infants. As we then show, there are differences in the types of attachment infants form with their parents, and these differences may affect children's later cognitive, social, and personality development. The quality of infant-parent attachments is itself influenced by a variety of factors, of which the harmony of infant-parent interaction and the infant's temperament have been most widely studied.

Following a consideration of attachments, we discuss infant-parent interaction. In particular, we describe prominent domains of infant-mother interaction, individual differences in interactions, stability and continuity of those

domains, and correspondences between infant and parent activities. The chapter concludes with a brief review of sex differences in social behavior and development. Of course, interactions with people other than parents and caregivers (for example, siblings and peers) also affect the child's development, as we pointed out in Chapter 2.

All the major theories of emotional development have addressed the development of attachments, and all contribute something to our understanding of this important phenomenon. However, the most popular explanation of the process of attachment formation was provided by John Bowlby (1969), a psychoanalyst who was much impressed by the capacity of ethological theorists to explain early emotional communications and the formation of social bonds in nonhuman species.

Bowlby began with the assumption that the behavioral propensities of infants and parents are most profitably considered in the context of the environment in which our species evolved. In that "environment of evolutionary adaptedness," the survival of infants would have depended on their ability to maintain proximity to protective adults in order to obtain nourishment, comfort, and security. Unlike the young of many other species, however, human infants are unable to move closer to or to follow adults for several months after birth, and they are even incapable of clinging to adults in order to stay in contact. Instead, human infants rely on signals of various sorts to entice adults to approach them. In order for these signals to be effective, adults must be predisposed to respond to them. The best example of such a prepotent signal is the infant cry, which very effectively entices adults to approach, pick up, and soothe the infant (Barr et al., 2000). As they grow older, infants develop a variety of means of achieving proximity or contact, including independent locomotion, and gradually come to focus their bids on people with whom they are most familiar, thereby forming attachments to them (Figure 11.1).

Basic Phases of Social Development

Bowlby (1969) described four phases in the development of infant-parent attachments: the newborn phase of indiscriminate social responsiveness (months 1 to 2), the phase of discriminating sociability (2 to 7 months), "maintenance of proximity to a discriminated figure by means of locomotion as well as signals" (month 7 through the second year), and finally the phase of goal-corrected partnership (year 3 on). We will concentrate on the first three phases, because the fourth does not begin until after infancy.

Phase 1: Newborn Indiscriminate Social Responsiveness (1 to 2 Months of Age)

This first phase in the attachment process is marked by the development of a repertoire of signals. From the time of birth, at least one very effective signal is at the baby's disposal—the cry. Crying motivates adults to soothe infants by picking them up and is the first-emerging example of a class of behaviors labeled *attachment behaviors* by Bowlby. The defining or common characteristic of these behaviors is that they all help to provide comfort and security



FIGURE 11.1

It was commonly believed that infants developed attachments to the individuals responsible for their basic care and feeding. In a classic study involving rhesus monkey infants, however, Harlow and Zimmermann (1959) showed that infants form attachments to cuddly terrycloth mother surrogates rather than the wire surrogates that fed them. This study helped pave the way for Bowlby's theory of attachment, which placed emphasis on proximity and contact seeking rather than feeding. (Courtesy of S. J. Suomi.)

by bringing the baby close to a protective, caregiving adult (Figure 11.2). Another potent attachment behavior enters the baby's repertoire in the second month of life—smiling. Like crying, smiling is a signal that powerfully affects adult behavior. However, smiles are effective because they encourage adults to stay near the baby, whereas cries encourage adults to approach the baby.

From birth, therefore, babies are capable of affecting the social environment around them: Adults respond differentially to various newborn behaviors and signals. The defining feature of this phase, however, is that babies are indiscriminate in the use of proximity-promoting signals: They appear to be satisfied whoever responds to their cries, smiles, and other similar signals. Adults, of course, respond selectively depending on their relative investment and responsibility.

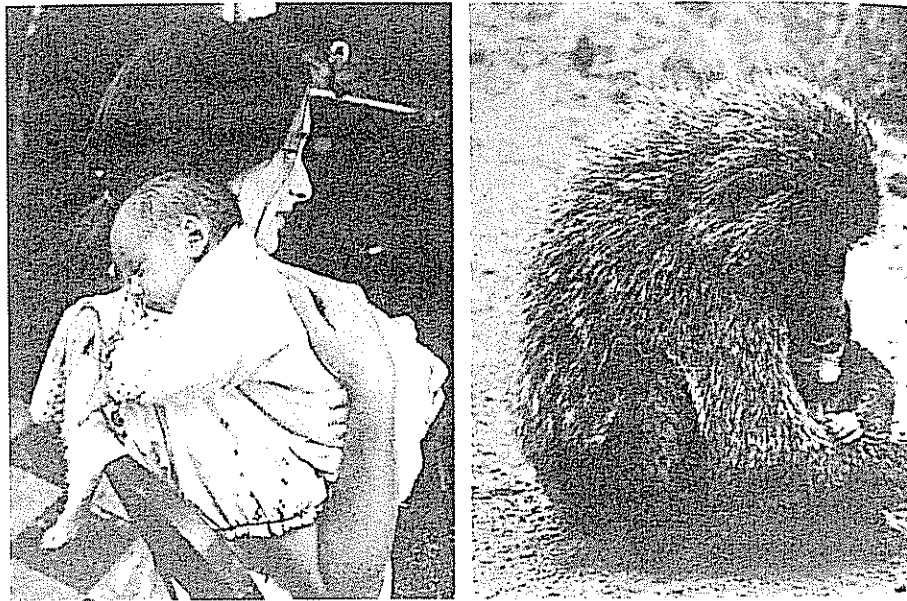


FIGURE 11.2

Physical contact between young infants and their parents dominates interactions early in life.

The newborn baby is characterized by marked, sudden, unpredictable changes in state (levels of arousal and distress) and by poor coordination of movements (Chapters 4 and 5). Behavior becomes more organized over time as internal neural control mechanisms develop (Chapter 5). During the first 2 months, caregivers have a major impact on the baby's state of arousal. When babies are distressed, adults intervene to soothe them; even when babies are drowsy they become alert when held erect at the adult's shoulder (Brazelton & Nugent, 1995). Doing so is obviously important, because infants can learn little about their environment—either social or physical—outside these periods of alertness. Relatively long periods of alertness simply do not occur spontaneously during this early phase: It is only through adult intervention that their value can be optimized. Practically, this means that when infants are alert and able to learn about the environment they are often in the arms of their caregivers. Because the caregivers who are close by can be felt, smelled, heard, and seen when infants are alert, babies may come to learn a great deal about them, and rapidly learn to associate their presence with alertness and the relief of distress (Thompson, 1998). This association may be one of the earliest, and certainly one of the most dramatic, associations that infants acquire. For example, Lamb and Malkin (1986) found that babies rapidly learned to expect their parents to respond when they cried, and so began to quit crying as soon as they heard or saw their mothers approaching, rather than when they were actually picked up.

Distress-relief sequences are not the only contexts in which young infants interact with their parents, of course. Various caregiving routines, including feeding (e.g., Bentley, Gavin, Black, & Teti, 1999) and social play (Fogel et al., 1997) provide the context for social interaction. Kaye (1982) described the interactions between mothers and their very young infants during feeding. He found a consistent tendency for mothers and infants to take turns, with the

mother jiggling the nipple in the baby's mouth whenever the infant paused (Chapter 9). This turn taking, of course, alerts the infant to the basic principle of *reciprocity*. In addition, mothers (and presumably fathers as well) try to capture and maintain their infants' attention in the course of face-to-face play by moving their heads, exaggerating their facial expressions, and modulating the intonation of their voices. At 2 months, social and didactic interactions are equally emphasized by mothers, but over time didactic interactions (those in which the parent encourages the child to examine some property, object, or event in the environment) become increasingly prominent (Bornstein & Tamis-LeMonda, 1990). Correspondingly, 2-month-olds are oriented to social interactions, whereas 5-month-olds are focused more on exploration of the environment.

Frequent encounters with adults at times when infants are alert may also facilitate infants' capacities to recognize their parents, and Bowlby suggested that acquisition of the ability to recognize specific people marked the transition to the second phase of attachment development. As described in Chapter 6, however, studies show that infants are able to recognize their own mothers' voice and smell within the first 2 weeks of life, much earlier than Bowlby believed.

Phase 2: Discriminating Sociability (2 to 7 Months of Age)

Bowlby (1969) suggested that discriminating sociability began in the second or third month of life, although this capacity may in fact emerge much earlier. Presumably because significant others (such as parents) have been associated with pleasurable experiences (e.g., feeding, cuddling, rocking, and play) and with the relief of distress from early in life, familiar people become persons with whom the baby prefers to interact. Initially, these preferences manifest themselves in fairly subtle ways: Certain people will be able to soothe the baby more easily, and to elicit smiles and coos more readily, broadly, and frequently. Parents are enormously rewarded by this change in their baby's behavior: It indicates that they are special to the baby and that the child (at last) appreciates the effort they have put into caregiving. Prior to this phase, the baby appeared to enjoy interacting with anyone without apparent preference.

During this second phase of social development, babies are far more coordinated behaviorally than they were earlier. Their arousal level is far less variable, and (as described in Chapter 5) infants now spend larger proportions of their time in alert states. Distress is less frequent, and interactions with adults more often involve play. In many Western cultures, face-to-face games make their appearance in the first phase, becoming most prominent when infants are between 3 and 6 months of age (Adamson & Bakeman, 1984), following which infants become more interested in exploration than in social play (Bornstein & Tamis-LeMonda, 1990). In early face-to-face interactions, the adult assumes major responsibility for keeping the interaction going: Babies coo or smile or stick out their tongues, and adults respond with similar actions (Kaye, 1982). However, babies are not simply passive partners in face-to-face games. Two- to 3-month-olds begin to respond with boredom, distress, or withdrawal when their mothers adopt unresponsive "still-faces" instead of behaving in their typical interactive fashion (Moore, Cohn, & Campbell, 2001). They seem concerned over adults' failure to follow the rules of interaction, indicating that

infants may indeed understand these rules, find synchronized and reciprocal interactions more enjoyable, and "expect" their partners to follow the rules (Chapter 9).

From repeated experiences in face-to-face play and distress-relief sequences, the baby seems to learn at least three important things: The first is the rule of *reciprocity*: In social interaction, partners take turns acting and reacting to the other's behavior. Second is *effectance*: The baby learns that her or his behavior can affect the behavior of others in a consistent and predictable fashion. The third is *trust*: The caregiver can be counted on to respond when signaled. Attaining these concepts means a major development in the process of becoming social. Once infants realize that their cries, smiles, and coos elicit predictable responses from others, they begin to develop a coherent view of the social world and concepts of themselves as individuals who significantly affect others. The degree to which babies feel confident in their predictions regarding the behavior of others—that is, the degree to which they trust or have faith in the reliability of specific people—may influence the security of their attachment relationships, a topic about which we shall have much to say in a later section. Individual differences in the amount of trust or perceived effectance each infant develops probably depend on individual differences in the responsiveness of the adults with whom the baby interacts in a variety of contexts (play, feeding, distress-relief, and so forth).

Phase 3: Attachments (7 to 24 Months of Age)

By 6 or 7 months of age, the infant bears little resemblance to the neonate. Seven-month-olds clearly understand and respect the rule of reciprocity in their interactions. Their confidence in others reinforced, 7-month-olds enjoy their newly acquired ability to creep around and to take responsibility for getting close to their parents at will, instead of waiting for others to come in response to their cries or coos. Between 6 and 12 months of age, infants are increasingly likely to initiate interaction using directed social behaviors, whereas mothers more frequently initiate games, terminate or redirect their infants' activities, and issue verbal requests (Green et al., 1980).

In addition to assuming an increasingly active role in their relationships, babies also begin in Phase 3 to protest (by crying) when left by attachment figures (Figure 11.3). According to Bowlby, separation protest should be viewed as a signal aimed at making attachment figures come back to the baby, and its emergence can be linked to attaining some primitive conception of person permanence (Ainsworth, 1973)—the notion that people have a permanent existence independent of the infant (see Chapter 7).

Major changes in social relationships occur between 7 to 8 months (the beginning of Phase 3) and at about 24 months (the end of this phase): Infants become increasingly sophisticated in their abilities to behave intentionally, communicate verbally, and respond appropriately in different contexts. As infants grow older, they initiate an increasing proportion of their interactions and are therefore respondents in a decreasing proportion. They can tolerate a growing distance from attachment figures, and (as noted in the Chapter 2) they become more and more adept at interacting with peers and unfamiliar adults. Figure 11.4 shows that these developmental trends are the same across a variety of primates, including langurs, baboons, gorillas, and humans.

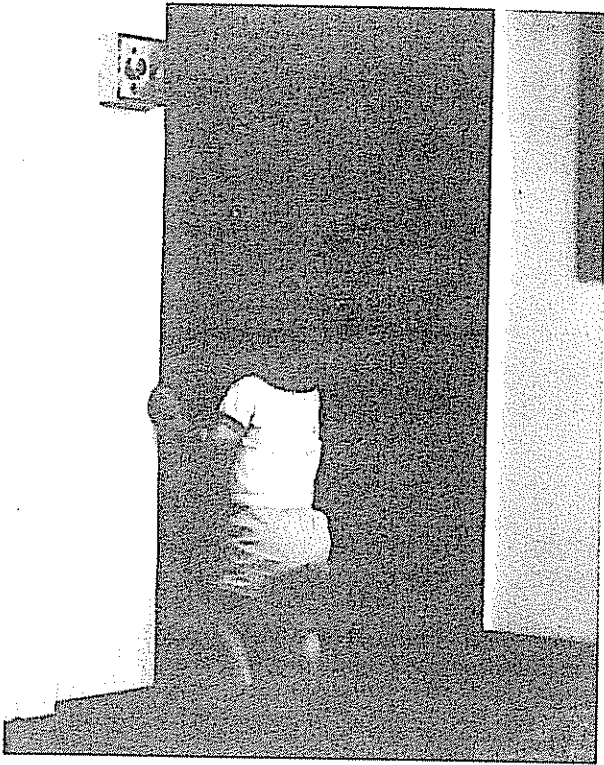


FIGURE 11.3

A toddler cries as the parent leaves the room, and goes to the door in an attempt to follow. Separation protest is a hallmark of Phase 3 in the development of attachment. (Courtesy of R. A. Thompson.)

For humans, however, this stage is marked by the emergence of discriminating attachments, which we discuss in detail following a brief discussion of Phase 4.

Phase 4: Goal-Corrected Partnerships (Year 3 Onward)

According to Bowlby (1969), the next major transition occurs at the beginning of the third year of life, when children become able to take their parents' needs into account when interacting with them. For example, they now appear to recognize for the first time (and begrudgingly) that parents must sometimes give priority to other activities, whereas the child's needs or wants must wait. Indeed, research on attachment has also focused on the study of attachment in preschoolers and school-age children (Teti, 1999). This focus includes the examination of patterns of interaction between children and their attachment figures, but in light of preschoolers' improved abilities in memory and language, the study of attachment in the preschool years has also focused on children's verbal representations of attachment relationships, in particular the child's recollections and expectations about the parent's behavior in hypothetical situations (Solomon & George, 1999; Teti, 1999, 2001).

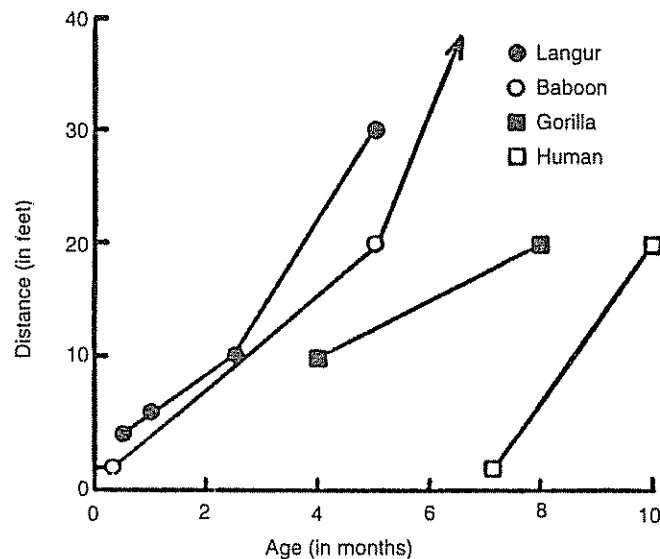


FIGURE 11.4

Distances between infants and mothers of some primate species at a variety of ages; the data points represent the maximum distances observed at each age, with the curve for the baboon reaching 90 feet at the end of 10 months (After Rheingold and Eckerman, 1970. © 1970 by the American Association for the Advancement of Science. Reprinted by permission.)

Some Features of Attachment Bonds

The beginning of Phase 3 marks (by consensus) the time at which the first infant-adult attachments are formed. *Attachments* are specific, enduring, emotional bonds whose existence is of major importance in the process of sociopersonality development. In light of this, it is necessary to ask: What are the processes by which attachments form? To whom do infants become attached?

How Do Attachments Form?

Studying young ducklings, Konrad Lorenz (1935/1970) described what seemed to be an innate predisposition to "imprint on" an object—attempt to remain close to whatever salient moving object is present during a "sensitive period" occurring shortly after hatching (Bornstein, 1989). Attachment formation takes far longer in humans than in birds, and we doubt whether imprinting in ducklings and attachment in humans should be viewed as the result of similar mechanisms. Nevertheless, Bowlby was influenced by Lorenz's work on imprinting when proposing a comparable predisposition in humans to form attachments. According to Bowlby, the consistency of the adults' presence and availability during the sensitive period—the first 6 postnatal months—determines to whom the baby will become attached. If there is no consistent caregiver over this period (as might occur in institutions like hospitals, for example), the baby would not form attachments (Figure 11.5). Bowlby and his cotheorist, Mary Ainsworth, believed that most babies develop a hierarchy of attachment figures and that their primary caregivers—usually their mothers—become primary attachment

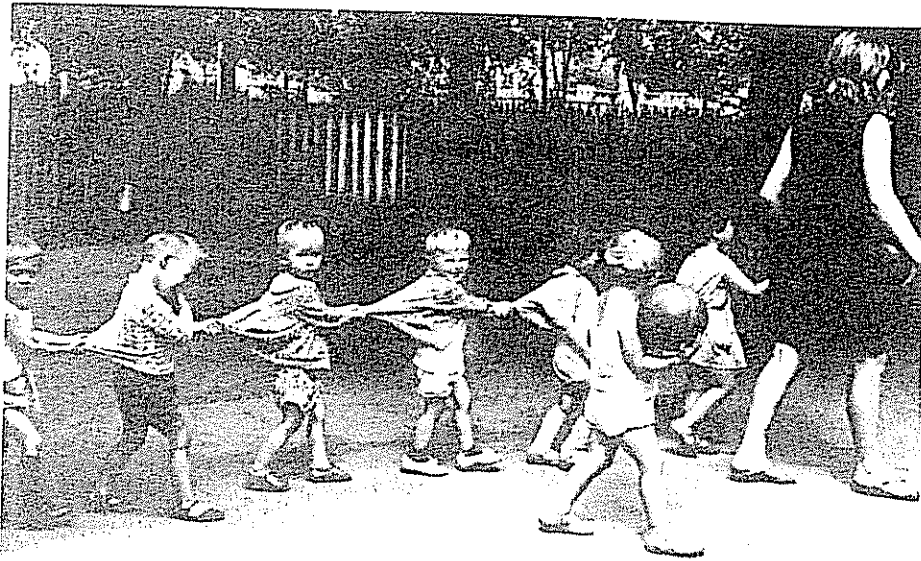


FIGURE 11.5

These children following their teacher remind us of the ducklings in Lorenz's description of imprinting

figures before any other relationships are formed. Once infants have this foundation, Ainsworth and Bowlby argued, they may (and often do) form relationships with others, for example, fathers, daycare workers, and older siblings. Obviously, there must be a minimal amount of time that these other individuals regularly interact with infants if attachments are to form, but unfortunately we do not know what this minimum level is or how it varies depending on the style or quality of interaction.

The amount of time adults spend with infants is not the only factor determining whether infant-adult attachments will form: The quality of adult-infant interaction also appears to be important. Bowlby and Ainsworth believed that infants become attached to those persons who have been associated over time with consistent, predictable, and appropriate responses to the baby's signals, as well as to their needs (e.g., Ainsworth, Blehar, Waters, & Wall, 1978; Cummings & Cummings, 2002; Thompson, 1998, 1999). The importance of the quality of interaction over and above the quantity of interaction is underscored by the evidence reviewed below, indicating that babies may become attached to both of their parents at about the same time, contrary to Ainsworth and Bowlby's hypothesis, even though they spend much less time with their fathers than with their mothers. Whether or not a baby becomes attached to and protests separation from someone seems to depend on the quality of their interaction, not on the amount of time (over and above some minimum) the baby spends with the person.

To Whom Do Infants Become Attached?

Before the mid-1970s, developmentalists assumed that infants formed their first and most important relationships with their mothers. Researchers still agree that mothers play a central role and that the stages and processes described

above apply especially well to the infant-mother attachment. This conception is too narrow, however, because it pays little attention to the ways in which the mother's other relationships might affect her relationship with the child and to the possible influences of fathers and other caregivers (Chapter 2). Developmental researchers are now keenly aware not only of the number of individuals (other than mothers) who may directly influence the child, but also of the elaborate ways in which children's behavior is affected by the multiple other social relationships in which they are involved. Because most of this chapter is implicitly concerned with the infant-mother relationship, here we focus most directly on infant-father relationships.

The Development of Father-Infant Attachments

There is substantial evidence that infants develop attachments to both their mothers and fathers (see Lamb, 1997, and 2002, for reviews). However, it was unclear how early in their lives infants form these attachments, because no data were available concerning the period between 6 and 9 months of age. Controversy also arose concerning the existence of preferences for mothers over fathers—some studies reported such preferences, whereas others failed to find them—and no data were available concerning father-infant interaction in the unstructured home environment rather than in the laboratory.

As Lamb (1997, 2002) concluded, studies of infant-mother and infant-father attachments have indicated that 7-, 8-, 12-, and 13-month-old infants show no systematic preference for either parent over the other on attachment behavior measures (their propensity to stay near, approach, touch, cry to, and ask to be held by specific adults), although these measures all show preferences for parents over a relatively unfamiliar adult visitor. Measures of separation protest and greeting behavior also show no preferences for either parent. Thus, most infants form attachments to both their parents at about the same time. When distressed, the display of attachment behaviors increases, and infants organize their behavior similarly around whichever parent is present. When both parents are present, distressed infants turn to their mothers preferentially. Interestingly, some boys show strong preferences for their fathers at home during the period that they turn to their mothers preferentially when distressed, suggesting that mothers are still deemed more reliable sources of comfort and security even when fathers become more desirable partners for playful interaction. These findings suggest that, although many infants become attached to both of their parents at the same time, they rank attachment figures in a hierarchy, with primary caregivers preferred.

Characteristics of Mother- and Father-Infant Interaction

Even in the first postnatal trimester, fathers and mothers appear to engage their infants in different types of interactions. When videotaped in face-to-face play with their one-half to 6-month-old infants, for example, fathers tend to provide staccato bursts of both physical and social stimulation, whereas mothers tend to be more rhythmic and containing (Barnard & Solchany, 2002; Parke, 2002; Teti, Bond, & Gibbs, 1988). Fathers continue to be more playful than mothers when interacting with their infants (Lamb, 1976b, 1977). Contrary to popular misconceptions, however, fathers are neither inept nor uninterested in interacting with

their newborns. When observed feeding their infants, for example, both fathers and mothers respond to their infants' cues, either with social bids or by adjusting the pace of the feeding (Lamb, 1999, 2000, 2002). Although fathers are capable of behaving sensitively, however, they tend to yield responsibility for child-tending chores to their wives when not asked to demonstrate their competence for investigators (Parke, 1996). With older infants, fathers tend to engage in more physically stimulating, unpredictable, and arousing play than do mothers (Lamb, 2002; Parke & Buriel, 1998).

Pedersen, Cain, and Zaslow (1982) suggested that these patterns of interaction may differ, at least in middle-income families, when both parents are employed full-time, however. When observed with their infants, employed mothers stimulated more than homemaker mothers and were far more active than their husbands. Fathers with homemaker wives played with their infants more than did the mothers, but this pattern was reversed in families with working mothers, even though maternal responsibility for caregiving did not differ depending on the mothers' employment status. In other research involving families in which Swedish fathers assumed a major role in childcare, as well as traditional Swedish (Lamb et al., 1982a) and American (Belsky, Gilstrap, & Rovine, 1984) families, however, parental gender appeared to have a much more powerful influence than did parental role and employment status: Fathers and mothers tended to behave in characteristically distinct ways. Mothers were more likely to kiss, hug, talk to, smile at, tend, or hold their infants than fathers were, regardless of their degree of involvement in caregiving.

On average, it appears that fathers spend less time than mothers do with their infants, and this is true of families in the United States, Australia, Belgium, and Great Britain, and of families of varying ethnicity in the United States (European American, African American, and Latin American) (Parke & Buriel, 1998). Despite recent increases in the amount of time children spend with their fathers, however, most fathers continue to assume little or no responsibility for their infants' care and rearing. Fathers typically see themselves (and are seen by their partners and others) as helpers rather than parents with a primary responsibility for caregiving. All parties see breadwinning as the primary responsibility of fathers. However, most infants must have enough "quality" interaction with their fathers, despite the low quantity, because most infants become attached to their fathers (Lamb, 2002). And when fathers do take a greater role in infant care, their responsiveness and sensitivity appear to increase (Lamb, 1997, 2002).

In summary, infants generally form attachments around the middle of the first year of life to those adults with whom they have had most consistent and extended interaction. Infants generally establish significant relationships with both of their parents, even though they tend to have three or four times as much interaction with their mothers as with their fathers. The types of interactions that infants have with their parents also tend to differ. When mothers assume primary responsibility for childcare within the family (as they typically do), infant-mother interactions are characterized by childcare activities, whereas infant-father interactions are dominated by play. As a result, relationships with the two parents are distinctive from a very early age. Infants also form relationships with siblings, peers, and nonfamilial caregivers as well as their parents (as we reported in Chapter 2). These early relationships with mothers, fathers, brothers, sisters, and others all ensure that the social world of the young infant is rich and that we need to consider all the people in the child's

social world when trying to understand the social context in which the infant is developing

Behavior Systems Relevant to Infant Attachment

In this section, we want to examine more closely the characteristics of infant-parent attachments, particularly those that distinguish attachment from nonattachment relationships. To do so, we must consider some additional facets of attachment theory. Ethologically oriented attachment theorists are particularly interested in the biologically adaptive function (i.e., survival value) of infants' behavioral tendencies. As a result, Bowlby (1969) stressed the fact that attachment behaviors promote proximity between infants and adults; proximity to protective caregivers is of obvious adaptive value to dependent and helpless infants. Bowlby drew on control systems theory to derive a metaphor for the functioning of the so-called attachment behavior system, which mediates multiple distinct behaviors (for example, directed crying and approaching), employed to achieve the same goal (proximity and protection). In addition to the attachment system, theorists such as Bischof (1975; Gubler & Bischof, 1991) suggested that three other systems also mediate infant social behavior. Each system controls a set of behaviors that have a common utility in achieving an adaptive goal. In this section we describe the four behavioral systems and the interrelations that exist among them.

Four Behavior Systems

The *attachment behavior system* controls or coordinates infant activities most clearly and obviously related to attaining and maintaining proximity to or contact with attachment figures. Examples of these behaviors are gestures or signals indicating a desire to be held, crying to a person, and so forth. These attachment behaviors are infrequently directed to persons to whom infants are not attached, which means that researchers can identify attachment figures by determining to whom babies direct these behaviors. The function of the attachment behavior system is to ensure that infants retain access to persons on whom they can rely for nurturance and protection. In the eyes of the ethologically oriented theorists, such behavioral propensities would have been of adaptive significance (i.e., would have maximized the probability of infant survival) in the "environment of evolutionary adaptedness."

The second behavior system is the *fear/wariness system*. It coordinates avoidant, wary, or fearful responses to strangers (Figure 11.6). These behaviors are quite unlike those controlled by the attachment behavior system, although both systems are of adaptive value. For the same reason that it is important for infants to ensure access or proximity to protective adults, it is of survival value to avoid encounters with unknown and potentially dangerous persons and situations. As we described in Chapter 10, apprehension over the appearance of strange persons becomes marked in many infants around 7 to 8 months of age. This apprehension is a product of the fear/wariness system.

Although it may be adaptive to be wary when first encountering strange persons, it is assuredly not adaptive for human infants to refuse all contact or



FIGURE 11.6
Although he had been interacting quite happily with this stranger a moment ago, this toddler is concerned when the stranger picks him up and soon reaches out toward his mother (Courtesy of R. A. Thompson)

interaction with nonattachment figures. Persons other than parents have a profound impact on psychosocial development, and most interactions in later life involve people to whom children are not attached. Consequently, it is not surprising that the wariness response diminishes rapidly over time, and infants eventually enter, albeit tentatively at first, into friendly interactions with nonattachment figures. This kind of interaction typically involves distal social behaviors like smiling and vocalizing and is mediated by the third behavior system, the *affiliative system*. During an intermediate period when both affiliation and fear/wariness are activated, coy responses may be prominent.

Unlike attachment behaviors, affiliative behaviors do not promote physical contact with the person to whom they are directed, and consequently affiliative behaviors (like vocalizing) are often used in interaction with attachment figures as well as with persons to whom babies are not attached. It is not possible to investigate attachment relations by considering only behaviors such as smiling, because they may reflect either attachment or affiliation.

The existence of the affiliative behavior system speaks to the importance of infants' interactions with persons to whom they are not attached. In the course of interaction with other people, babies have the opportunity to gain social competence and learn social skills through modeling and reinforcement (Figure 11.7). Affiliating with a variety of individuals sets the occasion for infants to learn how to modulate their style of interaction in accordance with each individual's characteristic and unique interpersonal style. Social stimulation also seems to influence the rate of cognitive development (Chapter 7). In all, therefore, infants benefit from their social interactions in a variety of ways.

Infants also engage in interaction with their physical environment in order to develop competence in and mastery over it (Wachs, in press). The *exploratory*

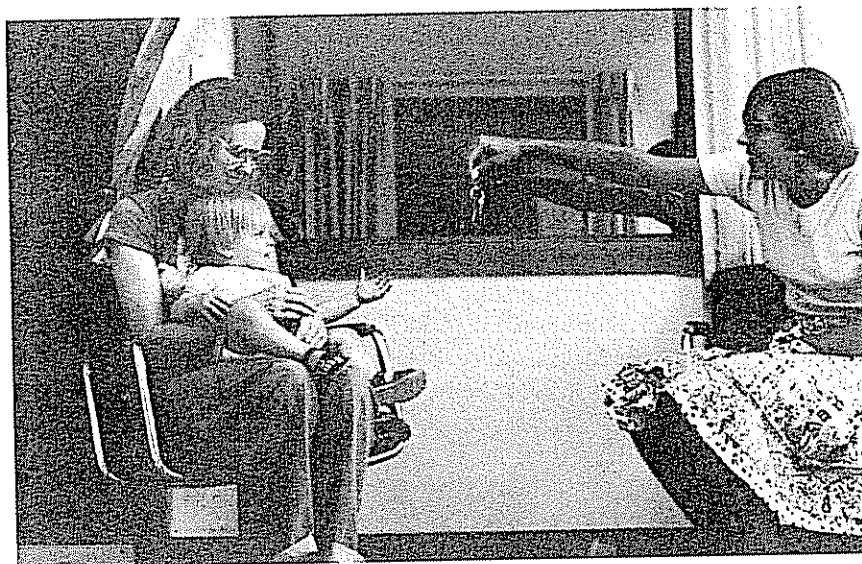


FIGURE 11 7

While gaining security from the close contact with mother, the toddler engages in friendly interaction with a stranger (Courtesy of R. A. Thompson)

behavior system mediates contacts with the physical or nonsocial environment, whereas "exploratory" social encounters are mediated by the affiliative system. The exploration and manipulation of objects also facilitate the development of cognitive competencies (Bornstein, 2002; Bornstein & Tamis-LeMonda, 1990; Keller & Boigs, 1991).

Interdependencies Among the Behavior Systems

One major claim of the ethological theorists is that the four behavior systems are complementary and interrelated rather than independent of one another. Furthermore, the immediate goals of all the behavior systems usually cannot be achieved simultaneously. Consequently, the degree to which one of the systems is activated influences arousal or inhibition of the others. The specific effects that any one system has on the arousal or inhibition of others can be predicted by considering the adaptive functions of the four systems; these predictions are generally supported by both anecdotal and scientific evidence about infant behavior. A few examples will suffice to demonstrate how these behavior systems operate and interrelate.

The appearance of an unfamiliar individual should, according to the ethological model, arouse the infant's fear/wariness behavioral system. In most cases, the infant's response involves both an attempt to avoid interaction with the stranger (fear/wariness) and an attempt to move closer to the familiar attachment figure (attachment). Furthermore, activation of either (or both) of these systems is incompatible with affiliation or exploration. Consequently, affiliation and exploration are typically inhibited when either the attachment or the fear/wariness system is activated. The corollary is also true: When infants are not distressed and are in familiar (and thus not anxiety-provoking) surroundings, they may feel free to engage in interaction with less familiar persons (i.e., the

affiliative system is activated) and to explore the environment actively (i.e., the exploratory system is activated) without notable concern for remaining near their attachment figures (i.e., the attachment system is either not activated or is inhibited). According to Ainsworth, the presence of attachment figures provides infants with sufficient security that they are able to explore the environment extensively and adaptively. Thus attachment figures provide infants with the "secure base" from which they can engage in interaction with other persons and explore the physical environment. In the next section we discuss individual differences in attachment and the extent to which adults actually serve as secure bases for their children.

The Security of Infant-Parent Attachments

Many proponents of attachment theory are clinically oriented scholars primarily interested in the ways that early attachment relationships affect subsequent development. To explore this question, Ainsworth developed a procedure—the Strange Situation—for assessing what she called "the security of attachment" (Ainsworth et al., 1978). She also provided an elegant and persuasive account of the relationships among early infant-mother interaction, security of infant attachment, and subsequent child development. In this section we first describe the Strange Situation procedure and Ainsworth's hypotheses concerning security of attachment and then summarize major research on this topic.

The "Strange Situation"

This popular technique to study attachment can be used only when infants are old enough to have formed attachments and are mobile, yet are not so old that brief separations and encounters with strangers are no longer noteworthy. As a result, the Strange Situation is appropriate for infants ranging in age from about 10 to 24 months. The procedure has seven episodes, which are outlined in Table 11.1. The procedure is designed to expose infants to increasing amounts of stress in order to observe how they organize their attachment behaviors around their parents when distressed. Stress is stimulated by an unfamiliar environment, the entrance of an unfamiliar adult, and two brief separations from the parent.

A Typology of Attachments

As suggested earlier, infants should be able to use attachment figures as secure bases from which to explore the novel environment. Considering the four behavior systems, the stranger's entrance should lead infants to inhibit exploration and draw a little closer to their parents, at least temporarily. The parents' departure should lead infants to attempt to bring them back by crying or searching, and to reduced exploration and affiliation. Following the parents' return, infants should seek to reengage in interaction and, if distressed, may wish to be cuddled and comforted. The same responses should occur, with somewhat greater intensity, following the second separation and reunion. In fact, this is precisely how about 65% of the infants studied in the United States behave in

TABLE 11.1 THE STRANGE SITUATION^a

<i>Episode^b</i>	<i>Persons Present</i>	<i>Change</i>
1	Parent, infant	Enter room
2	Parent, infant, stranger	Unfamiliar adult joins the dyad
3	Infant, stranger	Parent leaves
4	Parent, infant	Parent returns, stranger leaves
5	Infant	Parent leaves
6	Infant, stranger	Stranger returns
7	Parent, infant	Parent returns, Stranger leaves

^a After Ainsworth and Wittig (1969)

^b All episodes are usually 3 minutes long, but episodes 3, 5, and 6 can be curtailed if the infant becomes too distressed, and episodes 4 and 7 are sometimes extended

the Strange Situation (Teti & Teti, 1996; Thompson, 1998). Following the practices of Ainsworth and her colleagues, these infants (designated Type B) are regarded as securely attached because their behavior conforms to theoretical predictions about how babies should behave in relation to attachment figures.

By contrast, some infants seem unable to use their parents as secure bases from which to explore. Furthermore, although they are distressed by their parents' absence, they behave ambivalently on reunion, both seeking contact and interaction and angrily rejecting it when it is offered (Figure 11.8). These infants

FIGURE 11.8

When mother returns after a brief absence, the securely attached toddler approaches her and requests to be picked up. Insecurely attached toddlers may turn away or behave angrily toward their mothers after similar separations (Courtesy of R. A. Thompson.)



are conventionally labeled insecure-resistant or ambivalent (Type C). They typically account for about 10% to 15% of the infants in American research samples (Teti & Teti, 1996; Thompson, 1998).

A third group of infants seems little concerned by their parents' absence. Instead of greeting their parents on reunion, they actively avoid interaction and ignore their parents' bids. The infants are said to exhibit insecure-avoidant attachments (Type A); they typically constitute about 20% of the infants in American samples (Teti & Teti, 1996; Thompson, 1998). Main and her colleagues have also described a fourth group of infants whose behavior is "disoriented" and/or "disorganized" (Type D; Main & Solomon, 1991). These infants simultaneously display contradictory behavior patterns, manifest incomplete or indirected movements, and appear confused or apprehensive about approaching their parents.

Determinants of Strange Situation Behavior

Considerable debate has ensued about the origins of individual differences in infants' Strange Situation behavior. Attachment theorists have emphasized the role played by prior infant-mother interactions; critics have suggested that Strange Situation behavior reflects temperament as much as attachment security.

Parent-Child Interaction and Attachment Security

According to ethological attachment theorists, infants count on attachment figures to protect them and to be accessible when needed, and so use them as secure bases from which to explore and interact with other people. As noted above, however, infants do not trust their attachment figures equally, and these differences in security of attachment might affect how willingly infants will use their attachment figures as bases of security in situations like the Strange Situation. Almost from birth, infants learn about people from their interactions with them. Because adults differ in their style and sensitivity, differences should be evident among infants in the extent to which infants have confidence in their own effectiveness (ability to act on the environment successfully) and in the reliability of others (Ainsworth et al., 1978; Lamb, 1981a).

Since Ainsworth's hypotheses were proposed, many researchers have attempted to test them in independent longitudinal studies (see reviews by Thompson, 1998; Weinfield, Sroufe, Egeland, & Carlson, 1999). There appears to be general support for the notion that sensitive parenting—that is, nurturant, attentive, nonrestrictive parental care—and synchronous infant-mother interactions are associated with secure (Type B) infant behavior in the Strange Situation, and this appears to be true of U.S.-based samples as well as samples from cultures outside the United States (De Wolff & van IJzendoorn, 1997; Posada et al., 1999; Thompson, 1998). The mothers of infants who behave in either insecure-avoidant (Type A) or insecure-resistant (Type C) fashions manifest less socially desirable patterns of behavior: They may over- or understimulate, fail to make their behaviors contingent on infant behavior, appear cold or rejecting, and sometimes act ineptly. Because there is much variability in these results, it is difficult to identify precisely what aspects of parental behavior are important. Some studies identify warmth but not sensitivity, some patterning of stimulation but not warmth or amount of stimulation, and so forth. There does appear

to be some consensus, however, that insecure-avoidant attachments are associated with intrusive, overstimulating, rejecting parenting, whereas insecure-resistant attachments are linked to inconsistent, unresponsive parenting (Belsky, 1999; De Wolff & van IJzendoorn, 1997). Although the antecedents of disorganized (Type D) attachments are less well established, Type D attachments are more common among abused and maltreated infants and among infants exposed to other pathological caregiving environments (Lyons-Ruth & Jacobvitz, 1999; Teti, Gelfand, Messinger, & Isabella, 1995) and may be consequences of parental behaviors that infants find frightening or disturbing (Main & Hesse, 1990; Schuengel, Bakermans-Kranenburg, van IJzendoorn, & Bloom, 1999).

The Role of Infant Temperament

Although studies exploring the linkage between early temperament and attachment security are inconclusive, most researchers now believe that infant temperament has at least an indirect effect on Strange Situation behavior because it likely affects the quality of infant-parent interaction. In addition, temperament may affect how infants are influenced by their parents: Distractible babies, for example, may be less affected by their parents' behavior than attentive babies are. Most researchers suggest that temperament does not have a direct effect on whether or not infants are classified as Type A, B, or C, although early temperamental irritability does predict insecurity in later infancy (Crockenberg, 1981; Susman-Stillman, Kalkoske, Egeland, & Waldman, 1996; van den Boom, 1994; Vaughn & Bost, 1999).

Such findings do not specify the relation between temperament and attachment security. Most researchers have relied on parent-report measures of temperament, which are potentially unreliable, telling us not only about the baby's style but also about the parent's personality (Chapter 10). Thompson and Lamb (1982) suggested that temperament may affect only the degree of distress manifest in the Strange Situation. Thus, whereas the quality of infant-parent interaction would determine whether the child will become securely or insecurely attached, constitutionally based differences in irritability would determine whether the insecurity will be manifest in a low distress (i.e., avoidant) or high distress (i.e., resistant) fashion, and whether security will be manifest by high levels of distal interaction or high levels of contact seeking. Findings consistent with this hypothesis have also been reported by other researchers (Belsky & Rovine, 1987; Frodi & Thompson, 1985; Vaughn, Lefever, Seifer, & Barglow, 1989), but researchers using more objective measures of adrenocortical reactivity or emotional reactivity have obtained less conclusive results (Calkins & Fox, 1992; Gunnar, Mangelsdorf, Larson, & Hertsgaard, 1989; Hertsgaard, Gunnar, Erikson, & Nachmias, 1995; Nachmias, Gunnar, Mangelsdorf, Parritz, & Buss, 1996; Thompson & Lamb, 1984), leaving uncertain the constitutional bases of Strange Situation behavior. It remains likely, however, that temperament and attachment security are independent dimensions, with temperament affecting irritability and emotionality but not the security of attachment *per se*.

Such findings add credence to Ainsworth's (1989) notions about the origins of individual differences in Strange Situation behavior. Relatedly, Rothbart and Bates (1998) follow the lead of Thomas and Chess (1977), who argued that the "goodness-of-fit" between child and parent or context is of paramount importance, as it affects the quality of their interaction. From this perspective, the nature of the child's temperament is less important than the fit between that

temperament and the parents' own temperament and expectations. Because the same infant temperament may fit well with one parent and poorly with another, the role played by temperament in the establishment of attachment relationships is much harder to study and specify than it would have been had the association between temperament and attachment security been direct.

Stability of Infant Attachment

The notion that Strange Situation behavior reflects something that is not ephemeral but intrinsic to the relationship was initially supported by findings showing that there is remarkable stability over time in these patterns of infant behavior. Both Connell (1976) and Waters (1978) reported stability between 12 and 18 months of age in the way infants behaved in the Strange Situation when observed more than once with the same parent. According to Waters, 48 out of 50 infants—96%—obtained the same classification on both occasions. Later, Main and Cassidy (1988) reported a high degree of stability (84%) between 12-month assessments in the Strange Situation and 6-year assessments using a new observational procedure designed by Cassidy to study older children.

However, test-retest reliability is not always so high, and, in fact, short-term stability estimates for Strange Situation classifications show much variation (Thompson, 1998). In some cases, instability of attachment classifications are lawfully related to changes in infants' "social ecology." For example, in their study of attachment stability in an economically disadvantaged sample, Vaughn, Egeland, Sroufe, and Waters (1979) found that many infants changed from one classification to another between 12 and 18 months of age and that such changes were systematic: When the families had experienced considerable social stress during the 6-month period, Type B attachments often changed to Type A or C, although when families experienced a low degree of stress, Type A or C attachments did not necessarily become Type B. In a middle-income sample, Thompson, Lamb, and Estes (1982) found that major changes in family circumstances or caregiving arrangements (e.g., the onset of maternal employment) led to changes in infants' Strange Situation behavior, but they did not necessarily engender change from the more desirable B to the less desirable A and C types any more often than the reverse. In another study involving a middle-income sample, Belsky, Campbell, Cohn, and Moore (1996) found no stability in attachment security between 12 and 18 to 20 months of age, nor were they able to identify any reliable correlates of instability. Attachment theory would predict that changes in stability of attachments over time should be associated in some way with lawful changes in parental sensitivity (for example, a change from secure to insecure should coincide with a decrease across the same time period in parental sensitivity).

At this point, a coherent explanation of stability or instability in Strange Situation classifications remains to be provided. We propose that stability and instability of attachments in infancy may indeed be explained by continuities and discontinuities in parental behavior, although researchers still need to study representative samples of parents and infants in multiple, ecologically valid contexts over time in order to provide an adequate test of this hypothesis. It is also likely that changes in attachment security may be partially independent of parenting quality and may relate to normative family life transitions experienced by children. Teti, Sakin, Kucera, Corns, and Das Eiden (1996), for example, found that

→ the birth of a second child predicted a significant decrease in attachment security among firstborn children and that this decrease was not linked to changes, from before to after the birth, in mothers' sensitivity with their firstborns, mothers' levels of psychiatric symptoms, or mothers' reports of marital harmony. Indeed, the decrease in firstborn attachment security may have reflected changes in the children's perceptions of their relationships with their mothers in response to the introduction of the new family members, who may have been perceived as threats (Teti, 2002). Studies of attachment stability thus should take into consideration not just continuity and change in life circumstances and in parenting but also the manner in which children cope with and perceive normative life transitions.

Predictive Validity of Attachment Classifications

Another reason why attachment classifications intrigue developmentalists is that they appear to predict aspects of the child's future behavior. Like Erikson (1950), attachment theorists believe that when babies encounter people for the first time, they tend to assume that those persons will treat them in the same way that other people have treated them in the past. Thus, babies who have developed trust in their attachment figures will tend to regard the new people they encounter as trustworthy too. As babies get to know each individual, of course, they develop a set of expectations about that specific individual.

The relation between Strange Situation behavior and styles of interaction with others has been well documented (Berlin & Cassidy, 1999; Kerns, 1996; Sroufe, 1996; Teti, in press). Babies with Type B attachments to their mothers were later more cooperatively playful when interacting with a friendly stranger than were Type A or C infants. Similarly, quality of early attachment relates to social relationships in encounters with peers both at the same and at later points in time. Strange Situation behavior may affect social relationships in contemporaneous encounters with peers. Type B infants engage in more frequent, more prosocial, and more mature forms of interaction with their siblings and peers, sharing more and showing a greater capacity to initiate and maintain interactions, for example.

Other researchers have examined the relation between Strange Situation classifications and aspects of later achievement motivation in children (Frankel & Bates, 1990; Grossmann, Grossmann, & Zimmerman, 1999; Sroufe, 1983a, 1983b). They report that secure infant-mother attachments at 12 or 18 months are associated with superior problem-solving abilities in a variety of stressful and challenging contexts in the preschool years. In particular, children who showed Type B attachments to their mothers as infants persist longer and more enthusiastically in cognitively challenging situations than do children who had Type A or Type C attachments. Type B infants also seem to be more resilient and robust when stressed or challenged and appear more socially competent and independent when they later enter preschool (Teti & Teti, 1996). Insecure attachment in infancy, and in particular the disorganized/disoriented (Type D) classification, predict elevated rates of antisocial behavior in later childhood (Lyons-Ruth, Easterbrooks, Davidson, & Bronfman, 1995; Shaw, Owens, Vondra, Keenan, & Winslow, 1997).

Evidence concerning the temporal stability of Strange Situation behavior and its relations to measures of earlier infant-child interaction and later

child achievement and personality suggests that the Strange Situation measures some meaningful aspect of mother-infant attachment and has important implications for understanding and predicting development. Presumably, Strange Situation behavior with fathers affects development in analogous ways, although the child's relationships with primary attachment figures, be they mothers or fathers, is likely to be more significant than other attachment relationships.

Lamb and his colleagues (Lamb, Thompson, Gardner, & Charnov, 1985; Thompson, 1998) point out, however, that the degree of predictive validity is far from perfect. Rather, the relation between Strange Situation behavior in infancy and subsequent child behavior is found only when there is stability in caregiving arrangements and family circumstances, which (as we noted previously) seem to maintain stability in patterns of parent-child interaction subsequently reflected in similar patterns of Strange Situation behavior. This raises the interesting question we first encountered when considering the stability of cognition in infancy: Is the prediction over time attributable to individual differences in the quality of early infant-parent attachments? Or, is it attributable to the continuing quality of child-parent interactions over time? Researchers often assume the former, namely that Strange Situation behavior reflects a part of the child's personality. But, if the latter were true, it would imply that the quality of early relationships was predictively valuable not because it caused later differences directly, but because it presaged later differences in the quality of relationships that in turn support continuing differences in the child's behavior. Such a pattern of findings would place the locus of stability in continuing parent-child interactions rather than in some aspect of the child's personality. Surprisingly, this possibility has not yet been tested directly, although it has major relevance for long-standing assumptions concerning the critical importance of early experiences and is consistent with the transactional view of development.

Although Strange Situation behavior, prior infant-parent interaction, and the child's later behavior are all interrelated, correlations obtained among them are not very strong. This suggests that factors other than quality of attachment, such as temperament or familiarity with strangers and brief separations, influence Strange Situation behavior. In turn, this means that researchers need to rely on multiple converging methods to assess constructs as complex and as important as the quality of infant attachments, rather than rely on a single measure like the Strange Situation in which behavior is influenced by factors other than quality of attachment.

Cross-Cultural Research on the Attachment Typology

As Table 11.2 shows, the distribution of infants across the A, B, and C categories in many other countries appear to differ from that typically found in American samples, even though secondary analyses have shown that researchers in different countries apply the coding and classification criteria similarly (van IJzendoorn & Kroonenberg, 1990). These results could mean that parents in the cultures concerned were either much more or less sensitive than American parents, but this ethnocentric interpretation seems incorrect. Rather, the results may underscore the importance of factors other than the quality of parental behavior in explaining infant behavior in the Strange Situation (Lamb et al., 1985;

TABLE 11.2 DISTRIBUTION OF INFANTS ACROSS ATTACHMENT TYPES IN SELECTED STUDIES^a

Country	Reference	A	B	C
United States	Ainsworth et al (1978)	23	70	13
	Thompson et al. (1982)	7	30	6
	Belsky and Rovine (1988)	11	69	11
	Fracasso, Busch-Rossnagel, and Fisher (1993) (Latino immigrants)	15	25	10
Japan	Takahashi (1986)	0	41	19
	Durrett, Otaki, and Richards (1984)	5	24	7
Germany	Grossmann et al (1981)	24	16	6
Israel	Sagi et al (1985)	7	47	28
	Sagi et al. (1994)	0	20	5
The Netherlands	van IJzendoorn, Goossens, Kroonenberg, and Tavecchio (1985)	14	27	0
Sweden	Lamb et al (1982)	11	38	2

^a Values represent actual numbers of infants in each attachment category

Thompson, 1998). For example, the high degrees of stress manifest by Japanese and Israeli babies in the Strange Situation may have led to increases in the proportion of infants classified as Type C. The Japanese infants may appear inordinately distressed either because they have much less experience with separations from their mothers than American infants typically have, or because their mothers are much more stressed by the procedures (Grossmann & Grossmann, 1990); in either case the situation would not be psychologically similar for Japanese and American babies. Likewise, for infants growing up on Israeli kibbutzim, encounters with total strangers are more unusual and thus elicit great distress. Again, even though the procedure was structurally the same for Japanese, Israeli, and American infants, the psychological experiences or meaning for infants from each culture may have been very different (Bornstein, 1995). In addition, Miyake, Chen, and Campos (1985) reported that Japanese infants who were classified as Type C were temperamentally more irritable than Type B infants from birth. Thus, it appears that culture-specific rearing practices or temperamental differences may help to account for at least some of the variation in Strange Situation classifications across cultures. van IJzendoorn and Kroonenberg (1988) also showed that there is a great deal of intracultural variability, making it important not to reach conclusions about cross-cultural differences on the basis of small and often unrepresentative samples from each culture.

In summary, the picture emerging from the many studies in which Strange Situation behavior was assessed is complex. Strange Situation behavior appears to reflect individual differences in patterns of infant-parent interaction, with Type B attachments potentiated in Western cultures by warm, sensitive, and supportive parental behavior. Infant temperament appears to affect the degree of distress infants manifest in contexts like the Strange Situation (Vaughn & Bost, 1999), but it does not clearly determine the degree of security that the baby will manifest. However, other factors seem to be important as well, notably, culture-specific rearing practices. To understand the formative importance of

infant-parent attachment, we need to obtain multiple measures of attachment rather than rely exclusively on observations in the Strange Situation.

Parental Behavior and Interaction with Infants

Origins of Parenting Characteristics

The origins of individual differences in parenting are extremely complex, as we noted in Chapter 2, but most researchers consider six spheres of influence to be of paramount importance: (1) parents' enduring personality characteristics, (2) parents' beliefs, (3) situational influences on parents' psychological state, (4) the actual or perceived characteristics of the infants, (5) parents' attachment representations, and (6) critical events. In this section we discuss these factors as well as the principal domains of parenting interaction, including their stability, continuity, and covariation, correspondence with infant activity, and some cross-cultural variations in parental behavior.

Personality

Theorists have usually assumed that parental sensitivity reflects adults' enduring personality traits or predispositions, and that sensitive parenting is more likely to occur when parents are psychologically healthy (Belsky, 1999; Belsky & Barends, 2002; Teti et al., 1995). Characteristics such as self-centeredness and adaptability might be especially pertinent, for example. Parents' adaptability may be important in the infants' first few months, during which their infants' activities appear unpredictable and disorganized, their cues less distinct and undifferentiated, and the infants themselves generally less "readable." Self-centeredness may lead to insensitivity when adults fail to put infants' needs ahead of their own. Other important aspects of parental personality include self-efficacy in the parenting role, cheerfulness, agreeableness, and low levels of depression and anxiety (Belsky, 1999; Teti et al., 1995; Teti & Gelfand, 1997).

A central concept in understanding the determinants of parental sensitivity is the adults' perception of his or her *efficacy* as a parent (Teti & Gelfand, 1991, 1997). By definition, parents who believe that they are efficacious see themselves as competent caregivers and interpret interactions between themselves and their infants as enjoyable for the infants. Parental skill, of course, is not the only relevant factor here. A parent who feels incompetent may feel rewarded by even modest levels of success, and the infant's temperament, readability, predictability, and responsiveness also influence the effectiveness of any adult intervention. The same behavioral intervention may rapidly soothe one infant yet seem totally ineffective when another infant is involved, leading the parents of different infants to reach very different conclusions about their own competence as parents, despite superficial similarities in their behavioral styles. Through the quality and contingency of infants' responses, meanwhile, infants have a major impact on how parents perceive their own effectiveness. We return to these so-called infant effects later in this section.

Perceived efficacy is likely to affect parental sensitivity because parents who feel effective are reinforced and thus motivated to engage in further interaction, which in turn provides additional opportunities to read infants' signals,