The Nature of Individual Differences in Infant–Caregiver Attachment

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Developing an attachment relationship with a caregiver in infancy is a normative phenomenon. Almost every infant will develop an affective tie with a caregiver and will endeavor to use that caregiver as a source of comfort and reassurance in the face of challenges or threats from the environment. The nature of the affective tie and the effectiveness with which the caregiver can be used as a source of comfort in the face of danger, however, differ across infant–caregiver dyads. These variations are individual differences in the quality of attachment relationships.

This chapter describes the nature of individual differences in infant–caregiver attachment as John Bowlby and Mary Ainsworth conceptualized it in their theory of attachment. It reviews how individual differences are described and assessed in infancy, as well as the meaning of attachment classification as an assessment of relationship history. This chapter also discusses theoretical predictions regarding the meaning of individual differences in early attachment relationships for subsequent relationships. Bowlby's theoretical perspective on continuity is discussed, and empirical support for these theoretical claims is briefly reviewed.

INDIVIDUAL DIFFERENCES IN ATTACHMENT: DEVELOPMENT AND DEFINITIONS

An initial distinction between the presence of an attachment relationship and the quality of an attachment relationship is important. According to Bowlby, a human infant will form an attachment to a caregiver as long as someone is there to interact with the infant and serve as an attachment figure. Forming attachments is strongly built into the human repertoire through evolution. Children will be unattached only if there is no stable interactive presence, such as is the case in certain kinds of institutional rearing. For all others, even those who are mistreated, attachment relationships are formed with caregivers. Individual differences in these attachment relationships are dependent on and reflective of differences in the history of care.

Individual differences in attachment relationships do not arise suddenly, nor are they carried solely in the traits of the infant or the caregiver (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969/1982; Sroufe & Waters, 1977). The patterns of interaction are built out of a history of
bids and responses within the dyad, and these patterns of interaction, rather than individual behaviors, reveal the underlying character of the relationship.

Through repeated interactions with the same adults over time, infants begin to recognize their caregivers and to anticipate the behavior of primary caregivers. Bowlby and Ainsworth were the first to elaborate on these early relationships in terms of both survival behavior and psychological processes. They described the infant as being biologically predisposed to use the caregiver, usually the mother, as a "haven of safety" and as a "secure base" while exploring the environment (Ainsworth, 1967; Ainsworth et al., 1978; Bowlby, 1969/1982). So when the infant feels threatened, he or she will turn to the caregiver for protection and comfort. In fact, Bowlby and Ainsworth described a delicate balance in the infant between exploration and seeking proximity to the caregiver when exploration proves threatening. Individual differences are most easily seen in this attachment-exploration balance. From this theoretical perspective, assessments of attachment security in infancy must be related to such secure-base behavior.

When seeking comfort or reassurance, infants direct behaviors toward their caregivers such as approaching, crying, seeking contact, and seeking to maintain that contact. These behaviors are called "attachment behaviors" (Ainsworth et al., 1978; Bowlby, 1969/1982). Attachment behaviors do not yield sufficient information, however, if one studies only the number of behaviors expressed. All infants display attachment behaviors at some point, and the number of behaviors may vary with the degree of threat the infant perceives in the environment. In a dangerous environment, when protection is needed, it will be maladaptive for an infant to refrain from expressing attachment behaviors. In an environment that poses little danger and warrants exploration, it may be maladaptive for an infant to forgo exploration in favor of seeking the caregiver. The study of attachment behaviors becomes most meaningful when one focuses on individual differences in the timing and effectiveness of their expression. Thus the issue at hand in studying individual differences in attachment relationships is not the quantity of attachment behaviors expressed. Rather, the organization of attachment-related behavior in the relationship—the quality of the attachment relationship (Ainsworth, 1972; Sroufe & Waters, 1977).

Individual differences in quality of attachment relationships have been broadly divided into two categories: "secure" attachment relationships and "anxious" or "insecure" attachment relationships (Ainsworth, 1972; Ainsworth et al., 1978; Bowlby, 1973). The term "secure" or the term "anxious" does not describe simply the manifest behaviors of the infant within the attachment relationship. Rather, the terms describe the infant's apparent perception of the availability of the caregiver if a need for comfort or protection should arise, and the organization of the infant's responses to the caregiver in light of those perceptions of availability.

Security of attachment does not mean that the infant never feels fear or apprehension (Bowlby, 1973). Fear and anxiety are normal human reactions. All infants will occasionally feel unsettled or fearful of something in the environment, and such reactions are adaptive because they prompt proximity to the protective caregiver. Security in the relationship with an attachment figure indicates that an infant is able to rely on that caregiver as an available source of comfort and protection if the need arises. Infants with secure attachment relationships may direct few attachment behaviors (such as crying or clinging) toward their caregivers when there are no threats in the environment. When threat-based feelings of apprehension arise, however, infants in secure relationships are able to direct attachment behaviors to their caregivers and take comfort in the reassurance offered by their caregivers. Secure relationships promote infants' exploration of the world and expand their mastery of the environment, because experience tells such infants that if the exploration proves unsettling, they can rely on their caregivers to be there and alleviate their fears. Infants with secure attachment relationships are confident in the sensitive and responsive availability of their caregivers, and consequently these infants are confident in their own interactions with the world.

This confidence is not instilled by the experience of infants who have anxious attachment relationships with their caregivers. Infants with anxious attachment relationships have not experienced consistent availability of and comfort from their caregivers when the environment has proven threatening. Bids for attention may have been met with indifference, with rebuffs, or with notable inconsistency (Ainsworth et al., 1978; Bowlby, 1973). The result of such histories is that these infants are anxious about the availability of their caregivers, fearing that the caregivers will be unresponsive or ineffectively responsive when
needed. They may also be angry with their caregivers for this lack of responsiveness. Anger seems to be a normative reaction to inaccessibility of caregivers, similar to that which occurs in prolonged separation (Robertson & Robertson, 1971). Bowlby (1973) speculated that angry reactions may have evolved because they punish caregivers for unresponsiveness, and may be intended to discourage caregivers from further unresponsiveness.

A history of unresponsiveness or erratic responsiveness results in infants' being unable to direct attachment behaviors at caregivers when appropriate. When there is no apparent danger in the environment, some infants with anxious attachment relationships may still direct many attachment behaviors to their caregivers, reflecting a constant low-level anxiety about the availability of the caregivers. When there is a perceived threat from the environment, and anxiety is high, some infants may not be able to direct appropriate attachment behaviors at their caregivers, or may not be easily comforted by caregivers who have been unreliable in the past. Because anxiously attached infants are not free to explore the environment without worry, they cannot achieve the same confidence in themselves and mastery of their environments that securely attached infants can.

Anxious attachments are nonoptimal organizations of attachment behaviors because they compromise exploration in some circumstances. At the same time, patterns of anxious attachment may be viewed as adaptations, in that they are suitable responses to the unresponsiveness of the caregivers. Main and Hesse (1990), for example, argue that establishing a low threshold for threat can be described as maximizing expressions of attachment even in low-threat situations. This may assure that inconsistent caregivers will be available if genuine threat should occur. Alternatively, some infants can be described as minimizing expressions of attachment, even in conditions of mild threat. This may forestall alienating caregivers who are already rejecting, and it may leave open the possibility of responsiveness if a more serious threat should arise.

Within the theoretical tradition of Bowlby and Ainsworth, all infants are viewed as adapting their attachment behavior systems to the caregiving environment at the same time as the environment adapts to them. In a proximal sense, both secure and anxious attachments can be considered adaptive: They promote proximity to caregivers, and consequently survival past the vulnerable period of infancy and to the age of reproductive maturity. In purely evolutionary terms, secure and anxious attachments are both distally adaptive as well, in that neither pattern should compromise reproductive success (Sroufe, 1988). In nonevolutionary terms, however, there are ways in which a history of anxious attachment may compromise an individual's subsequent development.

THEORETICAL PREDICTIONS REGARDING INDIVIDUAL DIFFERENCES IN ATTACHMENT

Bowlby (1969/1982, 1973) proposed two major hypotheses regarding individual differences in attachment. The first centered on antecedents of attachment relationships of varying quality. Bowlby defined security of attachment in terms of preferential desire for contact with the caregiver under conditions of threat, and secure-base behavior more generally. He viewed both as manifestations of a child's confidence in a caregiver's responsiveness. Through a history of responsive care, infants will evolve expectations (or, in Bowlby's terms, 'internal working models') of their caregivers' likely responses to signs of distress or other signals of the desire for contact. The specific prediction, then, is that caregiver responsiveness early in infancy is related to individual differences in attachment security later in infancy. In the most simple terms, Bowlby postulated that what infants expect is what has happened before. Not all aspects of parental care are related to attachment security, and caregiver responsiveness is not related to all aspects of infant behavior. For example, infants may vary in terms of activity level, preferred modes of signaling, and various aspects of behavioral style, none of which should have a significant impact on attachment security.

Bowlby's second hypothesis concerned the likely consequences of individual differences in attachment security for the child's development, particularly personality development (Bowlby, 1973). Bowlby argued that because attachment relationships are internalized or represented, these early experiences and subsequent expectations get taken forward to serve later behavioral and emotional adaptation, even in totally new contexts and with different people. In particular, internal working models are a foundation not only for expectations concerning the self, but also for later relationships with caregivers and
CHAPTER 4. Individual Differences in Infant–Caregiver Attachment

noncaretakers alike. Responsiveness by caretakers (and the ensuing confidence in that responsiveness) is more than a foundation for the developing parent–child relationship. The model of parent as responsive is inevitably associated with a complementary model of the self as effective, since the child is predictably effective at eliciting a parental response. By generalization, this pattern of responsiveness also leads to the idea that relationships may be a context in which needs are met. Thus there are implications for later efficacy, self-esteem, and involved social relationships.

This is not meant to imply that these early relationships alone are destiny. In Bowlby’s (1973) view, adaptation always depends both on the prior history of adaptation and on current circumstances, with established patterns influencing selection, interpretation, and reactions to the environment, and with current experience capable of transforming adaptation and subsequent expectations, while not erasing the influence of history. Bowlby adapted Waddington’s (1957) pathway model to argue both that change is always possible, and that change is at the same time constrained by prior adaptation.

These issues are elaborated in the sections to follow. Then we conclude with a discussion of current issues in the area of individual differences in attachment, including when attachment-based differences are not expected.

DESCRIPTIONS AND ANTECEDENTS OF INDIVIDUAL DIFFERENCES IN ATTACHMENT SECURITY

Research on Bowlby’s first hypothesis—namely, that individual differences in attachment arise from differential experiences and consequently differential expectations regarding the availability of caretakers—was pioneered by Ainsworth, who was the first to provide a formal description of individual differences in human infant attachment security. Inspired by Bowlby’s theory and her own ethological observations of caregiving practices and infant behavior in Uganda (Ainsworth, 1967), Ainsworth began by making hours of detailed observations of exploratory behavior, crying, and other attachment-related behaviors in the home for a small sample of infants. She also developed carefully crafted, behaviorally anchored rating scales for caregiver qualities: the Sensitivity to Signals, Cooperation–Interference, Acceptance–Rejection, and Availability–Unavailability scales. Thus, prior to developing her procedure for assessing attachment security in the laboratory at the end of the first year, Ainsworth established anchors in attachment behavior in the home, as well as in assessments of caregiver sensitivity. This methodical pursuit of information to be used for validation was an essential first step in the development of her measure of attachment security. This step was particularly impressive, in light of the fact that few researchers devote the time and resources necessary to validate laboratory measures against the naturalistic occurrence of the behaviors they are intended to capture.

It is not possible to observe directly the conscious and unconscious processes that guide the infant’s responses within the attachment relationship. And as mentioned previously, observing the number of attachment behaviors expressed in a given situation is not sufficient, because infants with anxious attachment relationships may not be making attachment-related overtures to their caregivers in an adaptive fashion. The key to assessing attachment rests in determining how an infant organizes attachment behaviors to balance the need for protection and comfort with the desire to explore the environment.

The strange situation (Ainsworth et al., 1978; Ainsworth & Wittig, 1969) was the method Ainsworth developed for assessing the infant–caregiver attachment relationship, and it has become the standard by which measures at later ages are judged. The strange situation is so named because it is intended to be a mildly to moderately stressful experience for an infant, akin to an experience in a doctor’s office waiting room. It introduces several strange and therefore stressful elements to an infant—a laboratory context that is unfamiliar, an unfamiliar adult who interacts with the child, and two brief separations from the mother. The premise of the situation is that the multiple increasing stressors will activate the infant’s attachment behavioral system, and that individual differences in the child’s expectations about the availability of the caregiver will thus be revealed. The situation also reveals the infant’s ability to balance exploration of a new environment with a need for reassurance from the caregiver (see Solomon & George, Chapter 14, this volume, for a detailed discussion of the strange situation).

Based on the pattern of interactive behavior across the session and especially the two reunions, each relationship is classified as “se-
cure,” “avoidant,” or “resistant” (Ainsworth et al., 1978). An additional classification, “disorganized/disoriented,” is now also used because some infants exhibit unusual behaviors that prevent them from being classified easily as displaying a single organization of attachment behavior, or that reflect striking episodes of disorientation (Main & Solomon, 1990). Such infants, like avoidant and resistant infants, are considered anxiously attached.

An infant classified as secure with his or her caregiver in the strange situation is able to use the caregiver as a secure base for exploration in the novel room. The infant may check back with the caregiver, but usually engages in exploring the toys. Upon separation the infant may be overly distressed, and play may become impoverished. A secure infant may be friendly with the stranger, and may even be somewhat comforted by the overtures of the stranger during separation, but there is a clear preference for comfort by the caregiver. Upon reunion with the caregiver, a distressed secure infant will seek proximity or contact with the caregiver, will maintain contact as long as it is needed, and will be readily comforted by the proximity or contact. Eventually, most secure infants will return to play. Even when not distressed, a secure infant is quite responsive to the caregiver’s return, greeting with a smile or vocalization and initiating interaction.

An infant classified as avoidant with his or her caregiver will usually engage with the toys in the presence of the caregiver. The infant is unlikely to show affective sharing (e.g., smiling or showing toys to the caregiver) before the first separation, although the infant may engage the caregiver for instrumental assistance (Waters, Wippman, & Stroffe, 1979). Upon separation the infant is unlikely to be distressed, although some distress when left alone is possible. The infant with an avoidant relationship tends to treat the stranger in much the same way as he or she does the caregiver, and in some cases the infant is actually more responsive with the stranger. Upon reunion with the caregiver, an avoidant infant shows signs of ignoring, looking or turning away, or moving past the caregiver rather than approaching. If picked up, an avoidant infant will make no effort to maintain the contact.

Infants classified as resistant with caregivers in the strange situation are conspicuously unable to use the caregivers as a secure base for exploration of the novel setting. These infants may seek proximity and contact with the caregivers even before separation occurs, and may be quite wary of the situation and the stranger. Upon separation infants classified as resistant are likely to be quite distressed, and are not easily calmed by the stranger. Upon reunion they are likely to want proximity or contact with their caregivers, but not to be calmed by the contact. Some resistant infants may display unusual passivity, continuing to cry but failing to seek contact actively. In most cases, however, the hallmark of this classification is seeking contact, then resisting contact angrily once it is achieved. Thus there is an obvious ambivalence in many of these relationships.

An infant who is classified as disorganized/disoriented in the strange situation (in addition to an alternate, best-fitting classification of secure, avoidant, or resistant) exhibits conflicted or disoriented behaviors that indicate an inability to maintain one coherent attachment strategy in the face of distress (Main & Solomon, 1990). Thus, an infant classified as disorganized/disoriented with the caregiver in the strange situation shows such contradictory or conflicted behaviors as behavioral stalling, stereotypies, or direct apprehension with regard to the parent.

Ainsworth et al. (1978) reported extensively on the home behaviors of their participants over the first year of the infants’ lives leading up to the strange situation. Although the full sample size used for the development of the strange situation coding procedures was 106 dyads, the more intensive study of home behavior was undertaken only for one subsample of 23 dyads. In general, a small sample size reduces the likelihood of finding significant between-group differences. The fact that Ainsworth and her colleagues found group differences despite the small sample size attests to the strength of these differences. They found that infants who would later be classified as anxiously attached (both avoidant and resistant) with their mothers in the strange situation were more overly angry and noncompliant at home and cried more at home than infants who would later be classified as secure. The mothers of infants who would later be classified as anxious with them were less sensitive in interactions, more interfering with the children’s behavior, and less accessible to the children’s bids than mothers of infants who would later be classified as secure. In addition, mothers of infants who would later be classified as avoidant were particularly striking in that they expressed an aversion to physical contact when their infants sought it, and expressed little emotion during interactions with them.
CHAPTER 4. Individual Differences in Infant-Caregiver Attachment

More recently, Waters and Deane (1985) introduced an observation-based Attachment Q-Sort that uses extended observations of the home behavior of children as indicators of attachment. This measure was designed for use either by the mother or by a trained observer, and the final result is not a separation into attachment classifications, but rather a continuous score for security. Items in the Q-set of the Attachment Q-Sort were chosen specifically to represent a series of home behaviors that should be relevant to attachment and that should discriminate between different organizations of attachment behavior. These behaviors include predominant mood, proximity and contact seeking, reactions to frightening stimuli, crying, communication skills and efficacy, and many other behaviors. An observer or the child’s mother spends several hours observing the child’s behavior at home. The observer then sorts the Q-set cards to describe the child’s behavior at home. This sort is compared to a criterion sort (developed through the input of many experts in the field of attachment) to determine security, resulting in a score along a security dimension. Vaughn and Waters (1990) found that infants who were secure with their mothers in the strange situation had significantly higher security scores on the Attachment Q-Sort when this was completed by observers, confirming the link between home behavior and strange situation classification.

Numerous others have replicated the core findings of a relation between caregiver insensitivity and later anxious attachment (Bates, Matlin, & Frankel, 1985; Grossman, Grossman, Spangler, Suess, & Unner, 1985; Isabella, 1993; Kiser, Bates, Matlin, & Bayles, 1986; National Institute of Child Health and Human Development [NICHD] Early Child Care Research Network, 1997). In our own research, Egeland and Farber (1984) found that mothers of infants who would later be classified as secure were more sensitive and expressive during a feeding situation than mothers of avoidant or resistant infants. Mothers of avoidant infants were insensitive to their infants’ timing cues and seemed to dislike close physical contact with their infants.

The magnitude of the relation between caregiver sensitivity and later attachment security is often not large, especially when compared to the findings in Ainsworth et al.’s (1978) original study, and there have been occasional nonreplications (e.g., Seifer, Schiller, Sameroff, Resnick, & Riordan, 1996). Some of the problems in replicating these findings may be found in the difficulty of devising a good measure of caregiver sensitivity, as well as in the different numbers of hours of home observation that form the basis for the different sensitivity measures. Despite the existence of some nonreplications, a meta-analysis based on 66 studies of varying quality did find a significant relation between sensitivity and attachment (DeWolff & van Uzendoorn, 1997). In addition, the recent multisite NICHD study of day care (n = 1,153), although finding little impact of day care on attachment, supported the significance of caregiver sensitivity in predicting individual differences in attachment (NICHD Early Child Care Research Network, 1997).

The finding that infant home behavior during the first year of life was related to later strange situation classification led to the suggestion that attachment classification could be a simple manifestation of temperamental characteristics of the infant, and not a product of the relationship (see Vaughn & Bost, Chapter 10, this volume). Direct comparisons of temperament and attachment in research, however, have suggested that there is not in fact a direct link between temperament and security of attachment (Belsky & Rovine, 1987; Crockenberg, 1981; Egeland & Farber, 1984; Gunnar, Mangelsdorf, Larson, & Hertsgaard, 1989; Seifer et al., 1996; Vaughn, Lefever, Seifer, & Barglow, 1989). Other research has demonstrated that what can be predicted by temperament are specific behaviors during the strange situation, particularly distress during separation from, but not during reunion with, the mother (Gunnar et al., 1989; Vaughn & Bost, Chapter 10, this volume; Vaughn et al., 1989). These findings bolster the supposition that the relationship between the mother and infant is not determined directly by infant temperament.

Other researchers have sought to explain the relation between temperament and attachment by looking at the interaction of maternal and infant characteristics. Although Crockenberg (1981) found no direct relation between infant temperament and attachment classification, she did find a significant interaction between maternal social support and infant temperament in predicting attachment classification. Those mothers with irritable infants (as assessed shortly after birth) and poor social support were more likely to have anxiously attached infants. When social support was high, infant irritability had no impact on attachment quality. Mangelsdorf, Gunnar, Kestenbaum, Lang, and Andreas (1990) looked at infant temperament and maternal per-
sonality in relation to attachment. Like previous researchers, they found no main effects of temperament or personality when predicting attachment; however, they did find a significant interaction. Infants who were highly prone to distress and had mothers who were rigid and traditional were more likely to be anxiously attached. In our own research project, Susman-Stillman, Kalkoske, Egeland, and Waldman (1996) found that maternal sensitivity during the first year of life predicted attachment security, that infant temperamental characteristics predicted type of insecurity, and that maternal sensitivity mediated the link between infant irritability and attachment security.

Thus, although some of the behaviors seen in the strange situation may be related to temperament, neither the patterning of the infant–caregiver relationship nor the confidence of the infant in the caregiver is determined by infant temperament (see Vaughn & Bost, Chapter 10, this volume, for a more extensive discussion of attachment and temperament).

PREDICTIVE MEANING OF INDIVIDUAL DIFFERENCES IN INFANT ATTACHMENT

Bowlby's second hypothesis concerns the developmental significance of individual differences in early attachment relationships. What are meaningful variations in infant–caregiver attachment? What features of development do they affect? And what are the processes by which this effect occurs? Bowlby and Ainsworth articulated their ideas regarding individual differences over the course of three decades. The theory and research described in this section draw from these precise, well-reasoned, and sophisticated ideas.

Bowlby described two types of variation in attachment: presence versus absence of an attachment relationship, and individual differences in organization of secure-base behavior across infant–caregiver dyads. Although absence of attachment is likely to affect survival, Bowlby did not predict that individual differences in attachment security have an influence on survival or reproductive success. It is sometimes argued (e.g., Belsky, Chapter 7, this volume) that the existence of the avoidant and resistant patterns in human infants means that these patterns must have evolved to ensure reproductive success in some circumstances. By definition, of course, humans have evolved to have these patterns in the behavioral repertoire. It is not logically essential, however, that these patterns have specific reproductive advantage; not all behaviors characteristic of a species do. Consider, for example, distress responses in the face of parental death. When no conspecifics are available, distress reactions that alert predators and cannot elicit protection from a deceased caregiver are not helpful. But distress signals in response to separation from a living caregiver are functional, and nature did not build-in a more discriminative system (perhaps because infants whose caregivers die are so unlikely to survive). It is interesting, then, to note that the resistant and avoidant attachment patterns are quite reminiscent of the protest–despair–detachment sequences seen in the face of loss (Heimicke & Westheimer, 1966; Robertson & Robertson, 1971). These attachment patterns, seen with caregivers who are physically present, may be contextual distortions of patterns available to all infants. It is extremely unlikely that they represent separate streams of evolution.

Individual differences in attachment security, because of their impact on emotional regulation and exploration, were viewed as important for both personality development and psychopathology. Whereas evolutionary theory is sufficient for explaining the consequences of failures to attach, understanding the developmental implications of individual differences in attachment behavioral organization for those infants who do become attached required the wedding of evolutionary theory, psychoanalytic theory, and general developmental theory. Bowlby argued, as Freud had previously, that early attachment experiences are of special importance because of their implications for mastery, emotional regulation, and interpersonal closeness. Rejecting the notion of drive reduction, Bowlby expanded on Freud's original focus on the role of actual experience. Bowlby elaborated on the idea of an internal world of mental processes as central to the ongoing influence of early history (Sroufe, 1986). Human expectations, according to Bowlby, are based upon the quality and patterning of early care. From a history of responsive care and smooth dyadic emotional regulation come a sense of efficacy, a capacity for serviceable self-regulation, and positive expectations regarding interpersonal relationships. Within this developmental process, the individual is viewed as active—adapting, coping, and shaping his or her own experiences.

There are at least four possible explanations
for why early attachment relationships influence later development. These explanations are not mutually exclusive, and it is likely that each plays a part in the continuing influence of attachment. First, it is possible that the experiences within the early attachment relationship influence the developing brain, resulting in lasting influences at a neuronal level (Schore, 1994). This possibility, though compelling, is not a focus of the present discussion (see Cicchetti & Tucker, 1994). Second, as suggested by Isabella (1993), Cassidy (1994), and Sroufe (1979, 1996), the early attachment relationship may serve as a foundation for learning affect regulation. The caregiver’s responses to the infant’s distress are an external source of emotion regulation before the infant learns to self-regulate. Early attachment relationships, then, may affect a child both through the mother’s actions and through the patterns of regulation internalized from the relationship. Individual differences in attachment may thus be carried forward in the form of differences in affect regulation. A third possible avenue for attachment to influence subsequent development is through behavioral regulation and behavioral synchrony. Through observing and interacting with an attachment figure, an infant learns what it is like to behave in a relationship (Ellicker, Englund, & Sroufe, 1992; Giazingo & Tronick, 1988; Pastor, 1981). Secure children develop abilities such as self-control and behavioral reciprocity, which result in more skilled interactions than those of anxious children. These interactional skills can then be applied to new settings and new relationships, resulting in continued differences that are strengthened across development. The fourth way in which individual differences in attachment influence later development is through representation. According to Bowlby (1969/1982), from the earliest attachment relationship the child begins to represent what to expect from the world and from other people, as well as how he or she can expect to be treated by others. These beliefs and expectations, or “internal working models,” begin in the relationship with the caregiver as the infant begins to anticipate the behavior of the caregiver in response to the infant’s signals. An infant who is treated in a consistently sensitive manner grows to see the world as good and responsive, and the self as deserving such consideration. An infant who is responded to harshly, erratically, or not at all grows to see the world as unpredictable and insensitive, and the self as not deserving better treatment. These internal working models are then carried forward to new relationships and new experiences, guiding the child’s expectations and behavior.

Bowlby proposed a very particular view of individual differences over time, based on an adaptation of Waddington’s (1957) “developmental pathways” (analogous to branching tracks in a train yard; see Sroufe, 1997). In this view, early differences in attachment do not directly cause later differences in functioning; rather, they initiate pathways that are probabilistically related to certain later outcomes. Any outcome is always the joint product of earlier history and current circumstances. Thus changes in patterns of adaptation always remain possible. Prior adaptation, however, constrains subsequent development—both in the sense that the longer a pathway has been followed, the more difficult it is to achieve substantial change in direction, and in the sense that not all patterns of subsequent adaptation are equally likely. Not only may circumstances remain the same (thus supporting the original pattern of adaptation), but individuals interpret, select, and influence the people and circumstances surrounding them (Sear & McCartney, 1983; Sroufe, Egeland, & Kreutzer, 1990). In Bowlby’s terms (1973, 1980), the environment is engaged within the confines of “working models” of self, other, and relationships that had been previously formulated.

There are specific predictions regarding individual differences in early attachment quality and later outcomes. Particular patterns are expected to have particular correlates, in terms of both personality and psychopathology. Moreover, not all developmental outcomes, whether of good or poor quality, are viewed as related to attachment history. As we discuss later, many outcomes are viewed as independent of the attachment system.

Bowlby did not conceive of the internal working model as a model for all things, but rather as a model of expectations and beliefs about oneself, other people, and relationships. Consequently, attachment should be expected to exert its influence on a child’s later adaptation primarily in the context of beliefs about the self and relationships, rather than indiscriminately predicting all things, both good and bad. The affective regulation and behavioral reciprocity learned in this early relationship should also be most influential in the realm of subsequent relationship and interpersonal issues.

- Even within the parent–child relationship, not
all interactions are driven by the attachment-exploration balance. Minimally stressful free-play sessions, for example, may appear quite similar for secure and anxious dyads (Ainsworth, 1990). Other elements of parent-child relationships, and other elements of children's lives overall, predict individual differences in adaptation as well. It would be naive and incorrect to suggest that infant attachment is solely and directly responsible for adaptation during childhood and adolescence. Attachment does contribute, however, to explaining individual differences in the course of adaptation during childhood, particularly when combined with other assessments of later or concurrent functioning. The idea that early attachment experiences maintain an influence and work together with subsequent experiences to predict development is faithful to Bowlby's (1973, 1980) idea that adaptation arises from a combination of early experience, subsequent experience, and current circumstances.

Theory dictates that the influence of infant attachment relationships should be particularly apparent in some specific domains of adjustment and developmental challenges. These domains include dependency, self-reliance, and efficacy; anxiety, anger, and empathy; and interpersonal competence (Ainsworth, 1972; Ainsworth & Bell, 1974; Bowlby, 1969/1982, 1973, 1988; Sroufe, 1988; Sroufe & Fleeson, 1986, 1988). These issues should be specifically related to attachment because they are intricately connected to the affect regulation, behavioral reciprocity, and expectations and beliefs about self and other that arise from early attachment relationships. Theoretical predictions and empirical findings follow not only from individual differences in secure versus anxious attachment, but also in some cases from more specific individual differences between those with a history of avoidant attachment and those with a history of resistant attachment (and, in some cases, those with a history of disorganized/disoriented attachment).

In the following section, we review empirical predictions from individual differences in infant attachment to theoretically relevant dimensions of behavior in childhood and adolescence. The empirical findings are drawn from the findings of the Minnesota Parent–Child Project, from a Minnesota longitudinal study of middle-class families, and from other longitudinal studies in which attachment with the primary caregiver was assessed with the strange situation during infancy.

**EMPIRICAL STUDIES OF INFANT ATTACHMENT AND LATER ADAPTATION**

**Dependency, Self-Reliance, and Efficacy**

Infants whose caregivers are sensitive and responsive to cues learn that they can readily get their needs met and that they have an effect on the world. Such infants grow to believe that they can influence the world around them successfully. Infants whose caregivers are unresponsive or erratically responsive to cues learn that they are not able to influence the world to meet their needs. These infants do not acquire the confidence to function autonomously (Ainsworth & Bell, 1974; Sroufe, Fox, & Pancake, 1983). Such a prediction was a cornerstone of Bowlby's theory, as described in a chapter entitled "The Growth of Self-Reliance" in the second volume of his classic trilogy (Bowlby, 1973).

When the attachment construct was first introduced, it was necessary for researchers to differentiate between attachment and dependency (Ainsworth, 1969, 1972; Bowlby, 1969/1982; Sroufe et al., 1983). Because attachment behavior and signs of dependency are similar (e.g., crying, clinging, seeking proximity), attachment quality was misunderstood to be a measure of dependency (Gewirtz, 1972). Some secure infants were mistakenly thought to be dependent, whereas avoidant infants were thought to be precociously independent. In Bowlby's view, however, it is not possible for an infant to be either too dependent or truly independent. Rather, infants may be effectively or ineffectively dependent.

The key to the relation between infant attachment, dependency, and self-reliance has been articulated by Sroufe et al. (1983), who explained that infants who are effectively dependent will become effectively independent. Using sensitive caregivers effectively to meet needs will lead infants to believe, as children, that they can influence the world to meet their needs and achieve their goals. This confidence allows the children to function autonomously and with a belief that they will be successful in their efforts. Thus the ongoing influence of attachment is brought forward through affect regulation, behavioral reciprocity, and representation. Several studies have examined the relation between attachment and dependency, and between attachment and environmental mastery.

In the Minnesota Parent–Child Project, depen-
ancy has been studied in preschool, middle childhood, and adolescence. Sroufe et al. (1983) and Sroufe (1983) studied dependent behavior in preschool. "Dependency" was defined in terms of seeking attention and proximity to the teacher, extreme reliance on the teacher for help, and seeking teacher attention at the expense of peer relations, as well as other indices. Data were obtained through multiple methods, including observer data and teacher rankings and Q sorts. Teachers and observers were all unaware of the children's attachment histories, and all indicated that children with anxious histories were more dependent on teachers than those with secure histories. Those with resistant or avoidant histories had more interactions with teachers, sat next to them more often during circle time, and were judged to be more dependent overall. Children with secure histories did seek teacher attention, but they tended to seek attention in positive ways, and not at the expense of peer relations. Dependency was later studied at age 10 in a summer camp context by Urban, Carlson, Egeland, and Sroufe (1991), who assessed dependency through camp counselor ratings and observer data on contact sought with adults. As in the preschool context, they found that children with anxious histories, both resistant and avoidant, were rated as more dependent. Children with secure histories sought less contact with adults at the camp overall.

Differences in dependency continued to be manifest at age 15, the latest age we have examined to date (Sroufe, Carlson, & Shulman, 1993). Both those adolescents with histories of resistant attachment and those with histories of avoidant attachment continued to show more dependency on adults than those with secure histories. This finding held even when variance attributable to contemporary parenting measures was taken into account.

Confidence, belief that one can succeed, and tolerance of frustration in goal seeking have also been studied in relation to attachment history. In our research, this took the form of studying "ego resilience," or a child's ability to respond flexibly to the changing requirements of a situation, particularly in the face of frustration. Sroufe (1983) reported that children with secure histories were rated as more ego-resilient than children with anxious attachment histories by their preschool teachers (all of whom were unaware of the children's attachment histories). Most striking was the fact that there was no overlap on ego resilience between the secure and avoidant groups.

These dimensions of personal efficacy were also explored in another longitudinal Minnesota study, a study of middle-class families. At the age of 2 years, children and their mothers were seen in a tool use situation. Matas, Arend, and Sroufe (1978) found that children with secure histories appeared more competent in the tool use tasks than those with anxious histories, showing more enthusiasm, compliance with maternal directives, and persistence. When these children were in preschool, Arend, Gove, and Sroufe (1979) found the same relation between attachment and ego resilience that would later be replicated in the Parent-Child Project: Children with secure histories were judged to be more ego-resilient than their anxious counterparts in a teacher Q-sort.

Other studies have explored these efficacy constructs as well. Frankel and Bates (1990), in a replication of Matas et al. (1978), found that toddlers with secure histories were more persistent in a tool use task than children with anxious histories. In an Israeli kibbutz study of attachment between young children and their metaplot (the primary caregivers in a kibbutz children's house), Oppenheim, Sagi, and Lamb (1988) found that children who had secure histories with their metaplot were described (by their metaplot, in Q sorts) as more goal-directed and achievement-oriented than children with anxious/resistant histories. In a German study of interaction with a stranger, Lütkenhaus, Grossmann, and Grossmann (1985) looked at 3-year-old children's responses to playing a competitive game with an unfamiliar experimenter. When the children were made aware of the possibility that they were failing, those with secure histories increased their efforts, whereas those with anxious histories decreased their efforts. This finding was interpreted as indicating that the children with secure histories believed they had more control over their environments and could succeed by using their skills if they tried.

Overall, these findings on dependency, self-reliance, and efficacy suggest that early attachment history does contribute to a child's growing effectiveness in the world. Children with secure histories seem to believe that, as was true in infancy, they can get their needs met through their own efforts and bids. In contrast, children with anxious histories seem to believe that, as in their early attachment relationships, their efforts are often ineffective, and they must rely extensively on others who may or may not meet their needs.
Anxiety, Anger, and Empathy

Chronic unavailability of and rejection by the caregiver, which are characteristic of anxious attachment, take their toll on an infant over the course of development. Unlike a secure infant, who can count on the responsiveness of the caregiver, an anxiously attached infant must deal with the constant possibility of needing an unavailable caregiver, as well as dealing with the accumulating frustration and dysregulation inherent in being treated insensitively (Bowlby, 1973).

According to Bowlby (1973) and Stayton and Ainsworth (1973), anxiously attached infants must be constantly concerned about the whereabouts of their caregivers, because the caregivers cannot be relied upon to be accessible in times of need. Because of the potential unavailability of the caregivers, these infants live with the constant fear of being left vulnerable and alone. This fear of separation or abandonment continues beyond infancy, because the fear of being alone when comfort or protection is needed continues throughout childhood and adulthood (Bowlby, 1973). Thus the anxiety associated with this fear of separation lasts beyond infancy as well. Such anxiety should be particularly characteristic of individuals with resistant attachment history, because these relationships are characterized by an unpredictable, erratic responsiveness that can provoke particularly anxiety-provoking and can give rise to a coping strategy centered on chronic vigilance (Bowlby, 1973; Cassidy & Berlin, 1994).

Another response to unavailability, rejecting caregiving is anger. Some anger is a natural response to the fear engendered by a separation from an attachment figure, because it serves to express displeasure over the separation and to prevent it from recurring (Bowlby, 1973). Chronic anger as a response to chronic unavailability, however, can be highly maladaptive. Such anger may manifest itself through angry or aggressive behavior toward the caregiver. When the expectation of being hurt, disappointed, and afraid is carried forward to new relationships, the anxious infant becomes an angry, aggressive child. Avoidant infants, who are chronically rejected, and disorganized/disoriented infants, who are conflicted in the face of frightened or frightening caregivers, are the most likely to show these angry, aggressive responses later (Ainsworth et al., 1978; Bowlby, 1973, 1980; Lyons-Ruth, Alpern, & Repacholi, 1993; Renken, Egeland, Marvinney, Mangelsdorf, & Sroufe, 1989).

Empathy is in many ways the complement or counterpoint to aggression. Whereas aggression often reflects an alienation from others, empathy reflects an amplified connectedness, and whereas aggression reflects a breakdown or warping of dyadic regulation, empathy reflects heightened affective coordination. In fact, in many ways aggression is dependent upon a lack of empathy or emotional identification with others.

Attachment theory makes a strong prediction with regard to the development of empathic capacity. Given that not only roles but basic properties of relating are learned within the attachment relationship (Sroufe & Fleeson, 1986), the responsiveness that underlies security is also predicted to give rise to empathy. Earlier we have argued, following Bowlby, that consistently providing for infants' needs does not condemn them to perpetual dependency, but in fact serves as the springboard for self-reliance because it instills a sense of efficacy concerning the environment. Similarly, being consistently nurtured and responded to empathetically leads not to a spoiled, self-indulged child, but rather to an empathic child. All children learn about the patterning of relating and dyadic emotion regulation through experience. Those whose caregivers are responsive to their tender needs learn that when one person is needy, the other responds; when one person is emotionally overaroused, the other provides comfort or reassurance. All that these children require are the cognitive advances necessary to play the more mature role. Recapitulating understood patterns of dyadic interaction and regulation is a natural human tendency. For some, particularly those with secure attachment histories, this gives rise to the capacity for empathy. Empirical studies on anxiety, anger, and empathy and their relation to infant attachment are reviewed below.

Both in laboratory assessments and in school settings, those with histories of resistant attachment have been found to be less forceful and confident, more hesitant in the face of novelty, and generally more anxious than those with either secure histories or avoidant histories. For example, using Banta's (1970) curiosity box situation at age 4½, Nezworski (1983) found the resistant group to be more hesitant about engaging this novel object than either the avoidant or the secure group. Likewise, from problem behavior checklist data provided by elementary school teachers, children with resistant histories were identified as more passive and withdrawn than children with secure or avoidant histories.
(Renken et al., 1989). Further data on anxiety are reported in the section on psychopathology.

Anger, and particularly aggression, as related to attachment history have been examined in several samples. In our research, angry and aggressive behavior was assessed in preschool and in elementary school. During preschool, teacher Q-sorts and detailed behavioral coding by observers indicated that more negative affect, anger, and aggression were expressed by children with anxious attachment histories than by those with secure histories. Q-sort data from elementary school teachers yielded the same results. Teachers and observers were always unaware of the children’s histories (for more details, see Sroufe, 1983; Sroufe, Schork, Motti, Lawroski, & LaFreniere, 1984).

Another analysis revealed differences between those with avoidant and resistant histories. Troy and Sroufe (1987) observed children in the preschool setting who were assigned to play pairs by attachment history. Analysis of the interactions between the children in each pair revealed a systematic relation between victimization and attachment. Children with avoidant histories were significantly more likely than other children to victimize their play partners. Children with secure histories were never victimizers, nor were they ever victims, whereas children with resistant histories were likely to be victims if they were paired with children with avoidant histories. In a study examining peer interaction in preschool in relation to attachment history in a German sample, Susser, Grossmann, and Sroufe (1992) also found that children with avoidant attachment histories exhibited more hostility and scapegoating of other children than did children with secure histories.

In the middle-class Minnesota sample mentioned previously, differences as a function of attachment history were found on expressions of anger and aggression toward mothers at 2 years of age (Matas et al., 1978). Matas and her colleagues found that children with anxious histories were more likely than children with secure histories to display aggressive behavior toward their mothers during a tool use task. These findings were replicated by Frankel and Bates (1990), using the same procedure in an independent sample. Interestingly, no difference in aggression was found between the groups with avoidant and resistant histories when the aggression was directed at mothers rather than peers.

Empathy has also been studied in relation to attachment history. In our research, empathic behavior was assessed in two ways. First, ratings were composited from preschool teacher Q-sort descriptions on items pertaining to empathy (e.g., “shows concern for others,” “is empathic”). Teachers were unaware of the early attachment histories of the children. The ratings significantly distinguished those with secure and anxious histories, often at the item level (see also Waters et al., 1979). In the written descriptions teachers provided of individual children, those described as “empathic” in each case had secure histories, whereas those described as “neutral” were always those with avoidant histories. Second, empathic behavior was assessed from videotapes of preschool interaction (Kestenbaum, Farber, & Sroufe, 1989; Sroufe, 1983). Tapes made of free-play interactions were examined for instances in which a child in the frame was distressed, and then any children in the vicinity of the distressed child were rated for empathic responses. Results indicated that children with secure histories were more empathic than children with avoidant histories. Children with resistant histories did not differ significantly from either of the other attachment groups on these measures, although they did seem to have trouble maintaining a boundary between someone else’s distress and their own; that is, they became distressed in response to witnessing distress in another. This is consistent with the idea that differences in attachment will be reflected in differences in affect regulation.

Overall, attachment history does seem to contribute to the prediction of anxiety, anger, and empathy during childhood. Children with resistant attachment histories seem to be more likely than children with other histories to have problems with anxiety, perhaps in response to the constant vigilance they have developed in their early attachment relationships. Children with avoidant or disorganized/disoriented histories are most likely to show hostile, aggressive behavior, both with parents and with peers, perhaps as a response to chronic rejection and insensitivity from their caregivers. In contrast, children with secure histories seem to have acquired a foundation for empathy from their early relationships; they take to new relationships the ability to be sensitive to another’s emotional cues, as well as a pattern of dyadic affect regulation in which the one who is not distressed helps to regulate the other.

Social Competence

Social competence is clearly an important task of development. According to Waters and Sroufe
PART I. OVERVIEW OF ATTACHMENT THEORY

(1983), competence in general is defined by two capacities: (1) being able to make use of the environment, and (2) being able to make use of personal resources in order to achieve a good developmental outcome. Navigating the world of social relationships is especially important.

One way in which attachment relationships influence later social competence is by providing a foundation for a child’s expectations about and approach to other relationships (Sroufe & Fleeson, 1986, 1988). Secure infants, as they develop, bring forward with them expectations that social partners will be responsive to them and that they are worthy of such positive responses. Anxious infants, as they develop, bring forward expectations that they will be treated inconsistently or rejected outright by social partners, and that they are not worthy of better treatment (Bowby, 1969/1982).

Another way in which the attachment relationship influences social competence is through teaching the infant about behavioral synchrony and communication (Ainsworth & Bell, 1974; Sroufe, Egeland, & Carlson, in press). The sensitive, responsive behavior of the caregiver in a secure dyad teaches the secure infant that communication is contingent upon each partner’s cues and responses. The insensitive, uncoordinated interactions of an anxious dyad teach the anxious infant that communication is not a responsive interaction, but a series of poorly coordinated bids and responses. All infants carry with them the expectations of how they should respond to social partners, and how social partners are likely to respond to them.

The data on social competence illustrate particularly well the continuity between early attachment differences and later functioning, despite changes in settings and constructs assessed. Early studies in our laboratory revealed differences in orientation toward peers as early as the toddler period (Pastor, 1981). With entry to preschool, however, the adaptive challenge expands. Children must not only engage in more extensive give-and-take with particular partners, but they must also begin to function with some proficiency in a group. When teacher ratings were focused on such capacities, children with secure histories were found to be dramatically more competent (Sroufe, 1983).

Greater complexity is confronted in middle childhood. A child not only must interact with others, but must sustain personal relationships over time (i.e., forge loyal friendships), must find a place in the more organized peer group, and must coordinate friendships with group functioning. Again, global ratings by school teachers have confirmed the greater interpersonal competence of those with secure histories. More detailed study of 47 children revealed differences with regard to each of the age-related competence issues. Those with secure histories, compared to those with anxious histories, more often formed friendships at a summer camp (and more often with those who also had been secure), as revealed by reciprocated sociometric choices, counselor nominations, and direct observations of frequency of interaction (Ellicker et al., 1992). Those with secure histories were also more accepted by the group and adhered more to group norms, such as those regarding maintenance of gender boundaries, than those with anxious histories (Sroufe, Bennett, Englund, Urban, & Shulman, 1993). Finally, those with secure histories were better able to coordinate these tasks than those with anxious histories, as witnessed by the ease of incorporating others into their activities while still maintaining a reciprocated focus with their partners (Shulman, Ellicker, & Sroufe, 1994).

In adolescence, those with secure histories were effective in the above-described ways; they were also rated by camp counselors as more competent in general, and more effective in the mixed-gender crowd in particular (Sroufe, Bennett, et al., 1993; Weinfield, Otagawa, & Sroufe, 1997). In addition, ratings in group problem-solving situations revealed greater leadership abilities of those with secure histories, who were also significantly more often elected spokespersons for their groups (Englund, Levy, & Hyson, 1997). In an interview study of the total sample, the friendships of girls with secure histories were judged to be more intimate (Ostoja, 1996). Differences for boys were not significant, perhaps due to the interview format with this lower-socioeconomic-status sample. Also, again at age 16 years, competence rankings by high school teachers using the total sample favored those with secure histories (Sroufe et al., in press).

In these studies, it was also the case that social competence assessments at each age were predicted by earlier assessments of competence and also were predictive of competence at later ages. Attachment history, along with earlier social competence, did predict later social competence better than attachment alone, as developmental theory derived from Bowlby would predict. But it was also the case that attachment history accounted for additional variance in the later out-
comes, even after earlier social competence was taken into account (Sroufe et al., in press). We return to this point later. Overall, the social competence data from our study and those of others (see Thompson, Chapter 13, this volume) are strongly supportive of Bowlby’s theory.

INFANT ATTACHMENT
AND PSYCHOPATHOLOGY

In the conceptualization presented here, adapted from Bowlby, individual differences in infant attachment quality are not in themselves viewed as pathological or nonpathological. In the pathways perspective, the hypothesis is that patterns of anxious attachment represent initiations of pathways that, if pursued, will increase the likelihood of pathological conditions. Thus, although anxious attachment is considered a risk factor for pathology, not all, or even most, anxiously attached infants will develop psychopathology. Psychopathology, like social competence, is a developmental construction involving a myriad of influences interacting over time (Sroufe, 1997). Similarly, secure attachment is not a guarantee of mental health, but rather is viewed as a protective factor. Research has demonstrated that children with secure histories are more resistant to stress (Plata, Egeland, & Sroufe, 1990) and more likely to rebound toward adequate functioning following a period of troubled behavior (Sroufe et al., 1990). Thus resilience, too, is viewed as a developmental construction within this framework. Children who are resilient in the face of stress, or recover following struggle, have been found either to have early supportive care or increased support during the time of recovery; resilience is a process rather than a trait (Egeland, Carlson, & Sroufe, 1993). Secure attachment appears to be part of this process. There is minimal evidence that some children simply are inherently resilient (Sroufe, 1997).

There are numerous reasons why anxious attachment histories may put children at risk for psychopathology. The anxiety and low frustration tolerance of some individuals with resistant histories, and the alienation, lack of empathy, and hostile anger of those with avoidant histories, may make the former vulnerable to anxiety disorders and the latter vulnerable to conduct problems and certain personality disorders. Both may be vulnerable to depression, but for different reasons (passivity and helplessness on the one hand, alienation and aloneness on the other). Both struggle with social relationships, which may exacerbate developmental problems (e.g., through mistreatment by others or through association with deviant peer groups) and may limit social support, thus reducing an important buffer for stress. Those with histories of disorganized attachment, characterized by a failure to maintain a coherent attachment strategy and postures resembling trance-like states (Main & Hesse, 1990), may be at risk for diverse forms of pathology and in particular, dissociation (Main & Morgan, 1996).

At present, there are limited data with regard to these issues. Still, the data from our research are promising. From individual interviews with the Schedule for Affective Disorders and Schizophrenia for Adolescents (administered at age 17½), we first created an overall index of psychopathology based on the number and severity of disorders manifested. The combination of avoidant and disorganized attachment histories across our 12- to 18-month assessments accounted for more than 16% of the variance in this outcome—a highly significant result, and particularly impressive over this length of time and given the difficulties of measuring these constructs. It was also the case, consistent with the developmental-construction view, that later assessments (including other aspects of parenting) added to the predictability of pathology, ultimately accounting for more than 30% of the variance. Attachment history remained significant after other variables were accounted for, and early measures based on competing hypotheses, such as infant temperament, did not predict outcome significantly (Carlson, 1998).

To turn to more specific predictions, a history of resistant attachment was found to be related specifically and uniquely to anxiety disorders (Warren, Huston, Egeland, & Sroufe, 1997). Resistant attachment history did not predict externalizing disorders, and other forms of anxious attachment did not predict anxiety disorders. Some measures of infant “neurological status” (e.g., “slow to habituate” on the Brazelton Neonatal Behavioral Assessment Scale) also predicted anxiety disorders, although not as powerfully as resistant attachment, and resistant attachment remained significant after differences on the Brazelton measure were taken into account.

Predicting anxiety-related symptoms in an independent sample was also one focus of a study by Lewis, Feiring, McGuffog, and Jaskir (1984).
PART I. OVERVIEW OF ATTACHMENT THEORY

In a longitudinal study extending from infancy to age 6, they examined the connection between infants' attachment history and later maternal reports of the children's psychopathological symptoms. They found that boys with resistant histories were more likely than boys with secure histories to have somatic complaints at age 6, and that boys with anxious histories (both avoidant and resistant) were more likely than boys with secure histories to be socially withdrawn.

As part of our research (Renken et al., 1989), conduct problems in elementary school were assessed through ratings on the Child Behavior Checklist (Achenbach, 1978) by the children's teachers in first through third grades. Results indicated that boys with avoidant attachment histories were rated as more aggressive by teachers than boys with secure or resistant histories.

Finally, disorganized attachment was significantly related to dissociative symptoms, based on the Child Behavior Checklist at age 16 and the Putnam Dissociative Experience Scales at age 19. Dissociation was, of course, also predicted by a history of maltreatment and trauma (Carlson, 1998; Ogawa, Sroufe, Weinfield, Carlson, & Egeland, 1997), but the relation between disorganized attachment and dissociation remained after childhood trauma was partialed out (Ogawa, Egeland, & Carlson, 1998).

A DEVELOPMENTAL PERSPECTIVE ON INDIVIDUAL DIFFERENCES IN ATTACHMENT: BEHAVIOR AS THE JOINT PRODUCT OF PRIOR ADAPTATION AND CURRENT CIRCUMSTANCES

Bowlby's theory led to a particular model of individual differences in development, the developmental-pathways model (Sroufe, 1997). In this model, individual differences in infant attachment are viewed neither as linear traits inexorably manifested over time, nor as infinitely elastic and easily altered by each new experience. Rather, individual differences are viewed in terms of distinctive developmental trajectories that, though requiring support for their maintenance and remaining open to modification, nonetheless embody a "homeorhetic" tendency; that is, a direction once set itself an influence on developmental course. In other words, following a particular developmental pathway constrains the probable degree and nature of change, resulting in change that is lawful rather than unpredictable.

Stability of the surrounding environment is certainly a partial explanation for the stability of individual differences. There is, however, a transaction between individual history and environment. One reason why change away from maladaptive behavioral patterns is difficult is that the environment itself is influenced by the individual; it does not simply wash over the person as an independent force. Individuals select, elicit, and interpret particular reactions from the environment that are consonant with their experience-based history of adaptation (Sroufe, 1983). Patterns of maladaptation are maladaptive in part because they lead to environmental experiences that perpetuate them. Take, for example, the case of avoidant attachment. If such children encounter responsive peers and teachers, countering the rejection they have experienced previously, in time one would expect changes in their working models of self and relationships. Such environmental inputs become less likely, however, because children with these histories are more likely to isolate themselves (Sroufe, 1983), to interpret the ambiguous or even supportive efforts of others as hostile (Suess et al., 1992), and to be rejected by both peers and teachers. In our research, for example, the children with avoidant histories were the only children in the nursery school who made teachers angry, perhaps because of their cool defiance or aggression toward vulnerable children (Sroufe & Fleeson, 1988; Troy & Sroufe, 1987). It is because children have a role in creating their own later experiences that describing individual history and stability of the environment as completely separate influences is unduly simplistic.

The patterns of adaptation reflected in early attachment patterns are, of course, subject to change. The pathways model implies two things about change: (1) The earlier a change is seen in circumstances (the shorter the time a pathway has been pursued), the more readily change may be accomplished; and (2) the more sustained the forces of change, the more permanent the change will be. Attachment classification itself has been shown to change between 12 and 18 months with changes in caregiver life stress (Egeland & Farber, 1984; Vaughn, Egeland, Sroufe, & Waters, 1979). Beyond infancy, the later functioning of children who were securely (or anxiously) attached as infants is sometimes worse (or better) than would have been predicted from attachment alone. Such change is lawful, with the most po-
tent factors identified thus far being changes in caregiver life stress, social support, and depression (Erickson, Sroufe, & Egeland, 1985; Pianta et al., 1990).

Current patterns of care and other environmental circumstances are clearly related to current adaptation, but this does not erase the influence of prior history. Early attachment history has been shown to add to the prediction of functioning even after the influence of contemporary experiences has been taken into account. For example, in our research we have shown that the peer competence and psychopathology measures obtained in adolescence are well predicted by assessments of family functioning at age 13 years. Nonetheless, early history of care and adaptation still adds predictive power (Englund et al., 1997). Even in the face of changes in adaptation, early experience still contributes to prediction of later behavior (Sroufe et al., 1990).

ON FINDING AND NOT FINDING DEMONSTRABLY MEANINGFUL PREDICTIONS FROM ATTACHMENT

Researchers do not always find the degree of stability and predictability with regard to individual differences in attachment that we have reported here (primarily from our own research). Our findings with regard to attachment are often modest as well. There is some inconsistency in the literature (see Thompson, Chapter 13, this volume), with some findings being small or non-significant, and others being quite powerful. There are many possible reasons for these varied results.

One issue that warrants consideration is measurement. Constructs such as secure and anxious attachment and subsequent behavioral outcomes are extraordinarily difficult to assess. Salient features of socioemotional development are often difficult to capture in research. In studying such issues, investigators face not only the complexity of the constructs themselves, but also their changing manifestations across development.

Adequacy of measurement is a basic requirement for research of any type. With regard to early attachment, the only laboratory measure that is currently validated against secure-base behavior at home is Ainsworth’s strange situation coding scheme, as used for infants between 12 and 20 months old. Beyond 20 months of age, the existing observational paradigm and coding scheme need to be modified or changed entirely to account for developmental changes in the child and relationship (Ainsworth et al., 1978; Marvin, 1972). Other laboratory procedures for assessing early attachment, though perhaps promising, have yet to be validated against home behavior (see Solomon & George, Chapter 14, this volume). Thus research using laboratory measures other than the strange situation to assess attachment relationships may be introducing as-yet-unidentified measurement error into analyses.

Single assessments of particular constructs can also introduce some unanticipated measurement error into analyses. In our own research, we dealt with this issue by using multiple measurements at different times, as well as multiple reporters. We assessed attachment security twice, at 12 and 18 months, and often pooled these assessments for a more robust indicator of attachment. In order to reduce measurement error further, at both ages each case was coded independently by two raters who conferred about disagreements. All raters were highly experienced and had established reliability with Ainsworth (there are now standard reliability cases for this purpose). We also pooled outcome assessments to establish more robust variables. Although we found that individual differences in attachment did relate to teacher appraisals of social competence or behavior problems for our total sample of 175 participants, relations based on the report of one teacher for each participant (from the more than 100 different schools attended by our participants) were significant but very small. Combining the reports of multiple teachers across years increased effect sizes. Pooling the reports of four independent counselors in our summer camps served a similar purpose, yielding dramatically more impressive findings.

Reports of null results often lead to questions regarding the psychometric properties of the measures used. If measurement issues can be ruled out, null results or counterintuitive results can be informative. A useful example comes from the work of the Grossmanns concerning the unusually high rate of avoidant attachment in their original Bielefeldt sample (Grossmann et al., 1985). Avoidant attachment in this sample was demonstrated to be related to caregiver sensitivity at 6 months and to other external correlates of avoidant attachment that had been established in previous samples, thus reducing the likelihood that the results could be attributed to measurement error. Further assessments showed this high rate of avoidant attachment to be a cohort effect, reflecting difficult societal circum-
stances at the time that may have influenced caregiving environments. This seemingly counterintuitive high rate of avoidant attachment in fact represented a coherent and informative consequence of a characteristic of the sample. Such research holds an important place in the study of attachment, because it allows us to understand more about the processes that influence individual differences.

Beyond these measurement concerns, conceptual problems are often at issue. Not only are many aspects of early care outside of the attachment domain (e.g., the socialization of impulse control; Sroufe, 1997), but variations in quality of care, even broadly conceived, are not responsible for all aspects of development and behavior. For example, one early inconsistency in the literature concerned details of the relation between attachment security and the age of mirror self-recognition (Cicchetti, 1986; Lewis, Brooks-Gunn, & Jaskir, 1985). In our own research, we found no relation between attachment security and self-recognition (Sroufe, 1988). Such inconsistencies should not diminish the value of Bowlby and Ainsworth’s elaboration of attachment theory, however, because nothing in the theory would lead to a strong prediction regarding a variable that is so heavily influenced by cognitive maturation. To the extent that such relations are found in research, they are most likely indirect, and are not validations of attachment theory per se. We have recently reported an impressive link between infant attachment and math achievement at age 16 years (Teo, Carlson, Mathieu, Egeland, & Sroufe, 1996). Surely this relation did not come about because attachment security has a direct influence on the brain’s ability to process math problems. More likely, math achievement requires regular attendance at school and perhaps specific support at home. Those adolescents with secure histories, both because their parents remain more involved and for a variety of other reasons, attend school more regularly. Relations between attachment history and reading achievement in high school are less strong, probably because reading proficiency is established early. Although this finding is interesting, it cannot be taken as a confirmation of attachment theory.

Attachment theory is concerned with social behavior and emerging expectations of self, others, and relationships. The strong theoretical predictions relate to feelings of self-worth, expectations regarding others, and capacities for close relationships. One could argue that these areas of personality and interpersonal functioning may influence diverse aspects of life, but the core predictions of the theory are clear.

Even within the domain of psychopathology, it is not reasonable to expect individual differences in attachment to be equally predictive of all problems. In our research, we deliberately singled out anxiety problems, conduct problems, and dissociation as prototypic resistant, avoidant, and disorganized outcomes, respectively. Anxiety and alienation (along with impoverished empathic capacity) are clear derivatives of the patterns of care associated with resistance and avoidance, respectively, and the disorganization and disorientation inherent in the failure to maintain an attachment orientation should have consequences for self-integration. Other kinds of problems should not be expected to be closely related to attachment history. For example, we have demonstrated that attention-deficit/hyperactivity disorder is more consistently related to other aspects of parenting than to attachment history; it is predictably related to early patterns of overstimulation and parent–child boundary violations (Carlson, Jacobvitz, & Sroufe, 1995). A full understanding of development and developmental problems requires much more than a knowledge of attachment history.

A final reason for varying results among studies might be the particular samples studied. Participants in the Minnesota Parent–Child Project were at risk because of poverty. At-risk samples tend to have higher rates of maladaptation in general and psychopathology in particular; indeed, this was our rationale for studying this population. Certainly the increased range of outcomes might have strengthened the relation between anxious attachment and pathology, particularly as compared to smaller middle-class samples with a more restricted range of outcomes. Middle-class samples have some advantages in that they include more stable attachments and much stronger relations with certain outcomes, in part because of more stable life circumstances. Waters, Merrick, Treboux, Crowell, and Albersheim (1998) found dramatic continuity between infant attachment classification and Adult Attachment Interview classification in a young adult middle-class sample. In our sample, a nonsignificant relation was found between infant attachment classification and Adult Attachment Interview classification at age 19 (Weinfield, Sroufe, & Egeland, 1998). We believe that the difference in the samples is at the heart of the difference in findings. In both samples, neg-
ative attachment-related life experiences were associated with instability of attachment classifications. The middle-class sample allows us to see that attachment can be stable over a long period of time; the higher rate of discontinuity (and the higher rate of negative life events) in our sample, however, allows for a more in-depth examination of types of experiences related to stability and change. Both middle-class samples and samples that are more at risk for developmental difficulties are needed in continuing research.

CONCLUSION

In general, the meaning of individual differences in attachment security, as conceptualized by Bowlby and Ainsworth, has been well substantiated by research. At times, of course, well-conceptualized studies by rigorous researchers have failed to obtain predictive relations. Development is extraordinarily complex, and longitudinal research is very difficult to carry out. Despite these challenges, well-conceived studies have repeatedly confirmed core propositions of this individual-differences theory.

In this chapter we have described Bowlby’s ideas about attachment security with regard to the normative function of attachment relationships, antecedents and qualities of individual differences in attachment, and consequences of individual differences in attachment for personality development. Bowlby viewed attachment as tied to evolutionary theory. He did not view individual differences in attachment quality as linked directly to eventual reproductive success, although they may well be tied to qualities of adult love and qualities of later parenting behavior. Bowlby focused on attachment because of its evolutionary value in the survival of the human infant, and because of its central role in subsequent human adaptation and development. The normative stages of attachment formation he proposed (see Marvin & Briner, Chapter 3, this volume) inspired Ainsworth’s assessment procedure. The similarity of resistance and avoidance to the patterns of protest, anger, and detachment that are normal responses in the face of loss of a caregiver led Ainsworth to focus on these behaviors in ongoing infant-caregiver relationships. The advent of the strange situation procedure has spawned 20 years of research on the meaning and consequences of individual differences in infant attachment for development.

The nature of modern society (thankfully) should not allow for further examination of the place of the attachment behavioral system in the survival of human infants to reproductive maturity. Nor will it allow for systematic examination of suppositions that avoidant and resistant patterns represent separate, evolved strategies because of their reproductive advantages in certain past environments (see Belsky, Chapter 7, this volume). Bowlby’s theories about the implications of individual differences in attachment for personality development, however, remain not only testable but also critically important to our understanding of the role of early experience in socioemotional development. These ideas have guided much research, as the contents of this volume demonstrate, and will no doubt continue to contribute to our understanding of development.

ACKNOWLEDGMENT

Work on this chapter was supported in part by a grant from the National Institute of Mental Health (No. MH40864-08).

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PART I. OVERVIEW OF ATTACHMENT THEORY


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PART I. OVERVIEW OF ATTACHMENT THEORY


