Most of this chapter examines infant-mother attachment. We focus on the theorizing of John Bowlby and Mary Ainsworth, two pioneers of modern attachment research. We then examine the development of attachment, individual differences in the quality, or security, of attachment, and the causes and consequences of individual differences in quality of attachment for psychological development and well-being. In the final section we look at the evolution of childcare, applying inclusive-fitness theory and parental investment theory to examine the care that mothers, fathers, grandparents, stepparents, and adoptive parents devote to children.

Although his parents explained to 18-month-old Stevie that his mother would be going to the hospital for a few days, he did not really understand, and after a week of being cared for by his grandparents, he was excited when his mother came home. However, the abdominal surgery his mother had prevented her from picking him up, and this made him angry with her, which he expressed by sometimes refusing to look at her and generally pouting. But at other times he crawled into bed with his mother, put his head on her shoulder, and stroked her face. One week later, when Grandma and Grandpa returned to babysit, Stevie screamed as his mom and dad left the house, despite their promise that they would be back shortly. When Mom returned home from her doctor’s visit 2 hours later, Stevie’s attitude quickly changed. The little boy’s face burst into a huge grin, as he ran to his mother and hugged her legs. Although Stevie was not able to tell his mother in words, it seems that he was afraid that her departure and the arrival of his grandparents meant another long separation, and he was overjoyed when this was not the case.

Preverbal Stevie’s distress at separation from his mother and his joy at her return are reflections of his love for his mother. More specifically, Stevie’s behavior reflects his attachment to his mother. Broadly stated, the term attachment refers to the especially close emotional links established by a child with his or her primary caregiver(s), usually the mother, particularly visible through the sort of behaviors just described (for example, physical proximity to the caregiver(s); stress in her absence and in the presence of other less-familiar people) beginning during the second half of the first year of life. It is a biologically based motivational system that evolved to protect children from danger while motivating caregivers to provide care (Del Giudice, 2009).
Infants and children develop emotional relationships with the adults who care for them, and these relationships are of utmost importance for psychological development. In the previous chapter we discussed in some detail infants' and young children's abilities to express, recognize, understand, and regulate their emotions. Although emotions can be experienced in response to any environmental event, some of the strongest and most influential emotions are those related to other people, who often make us feel happy, sad, angry, or loved. As we noted in Chapter 11, infants experience many primary emotions within their first months of life. Developing over this same period and beyond is the closely related concept of attachment, or as it is sometimes referred to “emotional attachment." The focus of attachment research has always been on mothers, although babies become attached to fathers, grandparents, siblings, and many other people who are a regular part of their daily lives.

In this chapter, we begin with a brief history of attachment research, probably one of the more fascinating stories in modern developmental psychology. Later we provide a summary of the main concepts, ideas, and research on attachment through the progressive answering of a set of eight basic questions. In the final part of the chapter, we focus on the evolution of early parent-child care that anticipates the contents of Chapter 13 on the family.

### Attachment

#### A Brief History of Attachment Research

Attachment theory was originally proposed by John Bowlby, a British psychiatrist trained in the psychoanalytical approach. Bowlby's initial ideas about attachment were influenced by three sources: (1) the mystery of the high death rates of infants staying in hospitals and orphanages; (2) ethological research conducted by Konrad Lorenz and colleagues on imprinting in birds; and (3) research with primates by Harry Harlow on "mother love,” looking for the roots of an infant monkey's love for its mother.

#### Hospitals and Orphanages: Sources of Infant Grief and Death

One issue that attracted both the interest and efforts of physicians and other professionals during the second half of the 19th century and the first half of the 20th century was the surprisingly high rates of mortality experienced by infants who were living in orphanages or those who had to spend a significant amount of time in hospitals because of health problems. Death rates for infants within their first year usually exceeded 50%, sometimes much higher, which was attributed to unsanitary conditions (see Blum, 2002). To reduce infection, hospitals and orphanages minimized contact between parents, staff, and infants, meaning that the lives of infants and children in these institutions were nearly devoid of social contact. This change in procedure did reduce the death rates substantially, but many infants were still dying and showing extreme emotional distress despite the more sanitary conditions.

Some physicians and psychologists made the connection between the psychological isolation infants experienced in these institutions and the elevated death rates and emotional wasting. They began conducting research to test the effects of early infant-caregiver separations and/or the lack of significant primary relationships on development (Goldfarb, 1945, 1947; Spitz, 1945, 1946). For example, René Spitz (1945, 1949) compared the psychological development of two groups of institutionalized children. Infants in one group were raised by their own mothers, whereas infants in a second group were raised from the third month of life by overworked nursery staff. Spitz examined differences in motor, social, and intellectual development, as well as mortality, between the two
groups and reported remarkable differences. The mother-raised infants developed into psychologically competent toddlers, whereas the staff-reared infants showed significant signs of impairment for all aspects of psychological development. Perhaps most striking was the difference in mortality rates: Over a 5-year period, none of 239 mother-raised infants died, whereas 37% of the staff-raised infants died over a 2-year period. Later on, Spitz (1946, 1965) identified what he called hospitalism, an almost irreversible and deathly syndrome in children who were separated from their mothers or other significant caregivers for periods longer than 5 months during their first year of life.

The findings that the lack or interruption of significant social relationships early in life could have such dramatic consequences for children's development were in line with Bowlby's own clinical studies on juvenile thieves and their lack of significant primary relationships. Moreover, these observations made Bowlby more aware of the importance of infant-mother relationships and further increased his interest in trying to better describe their origins, mechanisms, and, if broken, their potential consequences.

Ethological Research by Lorenz and Colleagues on Imprinting in Birds

Whereas the plight of institutionalized infants made it clear to Bowlby that lack of early human contact resulted in psychopathology, evidence from the emerging field of ethology caused him to see that infant-mother attachment was important not just for humans but for many species. The work of Lorenz on imprinting in precocial (early-developing) birds particularly influenced Bowlby's thinking. Basically, Lorenz showed that, shortly after hatching, the offspring of geese, ducks, hens, and other precocial birds followed their mothers, keeping as near to them as possible, thus increasing their chances of survival. This research indicated that there was a limited time in which such imprinting could occur (a critical, or sensitive period, see Chapter 1) and that it occurred almost automatically, with little specific experience on the part of the chicks.

**hospitalism** The deteriorating effects on infants of long-term confinement to hospitals or similar institutions.
part three
social development: becoming a social being

Lorenz (1943) also noticed that in many species, including humans, infants’ immature features trigger caretaking behaviors. These include a head that is proportionally larger than the body, a forehead that is large in relation to the rest of the face, large eyes, rounded cheeks, a flat nose, and short limbs (see photo above of immature human features). Most adults find this combination of characteristics appealing, or cute, and are more apt to express interest in caring for younger-looking children than children who look older (Volk, Lukjanczuk, & Quinsey, 2007). Subsequent research confirmed many of Lorenz’s observations and explored other child characteristics that might foster caregivers’ attention and behavior (Alley, 1981, 1983). For example, people’s assessments of “cuteness” also vary with their age. The preference for “babyness” is first seen between the ages of 12 and 14 years in girls and a couple of years later in boys (who enter puberty later than girls), suggesting that it may have evolved to prepare adolescents for parenthood (Fullard & Reiling, 1976). Recent research has shown that premenopausal women (ages 19 to 26 and 45 to 51) were more sensitive to infant cuteness than men and postmenopausal women (53 to 60 years), suggesting a hormonal influence on perceptions of infant cuteness, at least in women (Sprengelmeyer et al., 2009).

John Bowlby found in ethology several promising hypotheses about what he later would call “attachment”: (1) the main function of early infant–mother links, from an evolutionary perspective, is survival. According to Bowlby (1973, p. 276), “Protection from predators is by far the most likely function of attachment behaviour,” and is seen in other species; (2) these links are especially significant early in life when human infants are particularly immature and helpless and are triggered in adults by some infantile features of babies; and (3) not all early close relationships in other species qualify as attachment: some, like those of birds, are automatic, triggered at birth (imprinting), and do not imply the development of any caregiver recognition and/or relationship, which is the case in humans. For Bowlby, only nonautomatic links, involving the development of relationships to significant adult caregivers (primarily the mother), as observed in mammals, including humans, qualified as attachment.

Why Do Infants Love Their Mothers So Much?
What is the origin of a child’s love for his or her mother? There have been several different approaches to this question over the years, depending on the theoretical orientation of the person asking this question (see Table 12.1). Perhaps no one took this question more seriously, however, than Harry Harlow, an animal psychologist working with monkeys at the University of Wisconsin. Harlow’s work challenged the dominant theory of
chapter twelve
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Harlow suggested that food and love were two independent (though obviously related) primary needs that had to be fulfilled in order for development to proceed typically. Harlow went on to do research demonstrating that creature comfort alone is not sufficient to raise a well-adjusted monkey; social relationships, particularly with one’s mother but also with peers, are vital (Harlow et al., 1966). Harlow spoke and wrote unabashedly of the nature of love and its importance in monkey and human development and that the first loving relationship a child has is with its mother. This is in stark contrast to the views of an earlier generation of psychologists. For instance, the radical behaviorist John B. Watson (1928) proposed that modern science could provide the means of rearing children better than tradition or the supposed instincts of mothers (Cairns & Cairns, 2006). Watson believed that parental love and affection were unnecessary for proper development, and, in fact, they were handicaps for raising a child to become a competent adult; too much mother love would make a child overly dependent on the approval of others and a social invalid (see Hilgard, 1987).

Harlow’s research and thoughts on the nature of love (particularly mother love) and its importance in monkey and human development were compelling for Bowlby, who joined them with evidence from the effects of social separation on institutionalized infants and ethology to set the foundation of his theory.

In the next sections we summarize the basic tenets and evidence for attachment, using the list of eight core questions shown in Concept Review 12.1 as a basis for our review.

Harlow and his colleagues, rhesus monkeys preferred their cloth “mothers” even though they were fed by the wire “mothers.”

In studies by Harry Harlow and his colleagues, rhesus monkeys preferred their cloth “mothers” even though they were fed by the wire “mothers.”

**table 12.1 Why Do Infants Love Their Mothers (or Primary Caregivers) So Much?**

<table>
<thead>
<tr>
<th>Theory</th>
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</tr>
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<tbody>
<tr>
<td>Psychoanalytic theory</td>
<td>“I love you because you feed me”</td>
</tr>
<tr>
<td>Learning theory</td>
<td>“Rewards lead to love”</td>
</tr>
<tr>
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</tr>
<tr>
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<td>“Perhaps I was born to love”</td>
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**Concept of Attachment**

Imagine yourself visiting with the mother of a 3-month-old baby. One thing you may observe is that the baby will be nearly as happy in your arms as she is in the arms of her mother and will not fuss if, while you are holding her, Mom walks away. This scene would likely be very different, however, just several months later. When you visit again 5 months later, this baby, when sitting on the floor playing with a toy, will likely look up occasionally to make sure Mom is still in the vicinity, crawl toward her if she moves away, and become distressed if Mom moves out of sight. Your presence will not help much and, in fact, may contribute to the infant’s distress.

Why this difference? What has changed between the first and the second time you were with the baby? The answer is attachment. At 3 months of age, the baby was not yet attached to her mother, at least following Bowlby’s definition, but she was by 8 months, and, accordingly, she felt uncomfortable exploring the environment and objects that surrounded her when mother was not near. She became especially stressed if mother disappeared for a while (referred to as separation distress) or in the presence of unfamiliar people (referred to as fear of strangers). This does not mean that 3-month-olds have no feelings for their mothers, and in fact, behaviors and experiences at 3 months are important precursors of later attachment behaviors (see Marvin & Britner, 1999).

In a broad sense, attachment has been described as a close emotional tie between two people that keeps them united over space and across time (Ainsworth, 1978). In a narrower sense, attachment describes the close emotional relationship that ties infants and young children to their primary caretakers, usually their mothers. Attachment is identified by a series of infant behaviors, including exploring their environment when in the presence of their attachment figure (this is what the primary caregiver is called in the field), anxiety when separated from their attachment figure, and wariness toward strangers (Cassidy & Marvin, 1992).

As mentioned earlier, Bowlby believed that an infant’s attachment to its mother had substantial survival value. It is possible that infants’ attachment to their mothers protected them not only from predators such as saber-toothed tigers but also from fellow humans including stepparents and co-wives (Hrdy, 1999; see discussion of filicide later...
Children are increasingly able to understand their caregivers’ behaviors and needs and to show a more balanced, two-way relationship with their caregivers.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Characteristics</th>
</tr>
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<tbody>
<tr>
<td>Preattachment (asocial attachment)</td>
<td>Babies display indiscriminate social responsiveness.</td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>Attachment-in-the-making (indiscriminate attachment)</td>
<td>Babies respond positively to nearly all normal-acting people and do not show substantial distress to strangers or to being separated from their primary caregiver.</td>
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</tr>
<tr>
<td>Clear-cut attachment (specific attachment)</td>
<td>Babies show a clear-cut interest in their main caregivers, usually their mothers, and react with distress when mothers leave them. They also typically display a wariness of strangers.</td>
</tr>
<tr>
<td>6–8 months to 18–24 months</td>
<td></td>
</tr>
<tr>
<td>Reciprocal-relationship 18–24 months onward</td>
<td>Children are increasingly able to understand their caregivers’ behaviors and needs and to show a more balanced, two-way relationship with their caregivers.</td>
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Stages of Attachment

Emotional attachment is not automatically established at the moment of birth but develops gradually. From birth, parents are responsive to their infants’ cries, coos, smiles, and movements, and infants respond in turn to their parents’ attention. The interactions that occur during feeding or diaper changing serve as the basis for later social relationships.

Early researchers identified four stages of attachment (Bowby, 1969; Schaffer & Emerson, 1964; see Howes, 1999 and Table 12.2). The first stage, called preattachment, or asocial, extends may assume attachment-like functions but are not attachment figures in the same sense” (p. 43). As Harlow and Bowlby noted, mothers are something special in the lives of young children, at least when it comes to attachment.

We should note that attachment describes only the strong emotional attraction that the babies feel toward their primary caregiver, usually their mother, and not the reverse. In other words, the attraction of mothers toward their children is another sort of relationship, sometimes called bonding, not attachment, and it has also been the object of research and debate (see Box 12.1). In fact, Harry and Margaret Harlow (1966) described five important relationships found in primates, including humans: attachment, bonding, peer relationships, sexual relationships, and father-offspring relationships. Therefore, as Thompson (2006) has noted, "children develop in an environment of relationships," with attachment being the first one.

### Stages of Attachments

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**bonding** The process of a mother’s “falling in love” with her infant shortly after birth.
BOX 12.1 food for thought

Mother-Infant Bonding

Bonding developed a specific meaning for psychologists and parents in the latter decades of the 20th century. Marshall Klaus and John Kennell (1976, 1982) used the word to describe a mother “falling in love” with her infant as a result of skin-to-skin contact between the just-born baby and its mother. According to Klaus and Kennell, there is a sensitive period surrounding the birth of a baby that is essential to this bonding experience, and although women will learn to love their infants without this experience, having it can facilitate the process. Klaus and Kennell reviewed research showing that women who had close physical contact with their newborns immediately after birth, and who continued to have an extra amount of contact with their infants in the days and weeks following birth, had more positive interactions with their babies over the course of the first year than did women who had a usual amount of contact. In some cases, the effects were found to persist for months and even years (O’Connor et al., 1980).

There was immediate and substantial criticism of Klaus and Kennell’s position (Goldberg, 1983; Lamb & Hwang, 1982). First, when examining other animals, the phenomenon of mother-infant bonding was best demonstrated in species such as goats and sheep that locomote shortly after birth. Bonding, it was argued, makes some sense for such animals, because mothers must be able to recognize and keep track of their young that may wander off. Bonding makes less sense for a species such as humans, whose young are so helplessly immobile that it will be months before they can even crawl away from mother, to say nothing of run away (Lamb & Hwang, 1982).

Not only did it make no sense, but in much of the bonding research, the mother’s motivation was not being taken into consideration. Women who seek out the bonding experience are likely to have different attitudes about babies and child-rearing than women who do not (Goldberg, 1983), and it may be this attitude, rather than the event, that is the principle factor in mothers’ feelings and behaviors. In fact, in a study that controlled for mothers’ motivation for having the bonding experience, no differences in mother-infant interactions were observed between women who had the critical skin-to-skin contact and those who did not (Svejda, Campos, & Emde, 1980). Moreover, for several generations, child-birth practices in North America and parts of Europe involved anesthetized deliveries, resulting in unconscious new mothers and groggy newborns. However, mothers still loved their babies.

The third stage of attachment, clear-cut attachment, or specific attachment, begins sometime early in the second part of the first year and extends to 18 to 24 months of age (see Figure 12.1). During this time, infants show a clear-cut interest in their primary caregivers, usually their mothers, and react with distress when mothers leave them, particularly in novel situations or with an unfamiliar (or even less-familiar) person, such as a babysitter. This can sometimes be distressing to fathers, aunts, or grandparents who find that their child/niece or nephew/grandchild is not happy to be in their care. As mentioned earlier, this is called separation distress, or separation protest, or sometimes separation anxiety. Other signs that children have established an emotional attachment, discussed briefly earlier in this chapter, include using their mothers as a secure base from which to explore novel environments (usually by
Maestripieri (2001) reviewed the research literature examining *adoption* in monkeys. He reasoned that if there is a mechanism like bonding in primates, it should be seen by a willingness of mother monkeys to adopt unrelated infants shortly after giving birth themselves, especially after the death of their own baby. This was indeed the pattern. In observations at zoos and primate research centers, mother monkeys whose infants had died were observed to adopt abandoned infant monkeys, or even to kidnap infant monkeys, with most instances occurring within two weeks of giving birth. The adopted babies were usually of the same sex and similar age as their own babies had been.

Also consistent with the bonding hypothesis, Maestripieri noted that (1) when monkey mothers are separated from their own infants *during* the bonding period, they later reject the infant (and other infants) if reunited *after* the bonding period; and (2) when mothers and infants are separated *after* the bonding period, they later accept their infant (but not other infants) if reunited some significant time later. The interpretation of these findings is that mothers bond with and will later recognize their infants if they are exposed to them shortly after giving birth (usually within the first two weeks), but not if they are separated from their infants during this sensitive time.

Why should such early nurturing behavior have evolved in a species such as monkeys, whose young cannot escape their mothers? Maestripieri argues that it was not in order to recognize their young, as seems to be the case for species such as goats and sheep, but to *motivate* mothers to care for their highly dependent offspring. In most cases in the wild, mothers will become attached to their own babies. Adopting unrelated infants is not an evolutionarily wise decision, but it is likely an infrequent event in nature. On average, heightened maternal sensitivity to infants in the immediate postpartum period produced mothers who cared for their own babies, despite producing the occasional “error” of caring for an unrelated infant.

Maestripieri’s evidence does not necessarily support Klaus and Kennell’s initial proposal, and the observations are with monkeys not with humans. Nevertheless, the neuroendocrine mechanisms associated with pregnancy and birth are similar in monkeys and humans, and there is some evidence in humans that mothers’ ability to recognize their infants on the basis of odor is influenced by “birth” hormones (Fleming et al., 1997). Perhaps it is time to revisit the bonding hypothesis in humans, although in a more cautious and conservative way.

---

12 months) and the so-called *fear* (or *wariness*) of *strangers*.

Although babies at this time do show decided preferences for specific people and often react with stress when held by unfamiliar people, we do not want to give the impression that infants of this age react fearfully to all unfamiliar adults in most situations. Infants and toddlers are learning about a social world that includes other people, and although they may initially be wary of strangers, they can behave very comfortably with them, especially if they are reassured by a parent. (Recall our discussion of social referencing in Chapter 11.) Moreover, the extent to which infants will be fearful of strangers depends on their previous experience. Babies who have spent most of their time in the sole care of their mothers are likely to display substantial distress when handed to an unfamiliar adult, whereas babies who have a history of interacting with fathers, siblings, grandparents, and other people in general will show less, or perhaps no, distress in a similar situation.

The fourth stage, referred to as *reciprocal relationship*, extends from 18 to 24 months on and reflects children’s increasing ability to understand their caregivers’ behaviors and needs, and, accordingly, to show a more balanced, two-way relationship with their caregivers. Children more readily establish new attachments beyond the earliest ones. All in all, the new cognitive and linguistic abilities children are acquiring at this time permit them to respond on being left by their attachment figure.

---

**separation distress (separation protest, separation anxiety)** infants’ distress response on being left by their attachment figure.

**fear (or wariness) of strangers** Pattern of behavior displayed by infants during second half of the first year that serves as an indication that the infant has developed an attachment for his or her caretaker.
Scottish sample were attached to only one person, and many were attached to five or more. That young children can establish multiple attachments with different people does not necessarily mean that all of the attachment figures have the same emotional ties to them. In fact, it was initially hypothesized that a hierarchy exists among the different attachment figures, with some (for example, mothers) being more significant for the children than others (Schaffer & Emerson, 1964). Yet, modern research shows that, rather than a hierarchy, children develop different sorts of attachments with different figures in a way that each of them fulfills some specific socioemotional need. A good example of this is illustrated by studies that focused on the often-forgotten role of fathers in attachment (Lamb, 1975; Parke, 2002, 2008) and its differences with attachment to mothers.

Fathers traditionally have had little role in caring for infants, and even today they spend much less time interacting with infants than do mothers (Hrdy, 1999; see discussion later in chapter). However, many contemporary fathers play an increasing role in the care of their infants, and research shows that they are quite competent (see Cabrera et al., 2000; Parke, 2002) and form attachments to their babies much as mothers do (see Parke, 2008). However, mothers’ and fathers’ interaction styles differ. Mothers more frequently take the role of primary caregiver and are thus more apt to hold and soothe their babies, to play traditional verbal games such as peek-a-boo and pat-a-cake, and to care for their babies’ needs. Fathers are more apt to play physical games with their babies involving unexpected reactions and stimulation (see Parke, 2008). Not surprisingly, babies often prefer their fathers at playtime and their mothers when they are distressed (Clarke-Stewart, 1980; Lamb, 1981).

Fathers and Multiple Attachments
As just noted, although mothers are usually children’s primary caregivers and thus their primary attachment figures (this is why most research on attachment has focused on infant-mother relationships), children also become attached to other people. In fact, attachment figures can be either female or male, kin or nonkin, including fathers, other family members (siblings, grandparents), adoptive parents, and even teachers and daycare providers. To whom the child is attached is therefore not as important as having at least someone to be attached to. (Mothers are special, however, as we will make clear in our discussion of an “Evolutionary Perspective of Childcare” later in this chapter.) According to Rudolph Schaffer and Peggy Emerson (1964), by 18 months, only 13% of children in their
attachment and early parent-child care

The test is built on the assumption that attachment behaviors are best elicited under conditions of mild stress. Briefly, the Strange Situation begins with a mother and her infant, between the ages of 12 and 18 months, entering a small room (although fathers and infants of other ages are sometimes tested, too). The mother interests the baby in some toys and allows the child to explore or play freely.

Moreover, it is possible for a child to be securely attached to one parent but insecurely attached to the other, with children who are securely attached to both parents showing better socioemotional adjustment than those who are securely attached to only one (Main & Weston, 1981). In other words, attachment to mothers and fathers tends to be specific to the relationship, contributing in different ways to a child’s care.

Types of Attachment

The age-related pattern we presented earlier may give the impression that attachment develops the same way for children all over the world. To some extent we believe this is true, for attachment to a primary caregiver was essential for the survival of infants in our species’ ancient past, continues to be critical for infants today, and is displayed, in one form or another, in most mammals. However, most research in attachment from its earliest days focused on individual differences. Although few infants fail to become attached to a primary caregiver, the quality of infant-mother attachment differs between individuals, and this has implications for later development.

As we have already pointed out, proximity to the mother or main caregiver, distress upon separation, and fear of strangers are three of the more visible signs of attachment. But how does one measure attachment scientifically, permitting the systematic assessment of different styles of attachment in children? The first and still most widely used method to measure the quality of attachment in children is a 20-minute test designed by Mary Ainsworth called the Strange Situation (see Table 12.3) (Ainsworth et al., 1978; Ainsworth & Wittig, 1969), which has been the workhorse of attachment research ever since its inception more than 30 years ago.

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<tr>
<th>Episode</th>
<th>Events</th>
<th>Attachment Behavior Observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Experimenter leaves parent and baby to play</td>
<td>Use of parent as secure base</td>
</tr>
<tr>
<td>2</td>
<td>Parent sits with baby</td>
<td>Fear of strangers</td>
</tr>
<tr>
<td>3</td>
<td>Stranger enters, talks to parent</td>
<td>Separation distress</td>
</tr>
<tr>
<td>4</td>
<td>Parent leaves, stranger lets baby play, offers comfort if needed</td>
<td>Separation distress</td>
</tr>
<tr>
<td>5</td>
<td>Parent returns, greets baby, offers comfort if needed, stranger leaves</td>
<td>Reactions to reunion</td>
</tr>
<tr>
<td>6</td>
<td>Parent leaves</td>
<td>Separation distress</td>
</tr>
<tr>
<td>7</td>
<td>Stranger enters, offers comfort</td>
<td>Fear of stranger; ability to be soothed by stranger</td>
</tr>
<tr>
<td>8</td>
<td>Parent returns, greets baby, offers comfort, lets baby return to play</td>
<td>Reactions to reunion</td>
</tr>
</tbody>
</table>

Table 12.4 Description of Different Styles of Attachment

<table>
<thead>
<tr>
<th>Child Behavior</th>
<th>Secure</th>
<th>Insecure-Resistant</th>
<th>Insecure-Avoidant</th>
<th>Disorganized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does infant explore when caregiver is present, providing a secure base for exploration?</td>
<td>Yes, actively</td>
<td>No, clings</td>
<td>Yes, but child’s play is not as constructive as that of secure infants</td>
<td>No</td>
</tr>
<tr>
<td>Does infant respond positively to the stranger?</td>
<td>Yes, if caregiver is present</td>
<td>No, even if caregiver is present</td>
<td>No, often indifferent to caregiver</td>
<td>No, confused responses</td>
</tr>
<tr>
<td>Does infant protest when separated from caregiver?</td>
<td>Yes, at least mildly</td>
<td>Yes, extremely upset</td>
<td>No, seemingly unfazed</td>
<td>Sometimes; unpredictable</td>
</tr>
<tr>
<td>How does the infant respond to the caregiver when she returns?</td>
<td>Reestablish contact when the caregiver returns</td>
<td>Display anger and initially rejection to contact when the caregiver returns</td>
<td>Avoid contact with caregiver when she returns</td>
<td>Display inconsistent patterns of responses to caregiver on her return</td>
</tr>
<tr>
<td>Parenting Style</td>
<td>Sensitive, responsive</td>
<td>Inconsistent, often unresponsive</td>
<td>Rejecting-unresponsive or intrusive and overly stimulating</td>
<td>Frightening (for example, abusive) or frightened (for example, overwhelmed)</td>
</tr>
</tbody>
</table>

This is followed by a series of approximately 3-minute periods of various activities by the adults in the study. First, an unfamiliar adult enters the room, talks to the mother, and interacts with the infant. Three minutes later, the mother goes out of the room, leaving the child with the stranger. Finally, the mother returns. The behaviors that are most important for evaluating quality of attachment are those of the baby when the mother returns. Do infants run to their mothers, and are they soothed by her presence, eventually leaving her side and exploring again? Do they cling to mom for the rest of the session, or perhaps refuse to make eye contact with her, sulking in the corner? Based on babies’ responses, Ainsworth and her colleagues developed three attachment classifications: secure, insecure-resistant, and insecure-avoidant (see Table 12.4). A fourth type, disorganized/disoriented (Main & Solomon, 1986) was included later. (To see a brief demonstration of the Strange Situation, go to http://www.youtube.com/watch?v=36Gl1PBQnM.)

Using the Strange Situation and based on mostly middle-class samples (see van Ijzendoorn et al., 1999), about 60% of the babies tested by Ainsworth and by others are classified as having secure attachment, at least in the United States. These infants actively explore while in the room with their mothers, and they become upset when their mothers leave them. When mother returns, a securely attached baby will often run or crawl to her, greeting her warmly. The mother is able to soothe the child to the extent that sometimes the child returns to play with the stranger.

Approximately 10% of the babies tested are classified as having insecure-resistant attachment, or ambivalent attachment. These infants appear anxious even with their mothers and tend not to explore much. They become very distressed when their mothers leave, but are ambivalent and display anger on her return. They stay near their mother after she returns but seemingly resent her earlier departure and often resist her attempts at contact. These babies are wary of the unfamiliar adult, even when the mother is present. These babies adopt a maximizing or overdependent strategy, exaggerating their signals of need in order to control their caregiver’s behavior.

About 15% of the babies tested are classified as having insecure-avoidant attachment. Unlike the insecure-resistant infants, they show little distress when their mothers depart, avoid contact with the mother when she returns, and usually do not show wariness of the stranger, although they may avoid the stranger, much as they do the mother. Their attachment strategy can be described as minimizing.

The final category, disorganized/disoriented attachment, was identified by Mary Main and

insecure-resistant attachment An insecure style of attachment in which infants keep very close to their caregivers and tend not to explore much. They become distressed when their caregivers leave temporarily but display anger and initially reject to contact when the caregivers return.

insecure-avoidant attachment An insecure style of attachment in which infants show little distress when their caregivers depart temporarily, avoid contact with them when they return, and usually do not show wariness of the stranger.

disorganized/disoriented attachment Attachment style in which infants seek to be close to their caregivers in inconsistent ways, often showing patterns typical of secure, insecure-avoidant, and/or insecure-resistant attachment simultaneously.
examined the behavior of 1,139 15-month-old children in the Strange Situation and found that, rather than classifying children in terms of specific styles as in the Ainsworth system, individual differences in attachment were better described in terms of two continuous variables: (1) proximity seeking versus avoidance, and (2) high versus low anger/resistance. This is a promising alternative to the categorical approach of Ainsworth and her followers, but, according to some experts, more than two dimensions are necessary in order for this approach to capture the richness afforded by Ainsworth's system (Thompson, 2006).

Cultural Differences in Attachment Classification

The distributions of children in each of Ainsworth's classification categories are based mostly on data from the United States, where Ainsworth developed the Strange Situation. In fact, the numbers we provided were for mostly middle-class samples. However, most research examining attachment classification across the globe has reported remarkably similar patterns as found for the United States, strongly suggesting that the phenomenon of attachment is truly universal, with secure attachment being the norm (van IJzendoorn & Sagi-Schwartz, 1999). About 15% of nonclinical middle-class children are classified as disorganized/disoriented. Unlike those in the three standard classifications, disorganized/disoriented infants show no coherent strategy for dealing with stress during separation and reunion in the Strange Situation. Disorganized/disoriented infants seek to be close to their mothers in inconsistent ways, often showing patterns typical of secure, insecure-avoidant, and/or insecure-resistant infants simultaneously (for example, strong approach to the mother followed by strong avoidance). They may sometimes look dazed and disoriented upon reunion with their mothers. They may freeze in the middle of movement, approach her backward, or wait an inordinate amount of time before deciding to approach her. They display high levels of motivational conflict, seemingly viewing their caregiver as both a source of comfort and fear.

The Strange Situation is not the only method available to measure the quality of attachment. For example, the Cassidy-Marvin system (Main & Cassidy, 1988; Cassidy & Marvin, 1992) assesses the quality of attachment by observing the behaviors of preschool children on reunion after one or several separations from a parent. Other measures assess attachment in a more indirect way. For instance, the Attachment Q-Set (Waters & Deane, 1985) uses the Q-sort method in which prepared statements are sorted into categories. The Attachment Q-Set consists of 90 statements, written on cards, describing children's (ages 1 to 5) behaviors (for example, "Child is strongly attracted to new activities and new toys"; "Child recognized when mother is upset. Becomes quiet or upset himself. Tries to comfort her"). The mother or a trained observer sorts cards into nine piles ranging from those in which the statements are "least like the child" to those that are "most like the child." After the statements have been sorted, the researcher compares the groupings to a profile for a securely attached child as defined by experts. The more similar the observer's groupings are with the expert's description, the more securely attached the child is.

Nor is Ainsworth's system of categorizing infants and children the only approach for describing individual differences in attachment styles. For instance, R. Chris Fraley and Susan Spieker (2003)
2008). Table 12.5 presents the percentage of infants classified as having secure, insecure-avoidant, and insecure-resistant attachments using the Strange Situation from different regions of the world (adapted from van IJzendoorn & Sagi-Schwartz, 2008). As you can see, for the most part, between about 60% and 70% of infants were classified as securely attached in samples ranging from traditional groups from Africa to the United States, China, Japan, Indonesia, Israel, and Western Europe.

However, it would be misleading to suggest that this pattern is the same in all cultural or subcultural groups. In fact, although most behavioral scientists believe that the attachment phenomenon captured by Ainsworth’s classification systems is universal, this does not necessarily mean that cultural differences should not be found. According to Marinus van IJzendoorn and Abraham Sagi (1999, p. 714), “the evolutionary perspective [of attachment] leaves room for globally adaptive behavioral propensities that become realized in a specific way dependent on the cultural niche in which the child has to survive.” Consistent with this perspective, some individual studies have reported substantial differences in the percentage of infants classified in the various attachment groups as a function of culture (Lamb et al., 1985; Thompson, 1998; van IJzendoorn & Sagi, 1999). For example, although about two-thirds of all Western European babies are classified as securely attached (see Table 12.5), this percentage was only 43% for a sample from northern Germany, with 46% of infants being classified as insecure-avoidant (Grossman et al., 1981, 1985).

Similarly, although 55% of Israeli infants growing up on a kibbutz (a group-living community) were classified as securely attached, 37% were described as insecure-resistant (Sagi et al., 1985).

Why the difference? Do the distributions in the United States, or perhaps Japan and (most of) Western Europe, where the proportions of children classified as securely attached are the highest, reflect the typical, or best-adjusted, pattern and the others reflect different levels of poor adjustment? Perhaps, but there is reason to believe that this is not the case. For example, it may be inappropriate to suggest national differences in attachment style, in that types of attachment can vary significantly within the same country (see van IJzendoorn & Kroonenberg, 1998, Thompson, 2006). Moreover, it seems that attachment practices in cultures different from the West may vary significantly. For example, in Bali, mothers use fake fear expressions (for example, calling out “Wild cat!” when none was around) to control their babies’ exploratory behaviors (Bateson & Mead, 1942); infants respond by stopping their exploration or running to the protection of their mothers. In Tikopia, a Micronesian society, attachment to a mother’s brother is promoted by systematically having “face-to-face talks” between infants and their uncles beginning early in life. Children’s maternal uncles play an important role in Tikopia society, and the Tikopians believe that it was important for an infant’s attachment not be too exclusive but to extend to important relatives (Firth, 1936). According to Bretherton (1992, p. 770), this can be understood by keeping in mind that “in both cultures [Bali and Tikopia], a biological system is molded to a particular society’s purposes.”

Other researchers have argued that the Strange Situation is not an appropriate measure of attachment in all countries but should be adapted for specific cultures (Colin, 1996). For instance, the Strange Situation was developed to represent a moderately stressful experience for an infant. The level of stress may be much greater for Japanese infants and for Israeli kibbutz-reared infants, who rarely encounter strangers, than for American babies (Thompson, 2006). Another possibility is that attachment is

<table>
<thead>
<tr>
<th>Country</th>
<th>Secure</th>
<th>Insecure-Avoidant</th>
<th>Insecure-Resistant</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States (21 samples)</td>
<td>67</td>
<td>21</td>
<td>12</td>
</tr>
<tr>
<td>Western Europe (9 samples)</td>
<td>66</td>
<td>28</td>
<td>6</td>
</tr>
<tr>
<td>China</td>
<td>68</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Indonesia</td>
<td>57</td>
<td>7</td>
<td>33</td>
</tr>
<tr>
<td>Japan (3 samples)</td>
<td>66</td>
<td>12</td>
<td>19</td>
</tr>
<tr>
<td>Israel (3 samples)</td>
<td>69</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>Uganda</td>
<td>57</td>
<td>18</td>
<td>25</td>
</tr>
<tr>
<td>Gusii (Africa)</td>
<td>61</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Dogon (Africa)</td>
<td>69</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Khayelitsha (Africa)</td>
<td>72</td>
<td>17</td>
<td>11</td>
</tr>
</tbody>
</table>


Table 12.5 Distribution (%) of the Attachment Types (Secure, Insecure-Avoidant, and Insecure-Resistant) in Several Countries
expressed differently in different cultures. For example, securely attached Gusii infants from Western Kenya are greeted by handshakes from their mothers instead of hugs (Kermoian & Leiderman, 1986).

As noted in the beginning of this section, infants in most cultures are securely attached to their caregivers. However, some cultures, or specific groups within a culture, do show different patterns of attachment type, and there is currently no consensus on why they exist. Thus, there continues to be a need for more multicultural research on attachment using different procedures of assessment (van Ijzendoorn & Sagi, 1999; van Ijzendoorn & Sagi-Schwartz, 2008). Although attachment seems to be a universal phenomenon, a more culturally sensitive approach to the assessment of the attachment types, causes, and outcomes is called for.

Causes of Individual Differences in Attachment

Knowing that there are differences in quality of attachment that can be measured by the Strange Situation is only a beginning. Here we address the questions: “How do such differences arise?” and, particularly, “What promotes the establishment of a secure attachment?” Bowlby (1969), based on the evolutionary roots of attachment, emphasized that all children, beginning early in life, exhibit a series of attachment behaviors and attachment signs. The main purpose of attachment behaviors is to keep the mother in close proximity. These include behaviors such as following or climbing on the mother, actions that children use to stay close by the mother. In contrast, the main purpose of attachment signs is to attract the mother to the child. These include behaviors such as crying or smiling that serve as signals to parents to provide care. Ainsworth and her colleagues (1978), in contrast, emphasized maternal sensitivity as the main cause of individual differences in quality of attachment. These pioneers had more to say about the nature of attachment, and research evidence over the years has provided a more complete picture of the causes and consequences of attachment.

Availability of an Attachment Figure

Although it may seem obvious, the first and most important factor that affects the quality of attachment is the availability of a stable attachment figure. Many different variables can influence the quality of attachment, but, initially, nothing is as important as having someone to attach to. The relevance of this factor has been repeatedly shown by studies in which infants live in overcrowded and understaffed institutions where, although they may receive adequate nutritional and medical care, they are sorely lacking in interactions with a stable caretaker (Spitz, 1945, 1965; Bowlby, 1960). Such infants display severe social, emotional, and intellectual deficits. We briefly discussed a study by Spitz (1945) earlier in this chapter and looked at some of these studies in Chapter 10 on intelligence.

One factor that was proposed to influence the quality of attachment (especially during the early days of attachment research) was whether infants and children spend most of their time in the home with their mothers or whether they spend a significant amount of time in out-of-home care. Daycare has become a fact of life for most American families. Approximately 70% of women with preschool children in the United States work outside of the home, many full time. This figure is even greater in other countries (Melhuish, 2005). As children from all walks of life increasingly began to attend daycare beginning in the 1970s and 1980s, there was great concern that spending so much time out of the home in nonparental care would be harmful for children, particularly with respect to infant-mother attachment. The worst fears of psychologists and social-policy makers were not confirmed (Scarr, Phillips, & McCartney, 1990), but there have been lingering concerns that prolonged daycare experience can have some negative long-term effects on children (see Belsky, 1988; Lamb & Ahnert, 2006). We discuss some of these issues in Box 12.2.

Parental Sensitivity to Infants’ Signals

Early research showed that mothers of securely attached infants are responsive to their babies’ emotional signals, encourage them to explore, and seem to enjoy close contact with them. These women respond appropriately and reliably to the cues their babies send, and their babies are able to predict reasonably well what to expect in a wide range of situations (Ainsworth et al., 1978). Mothers of insecure-resistant infants are also interested in their babies, but they frequently misinterpret their infants’ signals. They are out of sync with their babies’ schedules and are often inconsistent in the enthusiasm they show toward their infants. In contrast, mothers of insecure-avoidant infants show a lack of interest in their babies—sometimes an overt resentment. They are generally unresponsive to their infants’ signals (Ainsworth, 1979). These patterns do not hold up for all mothers and babies, but there is clear evidence that how mothers respond to their infants over the first year of life greatly influences the quality of attachment (see Belsky, 1999; Koren-Karie et al., 2002).

But is it really mothers’ sensitivity to read and respond to their infants that is so important in determining security of attachment? It seems so, at least in part. For example, there is no evidence that individual differences in security of attachment are heritable (that is, behavioral genetic studies indicate only
Part Three

Social Development: Becoming a Social Being

Interactional Synchrony

Other factors in addition to sensitivity, such as the quality of the marital relationship, the presence of psychological problems such as depression or anxiety in mothers, and the general level of stress in the home, also contribute to attachment security (Cummings & Davies, 1994; Meins et al., 2003; van IJzendoorn & De Wolff, 1997). One important influence on attachment style is the extent to which parents and infants establish a fluid, dyadic (two-way), and coordinated relationship. Bowlby (1969) viewed attachment in terms of a “goal-corrected partnership,” meaning that what actually matters is interaction, with the quality of attachment relying to a significant degree on the quality of the social interaction between mother (or the primary caregiver) and the child. This interactional synchrony is often described as a sort of dance where partners take turns responding to each other’s leads. This is easily seen, for example, during feeding, when the mother and the infant establish a rhythm of presenting

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**Box 12.2 Child Development in the Real World**

Daycare and Attachment

How does attending daycare affect infant-mother attachment? Do children who spend all day in daycare have different attachment relationships with their mothers? Do they develop different social, emotional, or cognitive skills than children who remain at home with their mothers?

First, daycare attendance does not dissolve the attachment relationships between infants and mothers. Early research on this topic showed that infants still preferred their mothers to their substitute caregivers (see Belsky & Steinberg, 1978; Clarke-Stewart & Fein, 1983). Differences have been found, however, in the security of infant-mother attachment between infants who attend daycare and those who are reared at home. For example, K. Allison Clarke-Stewart (1989) examined 17 published studies that evaluated the quality of attachment between children and their mothers using Ainsworth’s Strange Situation. She reported that infants whose mothers worked full-time were more likely to be classified as insecurely attached (36%) than infants whose mothers did not work or who worked only part-time (29%). With a sample of 1,247 mother/infant pairs, this 7% difference was significantly greater than expected by chance. Other researchers reported similar findings (Belsky, 1988; Bokhorst et al., 2003; see Thompson, 2006), and infant temperament does not seem to be directly related to attachment quality (see Thompson, 1998). In an interesting study, researchers evaluated the quality of attachment of infants placed in foster care. They also assessed the children’s biological and foster mothers. The attachment style of the children was better predicted by the behavior of their foster mothers than by their biological mothers (Dozier et al., 2001). That is, foster mothers who were more sensitive to infants’ signals were more likely to have securely attached children regardless of the attachment style of the children’s biological mothers. In other words, the behaviors of the foster mothers—specifically their sensitivity to infants’ signals of physical and social needs—were primarily what governed individual differences in quality of attachment.

Interpersonal synchrony

Mother-infant harmonious interaction, where partners take turns responding to each other’s leads, needs, and emotions.

The effects on infant-mother attachment of attending quality daycare are small and controversial. There also seem to be some cognitive benefits for children who attend daycare, although such children are also apt to show higher levels of aggression than are children in maternal care.

Michelle Del Guercio/Photo Researchers, Inc.

The effects on infant-mother attachment of attending quality daycare are small and controversial. There also seem to be some cognitive benefits for children who attend daycare, although such children are also apt to show higher levels of aggression than are children in maternal care.

Lamb, Sternberg, & Prodromidis, 1992). Nonetheless, the difference is small, and Clarke-Stewart (1989) suggested it might be because infants attending daycare may not feel as anxious about separating from their mothers in the Strange Situation as stay-at-home infants. In fact, when mothers, teachers, or observers rate quality of attachment

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in daily settings, no differences have been found between infants of working and non-working mothers (Belsky, 1988). Even if the attachment differences between the infants of working and non-working mothers are real, they are not substantial and, according to Sandra Scarr and her colleagues (1990), do not constitute evidence of greater risk.

In addition to examining the effect of daycare on attachment, researchers also investigated the relationship between daycare attendance and social and intellectual development. Here the picture is mixed. Children who attend daycare have been found to display elevated levels of aggressive behavior toward peers (Belsky, 2001) and more externalizing problems and conflict with adults when they are in kindergarten (NICHD Early Child Care Research Network, 2003a) relative to children in maternal care. Moreover, children who regularly attend more than one childcare facility display more behavior problems and show less socially positive behavior than children who attend only a single daycare facility (Morrissey, 2009). In contrast, with respect to cognitive development, children who attend daycare often display enhanced intellectual functioning, especially for low-income children attending quality daycare (NICHD Early Child Care Research Network, 2003b, 2006; Marshall, 2004; Votruba-Drzal, Coley, & Chase-Lansdale, 2004). In fact, the most recent research based on longitudinal observations of more than 1,300 children reports that higher-quality daycare was associated with higher vocabulary scores through the end of sixth grade (Belsky et al., 2007; see also NICHD Early Child Care Research Network, 2006).

What, however, constitutes quality daycare? More than two decades ago, Sandra Scarr and her associates (1990) listed three features of daycare that are associated with the quality of a child’s experience: caregiver-to-child ratio, group size, and caregiver training and experience (see also Lamb & Ahnert, 2006; Marshall, 2004; Melhuish, 2005). A ratio of one caregiver to four or fewer children ensures greater physical safety and more individual attention (talking and playing). Similarly, the fewer children there are in a daycare group, the more social and intellectual stimulation children receive (de Schipper, Riksen-Walraven, & Geurts, 2006). And not surprisingly, the number of years of child-related education and work experience a daycare provider has is related to greater social and cognitive competence in children. There is nothing magic about the relationship between years of education and enhanced developmental outcomes for children. Daycare providers with more education have been found to be more responsive to children and to provide more age-appropriate activities and learning opportunities to children than daycare providers with less education (see Marshall, 2004; Scarr et al., 1990).

Although many factors influence the type of experience a child has in daycare, generally speaking, quality daycare represents no risk to children. In fact, high-quality daycare has been associated with enhanced social, emotional, and cognitive benefits, particularly for children from disadvantaged backgrounds (Peisner-Feinberg et al., 2001; NICHD Early Child Care Research Network, 2006). One problem is that quality daycare is expensive. Unlike most European countries, the United States has no national policy on childcare and has made no commitment to provide quality child care for all families that need it. It is too late to tell mothers to stay at home with their children. As K. Allison Clarke-Stewart (1989, pp. 271–272) wrote more than 20 years ago: “Maternal employment is a reality. The issue today, therefore, is not whether infants should be in day care but how to make their experiences there and at home supportive of their development and of their parents’ peace of mind.”

the breast or bottle, nursing, and pausing, coordinated with periods of gentle rocking (Feldman, 2007; Kaye, 1982). Such synchrony and mother’s sensitivity to her infant’s signals are probably more easily seen when babies are being spoon-fed. When a mother is feeding her baby strained peas, for example, is she sensitive to what her baby is doing or wants? Does she wait for her infant to open his mouth, make eye contact, and perhaps lean toward him, or is she feeding baby on her own schedule, shoveling food into the little mouth whether the infant is showing signs of readiness or not?

Positive interactional synchrony implies that mothers are sensitive to their infants’ signals of physical and social need but extends beyond simple sensitivity. Such synchrony (also called caregiver attunement, Harrist & Waugh, 2002) involves relatively prolonged periods of interactional exchanges with coordination of bodies and facial expressions over time. Mothers are not just behaving at their babies, putting a spoon in their mouths at irregular intervals independent of whether the baby is ready for another spoonful or not; rather, they are behaving with their babies, coordinating their actions, including facial expressions, contingent on those of their infant (Harrist & Waugh, 2002). We have all seen mothers (and fathers) with their infants in such coordinated interactions, and one can understand why it is sometimes called a dance. The importance of interactional synchrony was demonstrated in a meta-analysis examining factors that contribute to security of attachment; synchrony was found to be as important as parental sensitivity in predicting quality of attachment (De Wolff & van IJzendoorn, 1997).

Maternal depression is one factor that has consistently been found to be related to quality of infant-mother interactional synchrony. Perhaps not surprisingly, depressed mothers are not as responsive to their infants as are mothers without depression, and their infants display more negative and less positive emotions and generally low levels of activity (Dawson et al., 1999; Field, 1995). Infants of depressed mothers also show greater
internalizing (for example, anxiety) and externalizing (for example, acting out) problems in later childhood (Gross et al., 1995; Zahn-Waxler et al., 1990). These behaviors are mirrored by differences in brain activity, especially lower levels of frontal cortex activity relative to children of nondepressed mothers (Dawson et al., 2003; Jones, Field, & Davalos, 2000).

Cognitive Factors Involved in Attachment

Cognitive developmental theory has been applied to explaining at least some aspects of the infant-mother attachment. Infants are born into a social world, and it would make sense for them to be prepared to perceive and respond to social stimuli. Research findings over the past 40 years clearly point to this conclusion (see Flavell, 2000; Kagan, 1984). Counter to beliefs prevalent throughout the first half of the 20th century, all sensory systems are functioning to some extent at birth, and infants are not born as blank slates (see Chapter 5). Rather, they prefer to look at, smell, and hear certain things. Many of these early preferences result in babies being oriented to other humans, because the things they prefer to look at, hear, and smell are associated with people.

For example, very young infants show a preference for the human face (Easterbrook et al., 1999; Maurer & Barrera, 1981) and can seemingly recognize faces hours after birth (Mondloch et al., 1999; Morton & Johnson, 1991). Also, the lenses of infants’ eyes do not focus well for the first 2 months of life, with objects being most in focus only when they are a specific distance from their eyes. This distance is about 8 to 10 inches (Banks, 1980; Haynes, White, & Held, 1965), which is about the distance an infant’s face is from its mother’s face during nursing. Thus, if babies are going to see something with relative clarity, that something is likely to be an important social stimulus. Newborns are also able to recognize their mother’s voice after birth (based on prenatal experience, DeCasper & Spence, 1986), and they prefer the odors of their mothers to those of other women within 2 weeks of age (Macfarlane, 1975). Newborns have also been shown to match the facial expressions of adults (neonatal imitation, Meltzoff & Moore, 1977; Nagy, 2006; see Chapter 5), which may maintain face-to-face interactions at a time when infants have little intentional control of their own social behavior.

A second line of cognitive research suggests that children’s developing representational abilities influence their attachments. For example, Piaget proposed that infants develop a notion of object permanence, the concept that objects continue to exist even after they are out of an infant’s immediate perception (see Chapters 5 and 6). For instance, babies in the first half of their first year behave as if their bottle that is covered by a cloth, or falls out of their crib, no longer exists. Out of sight is out of mind, quite literally. This applies to an infant’s attachment figure as well as to the bottle. Early researchers showed a connection between retrieving a covered object and attachment behavior in the middle of the first year of life (Schaffer, 1971). That is, babies who acted as if an object that was out of sight no longer existed showed fewer attachment behaviors than babies who knew that the covered object continued to exist in time and space.

Stability and Consequences of Secure (and Insecure) Attachment

Stability of Attachment over Time

Do attachment styles remain stable over time? If a child is classified as securely attached at 12 months, what is the likelihood that he or she will be similarly classified at 18 months? At 5 years? The research literature suggests that there is a moderate degree of stability of attachment over brief periods of time, although the degree of stability can be highly variable depending on the conditions in which children and their parents are living. For instance, in a summary of studies examining stability of attachment over periods ranging from 6 to 11 months (all using the Strange Situation on both occasions, and ranging in age of infants from 12 to 23 months), the percentage of infants who were classified the same at the two testing periods ranged between 30% and 96%, with a median value of 59% (Thompson, 2006).

Why the variation? One possibility is related to changes in ecological conditions during the testing interval. For example, in one study (Egeland & Sroufe, 1981), attachment classification for a low-income group of 12-month-old infants who were receiving excellent care was the same at 18 months in 81% of the cases. In contrast, attachment classification was much less stable (only 48%) for a group of infants who were being neglected or abused. Thus, when the environment is stable and of high quality, quality of attachment is also likely to be stable over time; when the environment is disruptive and unpredictable, as in homes where children are...
maltreated, changes in the quality of attachment can also be expected (see also Moss et al., 2005). In other words, highly stressful circumstances (for example, maltreatment, serious illness, divorce, parental loss) may provoke changes in parental sensitivity, which in turn will result in changes in quality of attachment (Thompson, 2006). However, changes from insensitive to more sensitive parenting can also result in changes in attachment style, in this case from insecure to secure.

The relationship between maternal responsiveness and attachment is illustrated in a study that assessed maternal responsiveness during infancy and at 12 years of age (Beckworth, Rodning, & Cohen, 1992). Mothers used the Attachment Q-Set to evaluate their children’s attachment-related behavior at age 12, and the researchers assessed children’s functioning on a variety of psychological measures at age 12. Not surprisingly, children who had mothers who were highly responsive both during infancy and at 12 years were functioning well. However, so were the children whose mothers were relatively unresponsive during infancy but became responsive at age 12. Both groups of children who had responsive mothers at age 12 had higher IQ scores, performed better on tests of mathematics, had more positive self-esteem, and had fewer behavioral or emotional problems than children who had consistently unresponsive mothers (both during infancy and at age 12). These findings indicate that when maternal responsiveness increases, the likelihood of a positive outcome also increases, suggesting that whatever effect quality of attachment (or maternal responsiveness) during infancy may have, it does not destine a child to any particular behavioral outcome in the future.

It is unlikely that being securely attached in infancy causes children to be securely attached in childhood or causes them to be more socially competent or intellectually advanced at age 12 or later on. Rather, securely attached infants receive greater support from their families in exploring the environment and feel secure and comfortable doing so. As these children grow older and their motor and cognitive skills become more advanced, they continue to receive support from their parents. That is, stability of attachment is usually correlated with continuity of parenting styles over time (Grossmann, Grossmann, & Waters, 2005; Waters, Weinfield, & Hamilton, 2000). Children who have sensitive and responsive parents at 6, 12, and 18 months usually have sensitive and responsive parents at 3 and 5 years (Arend et al., 1979). The same parental qualities that promote secure attachment in infancy also promote the development of social and intellectual competence and of secure attachment during childhood.

Consequences of Secure (and Insecure) Attachment

Attachment has long been recognized as important for psychological development. For example, Bowlby (1969, 1973) noted that hard-core delinquent boys often shared one thing in common: They had never formed a warm attachment in infancy, making it difficult for them to form healthy social relationships later in life and giving them a dissociative perspective on the world (see also Crenshaw & Garbarino, 2007). One of the most investigated topics in attachment research is the consequence of attachment classification in infancy on a host of psychological factors later in life (see Belsky, 1999; Thompson, 2006).

Does secure attachment, as one might expect, lead to better psychological adjustment than the various types of insecure or disorganized attachment? The general answer to this question is “yes.” In most cases, children who were classified as securely attached in infancy show better psychological adjustment in later childhood. In fact, the positive effects of secure attachment are so many and so rich that Teresa McDevitt and Jeanne Ormond (2004) described secure attachment as a “multivitamin” that prevents problems and fosters healthy development.

The research literature on the relationship of quality of attachment to later development is “dizzying” (Thompson, 2006) and covers almost every imaginable topic in cognitive, social, and emotional development. For example, research has shown that children with secure attachment are more independent and explore their environments more extensively and with greater autonomy than do insecurely attached children (Ainsworth et al., 1978; Hazen & Durrett, 1982). They also display richer and better organized symbolic play from 2 to 7 years old (Pipp, Easterbrooks, & Harmon, 1992; Slade, 1987), show more persistence in problem solving when they are 2 years old (Matas, Arend, & Sroufe, 1978), and have better conscience development (Kochanska et al., 2004). They have better relationships with their parents and peers than do children who are classified as insecurely attached (see McElwain et al., 2005; Schneider et al., 2001; Sroufe et al., 2005), and they display more positive personality characteristics, such as self-esteem, self-confidence, and general emotional health (Sroufe et al., 2005).

Some studies report lower levels of internalizing (for example, anxiety) and externalizing (for example, acting out) behavior problems for securely attached versus insecurely or disorganized/disoriented attached children (Feareon et al., 2010; Lewis et al., 1984; McCartney et al., 2004), although poor psychological adjustment...
is most apt to be found for disorganized/disoriented children (Carlson, 1998; Sroufe et al., 2005; Thompson, 2006) relative to other children. In adults, measures of attachment predict problems with depression, alcoholism, and eating disorders (Lindberg & Lindberg, 2007; Lindberg, Thomas, & Smith, 2004; Taylor & Lindberg, 2006). As mentioned previously, secure attachment is dependent upon sensitive care by children's parents, and the positive long-term effects of secure attachment are only to be found if children continue to receive sensitive care past infancy (Belsky & Pasco Fearon, 2002). As Ross Thompson (2006, p. 61) comments, “these findings suggest that later caregiving may be at least as important as early security in predicting later behavior.”

Although these findings clearly show how important secure attachment is to later psychological development, this does not mean that being insecurely attached as an infant dooms a child to a life of unpopularity and behavior problems, or that securely attached children will necessarily have an easy life. For example, in their study of mental illness in 6-year-olds, Michael Lewis and his colleagues (1984) found that other life-stress and family factors were as important as quality of early attachment in predicting the emotional problems of a child: “The findings suggest that although a child’s attachment relationship plays an important role in the development of psychopathology, the child is neither made invulnerable by an early secure attachment nor doomed to psychopathology by an insecure attachment” (p. 123). In other words, security of attachment is one of several factors that, in combination, contribute to individual differences in psychological development.

**Are the Different Attachment Styles Differentially Adaptive?**

It may seem that secure attachment and a belief that one can depend on other people is the most psychologically healthy outcome, which, as we have seen, is generally the case. However, some, including the pioneers of modern attachment theory, have argued that an insecure attachment style may provide some advantages, both immediately and in later adulthood, for some children growing up in harsh and unpredictable social environments. As Jeffry Simpson and Jay Belsky (2008, pp. 137, 138) noted, “although infants are biologically predisposed to form attachment bonds with their caregivers, the type of bonds they form ought to depend on the conditions in which they are raised, just as Bowlby (1969) and Ainsworth (1979) argued.” Moreover, the specific form of attachment they form may be well suited to their current (and perhaps, future) social environment. For example, an insecure-avoidant attachment style in boys is associated with aggressive behavior. This may be adaptive for young males as a strategy to gain status in male peer groups, particularly when other nonaggressive means for status attainment are not readily available to them (see Chapter 14). This does not mean that such boys are going to be psychologically well adjusted, only that, given the realities of their environment, adopting a trusting (secure) attachment style may actually be maladaptive if they are living in an environment in which social relationships are unpredictable and being tough is a better strategy for social and reproductive success than being cooperative. Similarly, the hypervigilant behavior of ambivalent/resistant infants may increase the amount of attention they receive from overburdened or unresponsive parents (see Chisholm et al., 2005; Del Giudice, 2009; Simpson, & Belsky, 2008). In other words, in the best of all possible worlds, children would live in an environment with responsive parents and dependable people. However, when environments are harsh and adult caregivers are undependable, children may be better served, in the long run, by having an insecure attachment style (see also Ein-Dor et al., 2010).

Stated slightly differently, quality, or style, of attachment can be thought of as adapting children to their local environment (see Chapter 2). Infants and children are sensitive to a range of ecological factors, including the attachment-related behavior of their parents, and they develop different styles of attachment depending on which fits best with their current environment, which will likely signal what their environment as an adult will be like (Belsky, 2005; Simpson & Belsky, 2008). This does not mean that insecure attachment results in competent behavior or a psychologically well-adjusted person. In fact, the opposite is usually the case (see Thompson, 2006). Rather, it adapts children to the particular conditions of their immediate family environment, which gets them through the niche of childhood.

Other researchers suggest that the influence of attachment quality in infancy extends beyond childhood and through the life span. For example, several researchers have proposed that quality of attachment in infancy and childhood, along with other aspects of children's early rearing environment, have a direct influence on subsequent mating strategies (Belsky, Steinberg, & Draper, 1991; Del Giudice, 2009; Ellis, 2004). Females are especially sensitive to quality of relationships and dependability of significant others to provide support. As we discussed in Chapter 4, when looking at factors that influence differences in pubertal
The possible answers are “Yes” (secure attachment), “No” (insecure-avoidant attachment), and “Maybe” (insecure-resistant attachment) (Hazan & Shaver, 1994). Attachment, when seen from this viewpoint, develops not only as a function of the quality of social interaction between a mother (or father) and child but also as a function of the changing mental models the child carries in his or her head.

In a more general sense, children’s internal working models help them anticipate future social relationships and interactions. For instance, a child with an insecure-avoidant attachment to his mother may represent that people in general are not reliable and that the best way to interact with them would be to remain distant and not to show one’s emotions. In contrast, a child who had established a secure attachment may represent that people are trustworthy, warm, rewarding, and open to emotional exchanges, promoting an open and positive attitude toward new people and social interactions. Children do not have a single internal working model of attachment, but multiple models, reflecting the fact that they have multiple attachment figures and that, as they get older, they also have representations of the mental models that other people have toward them.

An interesting variation of this model has been made by Kim Bartholomew and Leonard Horowitz (1991) (see Table 12.6), showing how attachment in childhood may produce, through the internal working models of attachment, four different attitudes and sets of expectations toward close emotional relationships in adulthood, as well as toward parenting, indicating how the timing, girls who experience insecure, high-stress, undependable, and unpredictable environments mature sooner, engage in sex earlier, and invest less in the children they have than do girls who experience more secure, low-stress, dependable, and predictable environments.

Given the importance of attachment for later adjustment and humans’ seemingly evolved propensity to form attachments, some have argued that parents would be best to return to a more “natural” style of rearing infants and young children. This is examined in Box 12.3.

### Internal Working Models of Attachment

A central explanatory mechanism in attachment theory, originally formulated by Bowlby (1969, 1973, 1980), is the internal working models of attachment. Bowlby proposed these models to describe children’s developing mental representations of their attachment relationships. Briefly, internal working models are sets of expectations and beliefs about the self, the world, and attachment relationships. They are constantly being revised as a result of experience (thus, they are working models).

Children’s working models of their attachment figures and of themselves provide them with a set of expectations for themselves and for their mothers/caregivers under certain situations. “What will Mother do when I cry? How will she respond if I start to babble and make eye contact? Will I feel I need her assistance if that strange animal comes over and licks the milk off my face?” Mental models essentially represent a child’s answer to the question: “Can I can count on my attachment figure to be available and responsive when needed?”

<table>
<thead>
<tr>
<th>MODEL OF OTHERS (Representation of Others)</th>
<th>Positive</th>
<th>Negative</th>
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</thead>
<tbody>
<tr>
<td>Positive</td>
<td>SECURE (Secure primary attachments)</td>
<td>PREOCCUPIED (Insecure-resistant primary attachments)</td>
</tr>
<tr>
<td>Negative</td>
<td>DISMISSING (Insecure-avoidant primary attachments)</td>
<td>FEARFUL (Disorganized/disoriented primary attachments)</td>
</tr>
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**Table 12.6 Attachment Styles in Adulthood**

Four types of attachment styles in adulthood (secure, preoccupied, dismissing, fearful) and in infancy (shown in parentheses) can be derived by combining the positive/negative models of Internal Working Models of Self and of Others. These types of attachment have been proposed to be influential in the establishment of close relationships in adulthood, as well as in parental attitudes.

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Mothers have been caring for infants ever since there were mothers and infants. However, how mothers care for infants varies among cultures and has changed in Western societies over time. In traditional societies, and presumably for our hunter-gatherer ancestors, mothers and infants are often inseparable, with mothers carrying their babies on their backs or bellies wherever they go. If infants are not with their mothers, they are in close contact with other caregivers, often female relatives of the mothers. In these communities, babies typically breast-feed on demand and sleep with their parents. This is rarely the case in Western societies. Baby formula, prepared baby food, disposable diapers, baby monitors, professional childcare providers, and mothers working outside the home have changed the nature of infant care. This should not be surprising, given how different the lifestyles of people are today compared to those of our ancestors. Infants and their parents seem to have adjusted to these innovations in infant care, at least to the extent that children reared in Western nations grow up to be productive (and reproductive) members of their society.

But is this modern way of parenting good for children? Might a return to a more natural form of childcare produce healthier children? Some people think so, and there is a movement in some Western nations to do just this. Termed **natural parenting** (also referred to as *attachment parenting* or *instinctive parenting*), practitioners advocate greater closeness between infants and parents (particularly mothers, but also fathers), increased sensitivity and responsiveness to infants’ signals, and extended breast-feeding on demand (Schön, 2007). Proponents of natural parenting argue that for 99% of our species’ history, infants over the first year of life, and perhaps longer, experienced constant contact and continuous care. For example, an assessment of modern hunter-gatherers showed that infants sleep with their mothers, usually continue breast-feeding until after their second birthdays or later, and are held approximately 50% of the day before they begin to crawl (Lozoff & Brittenham, 1979). Moreover, caretakers (most often mothers) tend to respond immediately and affectionately to their infants’ cries. Similar patterns of infant care were found in 176 nonindustrialized societies that practice agriculture.

“Intergenerational transmission of attachment patterns” may take place. Depending on children’s attachment experiences, they would form a primary representation of themselves (“Model of Self” in Table 12.6) and other people (“Model of Others” in Table 12.6). If children felt they were successful in attracting adult care and comfort to fit their needs (Representation of Self = positive) and if their attachment figures exhibited sensitive care and attention toward them (Representation of Others = positive), they would develop (in all likelihood) secure attachment. Other combinations are associated with other attachment outcomes (for example, Representation of Self = positive and Representation of Others = negative results in insecure-avoidant attachment). As can be seen in Table 12.6, crossing the dimensions of working models of self and others produces four types of attachment during childhood, as well as different types of adult attachment-like attitudes toward others, including their own children.

Contemporary research in internal working models of attachment examines how children mentally represent aspects of their socioemotional functioning and relate it to behavioral measures of attachment security (see Thompson, 2006). For
fishing, or herding, although fewer parents in these societies provide infants with close physical contact for more than half the day, unlike parents in hunter-gatherer communities (Lozoff & Brittenham, 1979; see also H. Keller et al., 2004).

In contrast to these more traditional communities, infants in Western countries are rarely held more than 35% of the day, with this amount decreasing considerably over the first year of life (see Schön, 2007). Cosleeping, with infants sharing their parents’ bed all night, has increased in Western countries over the past several decades, but the practice still is found in fewer than 15% of families in most countries (see Schön, 2007). Breast-feeding is practiced widely in Western nations immediately after birth, with about 70% of American mothers and greater than 90% of European mothers breast-feeding their infants while still in the hospital. These figures drop to about one-third or less by 6 months of age, however, and decline even further by 12 months (Li et al., 2003; Ryan, Wenjun, & Acosta, 2002).

Although it is difficult to get definitive figures, an increasing number of Western parents are practicing aspects of natural parenting by extending how long babies are breast-fed, practicing cosleeping, and increasing the amount of contact with and sensitivity to infants (Sears & Sears, 2001; Schön, 2007). Does natural parenting have any consequences for children’s development? Some characteristics of natural parenting have much in common with the practices of mothers who are sensitive and responsive to their infants’ signals of physical and social needs, and so it is not surprising that most infants who experience natural parenting are securely attached to their mothers. As such, they experience the psychological and physiological benefits that such positive infant-mother relationships provide (see research reviewed in Schön, 2007, and our earlier discussion of the causes and consequences of differences in quality of attachment).

Regine Schön (2007), in an extensive review of natural parenting, concluded that natural parenting provides infants with an optimal environment for psychological and physiological growth during early life. It is the rearing style to which the human infant has biologically adapted over the course of evolution, with lifestyle changes in recent history being far too short in duration to have allowed any significant biological adaptation to the altered living conditions. (pp. 157–158)

The question Schön asks is how much can Western practices deviate from this pattern before infants experience negative consequences?

Human infants show substantial plasticity and an ability to adjust to a wide range of environments. If that were not the case, the “unnatural parenting” practices that characterized Western societies throughout most of the 20th century and continue today would have had dire effects on the outcomes of several generations of children. Moreover, given the wide range of physical and social environments in which humans live, if infants required “perfect parenting” to survive, the species likely would have gone extinct long ago. This is reflected in Sandra Scarr’s (1992) concept of “good-enough parenting.” Children have evolved, Scarr proposed, to be able to respond to a wide range of parenting styles, and everyday “good-enough” parenting is sufficient to get children through childhood to adulthood. (Scarr’s ideas will be explored in greater detail in Chapter 13.) Schön (2007, p. 158), in contrast, believes “that conventional Western child-rearing approaches may have already crossed the line of optimal parenting in some areas of infant care.”

We are confident that aspects of natural parenting do indeed match children’s (and likely adults’) evolved biases to form social relationships and thus foster positive social and emotional development. However, we would not want to characterize the practices of modern parents as “unnatural parenting” or “insensitive parenting.” We are confident that infants can develop into psychologically healthy children and adults even if they sleep in their own rooms on most nights and they are not breast-fed past their first birthdays. Research has clearly shown that children’s psychological development is fostered by loving parents who are sensitive to the needs of their offspring. Natural parenting can promote such development, but so can parenting practices that are closer to current cultural norms.

example, researchers have reported that securely attached 5-year-old children show greater emotional understanding and greater frequency of mother-child conversations about emotions than do children classified as insecurely attached (Ontai & Thompson, 2002; Raikes & Thompson, 2005). This suggests that secure attachment, as reflected by children’s internal working models of attachment, influences emotional understanding through mother-child conversational style. Other research has similarly found associations between security of attachment measures and cognitive indices of socioemotional development, including memories of positive events, peers’ behavior attributions, conscience development, and self-concept (see Thompson, 2006).

Although internal working models of attachment are best thought of as cognitive mechanisms, this does not mean that they are not influenced by more basic biological factors. The biopsychological basis of internal working models of attachment is discussed in Box 12.4.

Attachment has received much research attention over the decades, for three good reasons: (1) attachment between infants and their mothers greatly increases the chances that children will survive; (2) it is a child’s first relationship, one that may serve as the basis for future relationships with other people; and (3) quality of attachment in infancy is related to behavioral, social, emotional, and cognitive adjustment later in life.
The Biopsychology of the Internal Working Models of Attachment

Attachment is a complex process that involves the coordination of biological, cognitive, and behavioral systems in infants and mothers (and perhaps fathers). Daphne Bugental (2000) proposed that attachment is one of several social domains that has experienced substantial pressure from natural selection. One way in which such domains can be identified is that a set of neurohormonal regulators can be specified for the domain. Neurohormonal regulators refer to coordinated hormone and brain mechanisms that influence motivation and behavior. For attachment, key neurohormonal regulators include opioids and oxytocin. Naturally occurring opioids are associated with reward, or pleasure, and these chemicals are recognized by receptors in the brain (primarily the limbic system, see Chapter 4). Oxytocin has been called the “love hormone” and is produced at orgasm in both males and females, during cuddling, birth, suckling, stroking, and hugging. It reduces levels of the stress hormone cortisol and promotes relaxation and feelings of warmth and affiliation (see Carter, 1998).

In young mammals, including humans, infant distress caused by either internal states (such as hunger) or separation from the mother is associated with a reduction in opioids. This in turn activates distress vocalizations (that is, crying) in the young. When mothers hear these cries, their own levels of opioids decrease, which prompts them to provide care for their babies. When mothers comfort their infants, opioid levels increase for both, which leads to a calm and restful state. The release of oxytocin in both mother and baby during nursing, or when a mother holds and cuddles her infant, promotes positive feelings and recognition of significant social partners, which, when coupled with the increased production of rewarding opioids, sets the stage for the formation of a durable infant-mother attachment (Bugental, 2000; Chisholm et al., 2005).

Hormones have their effect on behavior by influencing brain structures, which in turn influence the production of hormones and behavior. A good place to start is the amygdala, an evolutionarily old structure in the limbic system that is heavily involved in determining the emotional value of a stimulus (“Is this something to fear or something to love?”) (LeDoux, 1996). The hippocampus stores information and permits infants to match new experiences (or, for instance, a sensation of falling) with “old” experiences (consequences of past falls) (Chisholm et al., 2005). In the face of stress (falling, or a fear of falling), the hypothalamic-pituitary-adrenal (HPA) axis (see Chapter 4) becomes activated, generating a series of biochemicals in reaction to stress, such as cortisol, with the goal of preparing the organism for threat. Chronic stress, including ineffective and unresponsive parenting, is associated with increased cortisol levels and poor medical and psychological outcomes (Flinn, 2006).

When infants have positive and non-stressful experiences, the HPA axis regulates behavior by increasing the release of opioids and oxytocin, decreasing the production of cortisol, and promoting the recognition of the social beings associated with these good feelings. From such repeated experiences of emotional warmth, of parents who respond contingently to infants’ behavior, and the neurohormonal events associated with these experiences, babies create a secure representation of their caregiver in their internal working models of attachment (Chisholm et al., 2005). In contrast, if infants’ early life is dominated by unpredictability and a lack of caregiver warmth, they will have different neurohormonal experiences (increased stress hormones, decreased oxytocin and opioids), and this will result in an insecure cognitive-emotional representation of their attachment figure.

Why would parents not provide a supportive environment for their children, and thus one in which levels of cortisol are low and oxytocin and opioids are high? One possibility is that ecological pressures on the parents make it difficult for them to care adequately for all of their children. As a result, some offspring in a family (possibly all) experience high-stress, insecure attachment and chronically elevated levels of stress hormones (Chisholm et al., 2005). Although this seems to be maladaptive compared to the neurohormonal consequences of secure attachment, it may prepare these children for life as adults. The best predictors of future environments are current ones, and children who experience stressful environments early in life can expect similar environments in adulthood. High levels of cortisol prepare individuals to deal with difficult and threatening situations—to keep them alive and functioning despite the dangers they face. There may be negative health consequences later in life, or psychosocial maladjustment, but these later costs are compensated by more immediate benefits of having a neurohormonal system that is primed to deal with chronic conflict. This interpretation fits well with Thomas Boyce and Bruce Ellis’s (2005) idea that individual differences in biological sensitivity to context interact with individual differences in children’s early experience to produce different patterns of development that may prove to be adaptive for later environments (see Chapter 11, Box 11.2).

With respect to experiencing stress early in life, the relative costs or benefits may also be related to individual differences at the genetic level.

A child’s attachment relationship is not everything, of course. Although it may be the basis of a child’s relationship with his or her parent, relationships between parents and children are complex and extend far beyond attachment, as we will see in the next chapter. Yet, given the importance of social relationships to humans, it is little wonder that this first relationship has garnered so much attention from psychologists and has been regarded by many as a cornerstone for psychological well-being.

**opioids** Neurohormonal regulator associated with reward, or pleasure, recognized by specific receptors in the brain.

**oxytocin** Neurohormonal regulator that is produced at orgasm in both males and females, during cuddling, birth, suckling, stroking, and hugging; it reduces levels of the stress hormone cortisol and promotes relaxation and feelings of warmth and affiliation.
To understand why groups of genetic relatives may help mothers rear their children, we turn to William Hamilton’s (1964) concept of inclusive fitness. Essentially, inclusive fitness refers to how many copies of one’s genes make it into the next generation. Genes are passed along from parents to children but also to grandchildren. For example, a person shares 50% of his or her genes with a full sibling, 25% of genes with a half sibling, and 12.5% with first cousins (see Figure 12.2). (Recall from Chapter 3 that people actually share about 99.9% of their genes, with only 1% of genes being different among people. Siblings share 50% of those genes that differ among people, whereas first cousins share 12.5%.) The reproductive success of these blood relatives indirectly reflects one’s own success. If your sister has four children, each of those nieces and nephews will share, on average, 25% of your genes. One’s inclusive fitness refers not just to the number of children one has (Darwin’s definition of classical fitness), but also to the copies of your genes that are represented in future generations, whether they came directly from you in the form of children and grandchildren or indirectly through a genetic relative (for example, siblings, cousins, nieces, and nephews). According to inclusive-fitness theory, the care, or investment, we provide to children should be influenced by genetic relatedness.

Biologists often talk about parents and other genetic relatives investing in children. Investing implies that we expect to get something back for our efforts. In evolutionary theory, how many copies of one’s genes make it into the next generation, either directly through children or indirectly through relatives who share one’s genes.

An Evolutionary Perspective of Childcare

When we talk of infant-mother attachment, we implicitly assume that this psychological mechanism (or suite of mechanisms, more likely) increases the chances that a child will survive and thrive. This is to both the infant’s and the parent’s benefit, of course. But rearing human babies to maturity requires more than a close attachment to mothers. Humans are social animals, and this is perhaps most obvious when it comes to rearing children. It is the rare mother who is able to rear her child alone. As Hillary Clinton (1996) wrote, citing an African saying, “It takes a village to raise a child.” Perhaps, but actually human families are the social group with the primary responsibility for rearing children. Families come in many forms (see Chapter 13), but all include genetic relatives, or kin.

The conventional Western idea of raising children is within a nuclear family—Mom, Dad, and the kids, with perhaps occasional help from Grandma or Aunt Louise. Yet, as we will see in Chapter 13, the nuclear family is not the only child-rearing arrangement that is common among humans, and in all types of families the amount of time and effort different people devote to child-rearing is unequal, with women around the globe and over historical time spending considerably more time and physical resources (milk, for instance) than men, who, in some cultures, spend virtually no time caring for their children. But neither is childcare solely the mother’s responsibility. In virtually all societies, the task of child-rearing falls to families.
what we put in. In the case of children, parents and other kin invest time, effort, food, and other material resources, and their payback, as it were, is a child who survives to adulthood to hopefully become a parent himself or herself, passing some of the investor’s genes on to the next generation. As a general rule of thumb, inclusive-fitness theory predicts that, all other things being equal, the greater the genetic similarity between the child and the investor, the more care that individual should devote to the child.

Evolutionary theory also suggests that men and women (fathers and mothers) have different obligations and feelings toward their children. In humans, reproduction involves a gestation period of 9 months, plus, at least, a period of about 3 or 4 years of nurturing a highly dependent offspring. This puts an uneven burden on the two sexes with respect to investing in children. During gestation, females cannot engage in new reproductive efforts. They are already pregnant and can have only one child at a time (with the exception of multiples). After birth, as all mammals, mothers are obliged to nurse the baby. Males are not so constrained, either during gestation or after birth.

According to parental investment theory, as proposed by evolutionary biologist Robert Trivers (1972), the sexes differ in how much they invest in mating versus parenting. In most mammals, including humans, females invest more time and resources in parenting than do males. (Parental investment theory will be discussed further in Chapter 15 on the development of sexuality.) Because of these differences, men and women should have evolved different psychologies related to mating and parenting. For example, women are more generally selective in assenting to sex than are men (Oliver & Hyde, 1993), whereas men are more inclined to compete with one another for access to females and are less selective in terms of whom they have sex with. Although the males of most mammal species provide nothing in the way of childcare, human men are among the approximately 5% of male mammals that do invest in their offspring after birth. Because human children are dependent for such a long time, men can increase their inclusive fitness by investing in their offspring, and most men do, providing—if not childcare—resources to their mates and their children (Geary, 2007b). However, in both traditional and contemporary cultures, and surely in our past, women provided the bulk of the childcare.

We want to make it clear that the mating and parenting decisions that men and women are purported to make are not necessarily conscious. All sexually reproducing species make such decisions, and they are based on implicit (that is, out of self-awareness) strategies that have evolved because, on average, they benefited animals that possessed them. We humans, however, have the ability to make such decisions consciously—to ponder them and perhaps deliberately calculate the costs and benefits of any action. As a result, unlike other animals, we can override them if we see fit.

Any evolved differences between men and women should not be viewed as inevitable—they can be modified by experiences over the course of development—nor should they be viewed as natural and thus socially acceptable. Recall from Chapter 2 our discussion of the naturalistic fallacy: just because something has been influenced by natural selection and has evolved says nothing about its social or moral acceptability. Natural selection shaped human behavior for life in very different environments from those in which modern humans live. With our expanded brain and invention of material culture, we have evolved moral codes that in many ways were developed to combat our animal nature. Nonetheless, understanding our unconscious and animal dispositions can help us better understand contemporary behavior and sometimes to change it. This is as true of parenting as it is for any other evolutionarily significant sets of behaviors.

The Evolution of Human Childcare: Humans as Cooperative Breeders

As mentioned earlier, human mothers are not alone in caring for their infants and children. The provision of care to children by individuals other than the genetic mother is called alloparenting and has likely always played a significant role in human child-rearing (Hrdy, 1999, 2007, 2009). Other than by the father, alloparenting is usually provided by female relatives. Among traditional human groups, most care is in the form of babysitting or other types of assistance. For instance, among the Aché, a South American hunter-gatherer group, women with young children forage less than women without children. Other women, usually blood relatives, make up the difference by foraging more and sharing with the mothers (Crittenden & Marlowe, 2008; Hill & Hurtado, 1996). In many societies, preadolescent girls (often older sisters) and grandmothers babysit (see Hrdy, 1999).

parental investment theory Theory coming from evolutionary biology that predicts differences in behaviors between males and females as a function of how much each invests in mating versus parenting.
alloparenting Provision of care to children by individuals other than the genetic mother.
In this section, we look at some of the factors that influence the amount of care that mothers, fathers, grandparents, stepparents, and adoptive parents make in children through the lens of evolutionary theory.

Maternal Care

Mothers’ care for their children is substantial and obligatory, but some children may require more care or resources than others, and mothers may not always be able to devote the maximum amount of care that a child requires (or wants). In fact, a wise strategy for our ancestral mothers, who lived in times when resources were scarce and survival uncertain, would be to provide the most care to children who have the greatest chance of growing up and reproducing themselves. Recall that one of the principles of natural selection is that more offspring are born in a generation than will survive. The likelihood of surviving childhood for our ancestors was about 50%, meaning that about half of a woman’s children would not reach adulthood (Volk & Atkinson, 2008). Given those odds, successful mothers would be those who could identify cues that signal the likelihood of a child reaching adulthood, such as good health, and then devoting the necessary care.

Caring for and Investing in Children

We all expect mothers, fathers, and more distant relatives to provide the care, support, and the resources necessary for children to survive, and hopefully thrive. It is what parents do (or at least are supposed to do). But how much effort parents put into caring for any particular child may vary, and it may be different from the amount of care that children want from their parents. For example, parents may have several children, and although each child may want all the care and resources he or she can get, parents will want to distribute their resources among their various children (Salmon, 2005, 2007; Trivers, 1974). In fact, the efforts one puts into a particular child today may take away from efforts or resources that one can devote to future children. Strictly from the perspective of inclusive-fitness theory, it is not always in a parent’s best interest to devote everything he or she can into every child.
care to those children. This means that the amount of care given to riskier children (for example, those with poor health) may have to be reduced. Although it is often difficult for contemporary people to think in this fashion (“How can a mother not devote all the love and care she can to her children, no matter how risky they are?”), given what we know about nurturing behavior in other species and in traditional groups of humans, and the incidence in contemporary society of children being abandoned or removed from the home to be placed in foster care, such thinking must have surely characterized our foremothers. These are not necessarily conscious thoughts, but rather implicit, and perhaps automatic, cognitions that proved adaptive to our ancestors (Bugental & Beaulieu, 2003).

What factors influence how much a woman cares for any particular child? Perhaps most obvious is a child’s health. In contemporary society, children with intellectual impairment or other congenital diseases are two to ten times more likely than nonafflicted children to experience abuse sometime during childhood (Daly & Wilson, 1981). When these children are placed in institutions, the amount of parental care typically decreases substantially, with some parents rarely ever seeing their children again (Daly & Wilson, 1988a). In most cases, differential care to unhealthy children is less extreme and likely not even conscious. For example, Janet Mann (1992) observed the interactions of seven mothers and their premature, low-birth-weight, and sickly twins. At 8 months of age, all mothers displayed more positive behaviors, such as talking to, playing with, looking at, kissing, holding, and soothing, toward the healthier of the two twins.

Other factors also influence how much care a mother is likely to devote to her children. One important factor is a child’s age. Until very recently, rates of infant mortality were relatively high, with death rates declining as children got older. From this perspective, mothers should devote more care and resources to older than younger children, especially when resources are scarce and investment in a younger child can result in the deterioration and possibly death of an older child. Mother’s age is also an important factor. Younger women, who have many child-bearing years ahead of them, are less apt to devote considerable care to a high-risk infant than are older women, who may have fewer opportunities to have more children (Beaulieu & Bugental, 2008). The incidences of neglect and abuse are more frequently observed in younger than older mothers (Lee & George, 1999).

The amount of social support a woman has is also a cue as to how much care she should provide her children. Particularly important is support from the father of her child, as well as from alloparents. This is less of a problem today in the developed world, where the state or other institutions (for example, churches) help single mothers and their children, but lack of social support was clearly a serious concern for our foremothers and remains a problem for many single mothers in the world today, even in the United States and other developed nations. Overall, the investment decisions a woman makes about her children will be based on the resources she has available to herself and her children, including social resources, and her judgments about how a particular child can use those investments to become a successful adult (Bugental & Beaulieu, 2003). Most of these decisions will be made out of conscious awareness.

Paternal Care

Why should fathers provide time, energy, and resources for their children? The simple answer is that a father’s care is important to the survival and success of his children. This is not simply theory but based on hard facts. Data from hunter-gatherer societies (Hill & Hurtado, 1996), historical records from Western Europe (Reid, 1997), and from developing countries today (United Nations, 1985) all indicate that children’s mortality rates are higher and their social status is lower when fathers are absent (see Geary, 2000, 2007b). This seems to be especially true for male offspring (Gibson, 2008). In contemporary America, the quality of a father’s active involvement in the lives of his children is associated with school achievement, social skills, and emotional regulation (see Cabrera et al., 2000; Lamb, 1997).

Although women in all cultures devote more time to childcare than men (Eibl-Eibesfeldt, 1989; Whiting & Whiting, 1975), some fathers in some developed countries spend as much, or even more, time with their children than do mothers (see Parke, 2002, 2008). In modern society, good fathers not only provide financial resources but are also expected to spend considerable time with their children, including chores that once were women’s work only, such as changing diapers, bathing babies, and providing night feedings. Although this may be the cultural stereotype of good fathers, the reality is that the average amount of time fathers spend with their children in the United States has not changed appreciably over the past 50 years. Whereas many fathers are spending substantially more time with their children than fathers in past generations, this is counterbalanced by fathers who have minimal or no contact with their children on a regular basis. The number of children born to single mothers, without the presence of a father in the household, has increased four-fold since 1960 (see Cabrera et al., 2000).
One factor that influences how much men contribute to their offspring is **paternity certainty**. Men can never be certain of paternity, with the *cuckoldry rate* (the rate of the domestic father not being the genetic father) hovering around 10% (see Geary, 2005c). This provides men with a moderate degree of certainty, enough to (usually) convince a man that caring for his wife’s child is in his best interest, but not enough certainty to ignore hints that the child may not be his. Family members are often aware of this and frequently comment how much a new baby resembles the father, especially the mother in the presence of the father (Alvergne, Faurie, & Raymond, 2007; McLain et al., 2000).

In the first study to demonstrate this, 80% of all remarks about the appearance of the baby concerned the resemblance to the father (Daly & Wilson, 1982). This phenomenon has been found in several different societies (Brédart & French, 1999; Christenfeld & Hill, 1995) and presumably serves to convince the father that the child is indeed his.

In related research, the amount of investment parents devoted to their children (measured in terms of emotional closeness, use of physical punishment, and amount of time parents spend actively interacting with their child on a daily basis) was investigated in terms of the perceived personality and physical similarity between the parent and the child. The amount of investment mothers provided to their children was positively related to **personality similarity**; in contrast, the amount of investment fathers provided to their children was positively related to **physical similarity** (Heijkoop, Dubas, & van Aken, 2009). In other words, a mother’s investment decisions were based (quite likely unconsciously) on the psychological similarity between herself and her child, whereas a father’s investment decisions were based on physical similarity, consistent with the idea that men are sensitive to cues of physical resemblance that indicate paternity certainty. In other studies, men rated physical resemblance of infants to themselves as more important in making hypothetical adoption decisions than did women (Volk & Quinsey, 2007).

Related to this, a recent study found that the amount of affection and attachment fathers felt toward their children was related to their ability to recognize their children on the basis of smell (Dubas, Heijkoop, & van Aken, 2009). In this study, children wore cotton T-shirts to bed for three consecutive nights and avoided scented soaps and perfumes. Parents then smelled various T-shirts and were asked if they could identify who had worn them. Fathers who could identify their children on the basis of odor were more likely to report feelings of affection and attachment and less likely to ignore their children than were fathers who could not identify the T-shirts their children wore.

The authors speculated that fathers might unconsciously use olfactory cues as signs of genetic relatedness and display more affection for and investment in those children whose odors they recognize (and thus who are likely to be theirs).

**Males’ care** for their children may not be obligatory, but males are also biologically prepared to care for children, or at least can be induced to do so. For example, in a variety of mammal species, simple exposure to infants produces increased **paternal** behaviors in males, accompanied by changes in levels of female hormones, such as prolactin (see Schradin & Anzenberger, 1999). Human males are not immune to these effects. For example, levels of prolactin increased in a group of men over the course of their partner’s pregnancy, and levels of testosterone decreased after the birth of a baby (see Storey et al., 2000; Wynne-Edwards & Reburn, 2000).

### Grandparental Care

Parents are not the only people with a genetic interest in children. Although children share 50% of their genes with each of their parents, they share 25% of their genes with each of their grandparents. As such, the attention that grandparents give to their grandchildren is not solely out of the goodness of their hearts, but, from an inclusive-fitness perspective, is in their genetic best interest.

Grandparents are in a similar situation as parents in one respect. Just as the mother always knows the baby is hers, so does the maternal grandmother know that her grandchild carries 25% of her genes. None of the other grandparents can be so certain. Although the paternal grandfather can be certain that the grandchild is his daughter’s, he cannot be 100% certain that he is the genetic father of his daughter. The paternal grandparents have the same uncertainty that the father has, with cuckoldry being a possibility in two generations for the father’s father. From this perspective, all other things being equal, maternal grandmothers should be willing to devote the most care, paternal grandfathers the least, and maternal grandfathers and paternal grandmothers should fall somewhere in the middle.

Several studies have examined the amount of investment grandparents provide to their grandchildren as a function of genetic relatedness and have found general support for the evolutionary model (Bishop et al., 2009; Euler & Michalski, 2007; Pashos & McBuney, 2008). Depending on the study, investment is measured in terms of time spent interacting with, emotional closeness to, resources given to, or solicitude for grandchildren. In a pioneering study, researchers interviewed German adults and asked them to rate the amount of care they received from each of their grandparents.
up to age 6. Figure 12.3 presents the mean solicitude ratings (expressing care and concern for the well-being of another) for the four classes of grandparents. Overall, the pattern follows predictions: maternal grandmothers had the highest solicitude ratings, paternal grandfathers the lowest, and mother’s father and father’s mother were in between. The patterns were basically the same whether the grandparent in question was living with a spouse, widowed, or living separately (Euler & Weitzel, 1996).

These findings are supported by a study that examined more than 150 years of German births (1720–1874) and found that children without a living maternal grandmother were more likely to die than those without a living paternal grandmother. In some age intervals, the difference in death rate was as large as 60% (Beise & Voland, 2002). Further evidence for the importance of maternal grandmothers in the success of their grandchildren comes from research in contemporary rural Ethiopia, where the help provided by maternal grandmothers was associated with lower child mortality (Gibson & Mace, 2005). Other research demonstrated that the presence of a mother’s mother was associated with higher fertility and survival rates for Canadian and Finnish farm families (Lahdenperä et al., 2004).

There is at least one exception to this general pattern of greater maternal grandparent solicitude, and that is a study by Alexander Pashos (2000), who examined grandparental investment in Germany and urban and rural Greece. Pashos reported the same pattern as other researchers for grandparents from Germany and urban Greece, but the rural Greeks displayed a different pattern. The paternal grandparents provided more care than the maternal grandparents in this latter group. This discrepancy was explained by the traditional family custom in rural Greece of the married couple coming to live near or with the paternal family, who have the social obligation of caring for their grandchildren, particularly for their grandsons, who are their primary heirs. This close living arrangement means that the husband’s family can monitor the activities of their daughter-in-law, resulting in increased paternity certainty, so that the father’s family can care for their grandchildren with increased confidence. This finding indicates the potentially strong effect of culture in modifying evolutionarily influenced patterns of care. Although the decisions of grandparents may be affected by the number of likely genes they share with their grandchildren, such decisions are, in the end, influenced as much by cultural practices.

The importance of grandparents, particularly grandmothers, may not be surprising to modern readers, but might grandmothers also have influenced human longevity? In Chapter 2 we stated that natural selection has a more potent effect on the earlier parts of the life span, before and during one’s reproductive years, than it does later. After one has reproduced, natural selection is essentially powerless. One’s genes are already in the next generation, and whatever good or bad qualities one has, such as genes that promote longevity or early-developing cancer, have already been passed along.

One exception to this scenario that evolutionary theorists have proposed goes by the name the grandmother hypothesis (Alexander, 1974; Hamilton, 1966). By living past one’s reproductive years, women can devote their time and resources to their children and grandchildren and, as a result, increase the chances of survival of their grandchildren. This means that more of their genes will make it into future generations, and some of these genes will be associated with old age. Women who never lived long enough to become grandmothers could not provide care for their grandchildren, fewer of their grandchildren would survive, and thus fewer of their genes would be propagated.

Although it remains controversial, there is some evidence for the grandmother hypothesis. For example, among the Hazda, a group of foragers living in the African Rift Valley, postmenopausal women contribute significantly to the nutrition of their grandchildren, particularly when the mother is still nursing (Hawkes, O’Connell, & Blurton Jones, 1997; O’Connell, Hawkes, & Blurton Jones, 1999). So next time you visit your grandmother,
you may want to thank her not only for the support she gives to you and gave to your parents when they were raising young children, but also for contributing to our species’ long life spans.

Stepparent Care

In the developed world today, divorce and remarriage are common occurrences (see Chapter 13), and remarriage was also likely common, in one form or another, for our ancestors. With remarriage comes a stepparent—a genetically unrelated adult who lives with and has some responsibility toward a spouse’s children. According to a strict interpretation of inclusive-fitness theory, stepparents should not provide care for their stepchildren at all. They share no genes, and thus the stepparent should not be willing to share resources or devote his or her time to a stepchild. This is not the case, however, mainly because stepchildren come with a genetic mother or father. If a man or woman wants to attract a new mate, one way to do so is to care for that person’s children from a previous coupling. In fact, some people have argued that what care men provide to their stepchildren should not be viewed as investment in children, but as investment in mating opportunities; they provide for their stepchildren to gain access to their mother’s companionship and affection (Anderson, Kaplan, & Lancaster, 1999a; Rowher, Herron, & Daly, 1999).

How much care do stepparents provide for their stepchildren, and is it really much different from the care provided by genetic parents? In studies ranging from the United States, South Africa, and the Caribbean, and from traditional foragers to developed countries, stepparents have been found to spend less time interacting with (Anderson et al., 1999a; Flinn, 1988; Marlowe, 1999), spend less money on education for (Anderson et al., 1999a; 1999b), and spend less money on food for (Case, Lin, & McLanahan, 2000) their stepchildren than their biological children. Many stepparents love their stepchildren and provide them with substantial resources. In fact, there is no other species in which adults so regularly shower care and resources on unrelated offspring. Despite the magnanimous gestures of support by many stepparents toward their stepchildren, many stepparents report that it is difficult to form close emotional bonds with their stepchildren. For example, in an older study conducted in the United States, only 53% of stepfathers and 25% of stepmothers claimed to have any “parental feelings” whatsoever for their stepchildren (Duberman, 1975).

One indication that stepparents do not provide the care and support that natural parents do can be seen in the incidence of child abuse. The presence of a stepparent in a family is the single best predictor of child abuse (Daly & Wilson, 1988a, 1996). In a Canadian study, Martin Daly and Margo Wilson (1985) interviewed nearly 1,000 households, some where child abuse was known to have occurred. They reported that the incidence of child abuse was 40 times greater if children lived with a stepparent versus two natural parents. This enormous difference remained even after controlling for...
BOX 12.5 evolution in action

When Parents Kill Their Children

It fortunately does not happen often, and when it does it almost always makes the headlines: filicide, the killing of a child by a parent. Which children are apt to be victims of filicide and under what conditions are parents likely to kill their children? As we noted in Chapter 1 in discussing the history of childhood, infanticide, the killing of an infant, was a common practice in Europe if a child was of poor health, deformed, one of twins, illegitimate, or otherwise unwanted. Infanticide, particularly during the newborn period (termed neonaticide), has been found in most traditional cultures studied. It is practiced when resources are scarce and the newborn will not likely survive or would take resources away from a mother’s other children. For example, among the Eipo of West New Guinea, mothers give birth alone outside and, based on the apparent health of the infant, decide whether to bring the baby to the village or to abandon it in the bush wrapped in leaves and branches (Schiefenhövel 1988). These decisions are also made based on the resources available to support a new baby, as the village can only support a limited number of people.

A child’s age is also a factor in filicides in the developed world. The accompanying figure presents data based on child homicides committed by natural parents and nonrelatives in Canada between 1974 and 1983 (Daly & Wilson, 1988a). As you can see, the likelihood of a nonrelative killing a child is relatively low and stays low until the teen years. In contrast, the likelihood that a child will be killed by a natural parent is high during the first year of life and drops off sharply thereafter. For the most part, if a parent kills a child, the father is the probable perpetrator. The exception is during infancy, when genetic mothers are the most likely culprits (Harris et al., 2007). This is especially true for the youngest homicide victims, newborns. When a newborn is killed or abandoned to die, it is usually the mother who does so (Overpeck et al., 1998).

It is not just the child’s age that is a predictor of child homicide, but also the mother’s age (Day & Wilson, 1988a; Overpeck et al., 1998). For example, based on homicide rates in Canada between 1974 and 1983, teenage mothers were more than four times as likely to kill their babies as were women in their twenties, a pattern that has also been found in traditional groups (Bugos & McCarthy, 1984). Why are younger mothers more apt to kill their children? One reason may be the greater emotional immaturity typically shown by teenage mothers. Many such young women also lack social support, making it difficult for them to raise a child. Recall also that younger women have many childbearing years ahead of them, making the death of an infant less of a loss in terms of potential fertility relative to older women.

Adoptive Parents and Children

Stepparents are not the only people who willingly raise children who are unrelated to them. Humans across the globe adopt children and raise them as their own. In many societies, current and in the past, the adopted children are often relatives—the children of a deceased sibling, for instance (Silk, 1987). In contemporary Western societies, however, people adopt genetically unrelated children, often going to great expense and trouble to do so. From an inclusive-fitness point of view, this makes little sense; adoptive parents, who share no genes with their adopted offspring, should be as attentive to and investing in their adoptive children as stepparents and less investing than genetic parents. As you may expect, however, this is not what actually happens. In fact, research has shown that, compared to children being raised by two genetic parents, adopted children actually receive more investment. For example, adopted children are more likely to have computers in the home, attend religious ser-
In recent years, researchers have begun to pay particular attention to filicides by nonbiological parents (that is, stepparents). As we noted in the text, the presence of a stepparent in a family, especially a stepfather, is a potent predictor of child abuse. Might this also be so for child homicide? In pioneering work, Martin Daly and Margo Wilson (1988a) examined the incidence of child homicide in natural (genetic) and stepfamilies. They reported that the difference between natural and stepfamilies in child homicide was even greater than for cases of child abuse. In one study assessing 408 filicides in Canada, the risk of being killed by a stepparent was far greater than by a natural parent, especially during the first two years of life (Daly & Wilson, 1988b; see accompanying figure). A similar study conducted in the United States reported that children younger than 2 years of age were 100 times as likely to be killed by a stepparent than by a natural parent (Daly & Wilson, 1988a; see also Harris et al., 2007).

The increased risk of death in stepfamilies has even been reported for unintentional deaths (for example, drowning). In an Australian study examining fatal injuries of children 5 years of age and younger between 2000 and 2003, stepchildren were reported to be at an increased risk for unintentional fatal injury of any type relative to children in intact families or children in single-parent families (Tooley et al., 2006). It should not be surprising, however, to find that this relationship varies with culture. For example, the greater risk of filicide by a stepparent relative to a genetic parent is substantially less in Sweden, where there is state-sponsored social support, resulting in virtually no economic costs to unrelated stepfathers (Temrin, Nordlund, & Sterner, 2004).

<table>
<thead>
<tr>
<th>Natural Parents</th>
<th>Stepparents</th>
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<tbody>
<tr>
<td>700</td>
<td>600</td>
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<td>0–2</td>
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Although parents may invest somewhat more in their adoptive children than their biological offspring, the psychological outcomes of adoptive children are often less positive than those of biological children. Compared to biological children, adoptive children are more apt to have addiction problems, eating disorders, learning disabilities, and personality disorders, as well as lower school achievement (Brand & Brincich, 1999; Miller et al., 2000). In fact, the greater investment of time and money parents provide to adopted children may, in some cases, be a matter of the squeaky wheel getting greased. For example, one reason why adopted children are more apt to have private tutors or attend summer school may be because of their lower academic achievement (Gibson, 2009).

Why do adopted children have more problems than biological children? Perhaps some of these problems are adopted a way (perhaps unconsciously) for infertile couples not only to satisfy a biological yearning to have children but also to conform to social norms (Callan, 1985).
these children’s problems stem from difficulty dealing with the knowledge that they were given up by their birthparents. However, just as adoptive parents are not representative of the general population, neither are birthparents who put up their children for adoption, many of whom do so because they feel they are unable to raise a child as a result of their substance abuse, mental health, or domestic problems (Neil, 2000). To the extent that adjustment problems are heritable (see Chapter 3), many adopted children’s genetic dispositions, possibly in interaction with problems dealing with being given away by their birthparents, may put them at a greater risk for psychological problems than biological children. However, the majority of adopted children, just as the majority of children reared by their biological parents, display no serious adjustment problems (Brand & Brincich, 1999), making adoption a positive alternative both for childless couples and children whose birthparents are unable or unwilling to care for them.

Evolutionary theory provides some general guidelines that suggest who should invest in children (genetic relatives, with investment varying as a function of degree of relatedness) and factors that affect the degree of care and solicitude a person should provide for children (for example, health of the child, scarcity of resources, paternity certainty). These same factors influence parental investment made by other animals, by people from diverse cultures, and during different historical epochs. Although human parents may have the same deep concerns as other animal parents, they also have a social structure and a cognitive system that allows them to think beyond a gene’s-eye view of life to provide for children who, in centuries past, would have received reduced care. Taking an inclusive-fitness perspective can help us understand and predict the behavior of parents, but we are more than our genes, and evolutionary theory should be seen only as the foundation for comprehending human parenting, not as the whole edifice.

Attachment refers to a close emotional relationship between a child and his or her caregiver. Bowlby’s theorizing was influenced (1) by high death rates and psychological deterioration of infants housed in orphanages (hospitalism) due, presumably, to lack of social interaction; (2) ethological theory; and (3) the research on “mother love” by Harry Harlow.

Attachment is not instantaneous at birth, although research into bonding suggests that monkey and perhaps human mothers are biologically primed shortly after birth to form an emotional bond with their babies.

Stages of attachment have been proposed. During the clear-cut attachment, or specific attachment, stage, beginning between 6 and 8 months, most infants develop separation distress (or separation protest) and a fear (or wariness) of strangers.

Based on the Strange Situation, four attachment classifications have been described: (1) secure, (2) insecure-resistant, (3) insecure-avoidant, and (4) disorganized/disoriented. Secure attachment results when mothers are responsive to their babies’ emotional signals, encourage them to explore, enjoy close contact with their infants, and develop interactional synchrony with their infants. Securely attached infants are more independent and as children have a better self-concept, more positive social relationships, greater cognitive skills, and less psychopathology relative to insecure and, especially, disorganized children. Distributions of infants according to Ainsworth’s classification vary among cultures. Alternative methods have been developed to measure attachment, including the Attachment Q-Set, which uses the Q-sort method in which prepared statements are sorted into categories.

Some have argued for the practice of natural parenting, fostering greater closeness between infants and parents, increased sensitivity and responsiveness to infants’ signals, and extended breastfeeding on demand.

The development of children’s attachment has been described in terms of their internal working models of attachment. A set of neurohormonal regulators has been specified for attachment, including opioids, associated with reward, and oxytocin, which promotes relaxation and feelings of warmth and affiliation.
**Inclusive fitness** refers to how many copies of one's genes make it into the next generation, which is hypothesized to influence the amount of care or investment people provide to children. **Parental investment theory** postulates that there is a trade-off between how much individuals invest in mating versus parenting, with mammal females, including humans, having obligatory investment in infants that males do not.

The demands of a slow-developing child required that mothers receive help from others in child-rearing (alloparenting). The **cooperative breeding hypothesis** suggests that humans evolved a system of parenting in which mothers shared the responsibility for childcare with others.

The amount of care mothers devote to their children is related to a variety of factors, including the child’s health and age, mother’s age, and amount of social support available. Paternal care is related to child survival, health, and success, especially in high-stress environments. Grandparents, particularly maternal grandmothers, are important alloparents. Grandparental care is related to paternity certainty. The **grandmother hypothesis** proposes that the care that grandmothers provide for their grandchildren may have been selected in evolution, contributing to human longevity.

Stepparents, on average, provide less care for children than do genetic parents, and although most stepparents provide support for their stepchildren, there is a higher incidence of child abuse and **filicide** (the killing of a child) by stepparents than genetic parents. Unlike stepparents, adoptive parents provide more care for their adoptive unrelated children than for their biological children.

**Key Terms and Concepts**

- attachment (p. 481)
- hospitalism (p. 483)
- bonding (p. 487)
- separation distress (separation protest, separation anxiety) (p. 488)
- fear (or wariness) of strangers (p. 489)
- Strange Situation (p. 491)
- secure attachment (p. 491)
- insecure-avoidant attachment (p. 492)
- disorganized/disoriented attachment (p. 492)
- Attachment Q-Set (p. 493)
- interational synchrony (p. 496)
- internal working models of attachment (p. 501)
- natural parenting (p. 502)
- opioids (p. 504)
- oxytocin (p. 504)
- inclusive fitness (p. 505)
- parental investment theory (p. 506)
- alloparenting (p. 506)
- cooperative breeding hypothesis (p. 507)
- grandmother hypothesis (p. 510)
- filicide (p. 512)

**Ask Yourself . . .**

1. What is attachment, why is it supposed to be important for human development, and how can one identify attachment based on overt behaviors of infants and mothers?
2. How does attachment develop, and what are the stages?
3. Can infants establish attachments with people other than their mothers? With whom, under which circumstances, and with what differences?
4. What are the major individual differences in attachment, and how can these different attachment types be measured?
5. Are there cultural differences in attachment? How are these cultural differences explained/understood?
6. What factors contribute to the establishment of secure attachment and why?
7. How does attachment affect later behaviors and psychological characteristics?
8. Why does attachment affect later development? What are internal models of attachment, and how do psychologists believe they work?
9. Why does Sarah Hrdy think that human beings are “cooperative breeders,” and what have been some of the consequences for child rearing or, perhaps, human evolution, of cooperative breeding?
10. Based on the evolutionary theory of childcare (basically inclusive fitness theory and parental investment theory), what factors influence maternal care, paternal care, grandparental care, stepparental care, and adoptive-parents care?
Exercises: Going Further

1. Is attachment destiny? What do you think? A classmate of yours argues that, although textbooks says that establishing attachment is critical for children's psychological development, especially during the first year of life, she knows parents who took their children to daycare beginning at 1 month of age, and they seemed to grow up all right. Also, she seriously doubts that being insecurely attached in childhood makes children more prone to become a delinquent or be psychologically maladjusted as adolescents or adults. How would you respond to her?

2. If you ever plan to become a parent, what things about relating to children, if any, would you try to keep in mind in order to increase the likelihood of developing a secure attachment relationship with your sons and daughters?

3. According to what you have read on evolutionary theory of childcare in this chapter, make a list of the facts that would potentially increase the probability of child abuse, neglect, or filicide. Then explain why.

Suggested Readings

Classic Work
Bowlby, J. (1969). *Attachment and loss: Vol. 1: Attachment*. London: Hogarth. This is the first of a series of three books by John Bowlby, the grandfather of attachment research. It presents his ethological theory and his own earlier research that brought him to the field of attachment.

Daly, M., & Wilson, M. (1988). *Homicide*. New York: Aldine. As the authors of one of the founding documents of evolutionary psychology, Martin Daly and Margo Wilson review evidence documenting, among many other things, some of the factors associated with the most drastic form of parental disinvestment, filicide.

Scholarly Work
Sroufe, A., Egeland, B., Carlson, E., & Collins, W. (2005). *Minnesota Longitudinal study of risk and adaptation from birth to maturity: The development of the person*. New York: Guilford. This book by Alan Sroufe and his colleagues at the University of Minnesota summarizes the results from their longitudinal research, examining attachment and other aspects of psychological functioning in a large sample of people, including some who were at high risk for psychological problems. This research team has published important research on attachment and related topics for more than 30 years, and this book represents the culmination of their efforts.

Hrdy, S. B. (2009). *Mothers and others: The evolutionary origins of mutual understanding*. Cambridge, MA: Belnap Press. It is difficult to know where to place this highly readable and informative book. On the one hand, it is a scholarly work, presenting between two covers a nearly exhaustive look at the role of mothers—human and otherwise—and others—fathers and especially grandmothers—on child-rearing from an evolutionary perspective. Yet, it is so clearly written with an abundance of interesting and informative examples, that we also considered listing it under “Reading for Personal Interest.” Hrdy argues that humans’ tendency to cooperate arose as a need to care for highly dependent children and that such cooperative breeding set the stage for the advent of the modern human mind.

Reading for Personal Interest

Cengage Learning’s Psychology CourseMate for this text brings course concepts to life with interactive learning, study, and exam preparation tools, including quizzes and flashcards for this chapter’s Key Terms and Concepts (see the summary list on page 515). The site also provides an eBook version of the text with highlighting and note taking capabilities, as well as an extensive library of observational videos that span early childhood through adolescence. Many videos are accompanied by questions that will help you think critically about and deepen your understanding of the chapter topics addressed, especially as they pertain to core concepts. Log on and learn more at login.cengagebrain.com!