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Pair Bonds as Attachments

Evaluating the Evidence

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Anyone familiar with John Bowlby's writings can readily understand the common (mis)perception that attachment theory applies exclusively to relationships between infants and their caregivers. Although he made repeated reference to attachment as a lifespan phenomenon, the principal focus of his theorizing was "the nature of the child's tie to his mother" (Bowlby, 1958). His oft-cited claim that attachment is an integral part of human behavior from "the cradle to the grave" (Bowlby, 1979) was more a hypothesis than a thoroughly documented, empirically established fact.

The absence of a comprehensive theory of attachment beyond childhood may have delayed the initiation of research forays into the area, but it did not preclude them. In the last decade alone, investigations of adult attachment have proliferated at a rate comparable to that of infant attachment studies during the years immediately following the publication of Ainsworth's (1967) original findings. Adult attachment research has proceeded largely on the faith that Bowlby was right about two things: that patterns of attachment established in early life are relatively stable across development, and that pair-bond relationships are the prototypical adult instantiation of attachment.

The present chapter does not address continuity in attachment patterns between infancy and adulthood. Instead, our focus is the second assumption—that romantic relationships qualify as attachment bonds and thus constitute the appropriate context in which to investigate adult attachment phenomena. Although these assumptions may appear to be inextricably interrelated, they actually represent independent issues, at least from an empirical standpoint. Consider the possible outcomes of stability studies: a finding of relative continuity in patterns of attachment from infancy to adulthood, or, alternatively, no systematic connections between infants' strange situation classifications and their subsequent adult attachment categorization. Neither outcome would provide a definitive answer to the question of whether the attachment system is active in adult life or implicated in pair bonds. Continuity of individual differences is not the same as continuity of function; these are separate issues requiring distinct types of evidence. Thus the validity of our arguments concerning the second assumption is not dependent on the results of empirical investigations relating to the first.

The importance of the question—whether romantic bonds are attachments in the technical sense—can hardly be overestimated. The entire field of adult attachment research has been constructed on the premise that they are. If it were to turn out that Bowlby was mistaken, either about the lifespan significance of attachment or about

the preeminence of romantic partners as attachment figures in adult life, it could potentially undermine the whole body of findings. Therefore, it is crucial to the adult attachment enterprise that this foundational assumption be examined and evaluated in light of the evidence.

One reason for questioning the assumption that romantic relationships are genuine attachments concerns the presumed function of attachment bonds. In theory, the attachment behavioral system evolved in response to selection pressures in the "environment of evolutionary adaptedness" (EEA) that made it advantageous for infants to maintain proximity to protectors (Bowlby, 1958, 1969/1982). Thus the hypothesized ultimate function of attachment is *protection.* Few would argue with the adaptiveness of a system that in situations of real or perceived danger led vulnerable young to seek protection from their more mature and competent guardians, or with the necessity of such a system for human infant survival.

What is considerably less apparent is how attachment might contribute to *adult* survival. It cannot simply be assumed that adult attachment—if it exists—serves the same function as infant attachment. The burden of providing empirical evidence for this and related assumptions rests squarely with adult attachment researchers. A solid foundation is essential to support the already large and rapidly expanding body of findings.

Is there compelling evidence that the attachment system is operative in adult romantic relationships? If so, does it serve the same function as in infancy? Do pair-bond partners replace parents in their roles as primary attachment figures, as Bowlby hypothesized? And, if so, by what processes does the transition occur? These are some of the questions addressed in this chapter. In our own research, we started with the last ones—whether attachments are transferred from parents to partners, and how. We therefore begin with a brief summary of these results. This is followed by a review of the literature, including some of our own work, as it relates to the question of whether pair bonds are attachments in the technical sense. Throughout the chapter and in the third major section especially, we address issues related to the function and evolutionary significance of attachment bonds in adulthood. Finally, we outline a model of the processes by which attachment bonds are formed between romantic partners.

FROM PARENTAL ATTACHMENT TO PAIR BONDS

How Attachment Is Defined

Bowlby took care to define the specific type of socioemotional bond to which his theory applied, and to distinguish it from other kinds of social ties. Attachment bonds have four defining features: "proximity maintenance," "separation distress," "safe haven," and "secure base." These are readily observable in the overt behavior of an infant in relation to a primary caregiver (usually the mother). She serves as a base of security from which the infant engages in interactions with the social and physical world. The infant continuously monitors her proximity and availability. If the infant senses danger or feels anxious for any reason, he or she will retreat to the mother as a source of comfort and haven of safety. Because separations from her signal potential danger, the infant will object to and be distressed by them. But as long as the mother is perceived to be sufficiently near and responsive, the infant will be motivated to explore and learn about his or her environment.

Theoretically, this dynamic balance between attachment and exploration is an integral part of behavior during all phases of development. Nevertheless, changes as a function of maturation are expected. One predictable change concerns the time and distance from the attachment figure that can be comfortably tolerated. A typical 12-month-old will exhibit greater distress (and more disrupted exploration) as the result of even brief separations from a caregiver than will the average 36-month-old. By late childhood or early adolescence, longer separations are usually negotiated without undue upset, and separation distress is rare except in the case of unexpected and/or extended caregiver unavailability.

Perhaps the preeminent change in attachment relationships concerns their mutuality. The asymmetrical (complementary) attachments of early life—in which infants seek and derive security from caregivers but do not provide security in return—are hypothesized to be replaced by more symmetrical (reciprocal) attachments. According to Bowlby, the pair bond—in which sexual partners *mutually* derive and provide security—is the prototype of attachment in adulthood. Thus, in the course of normative development, the sexual mating, caregiving (parenting), and attachment systems become integrated (Hazan

& Shaver, 1994; Shaver, Hazan, & Bradshaw, 1988).

The Ontogeny of Infant Attachment

Given the opportunity, all normal human infants become attached to their primary caregivers, typically within the first 8 months of life. Attachment formation proceeds through a series of phases, beginning in the first weeks of life and ending sometime toward the end of the second year with the establishment of a "goal-corrected partnership" (Bowlby, 1969/1982). The process begins with close physical proximity, which is initially maintained by intentional actions of the caregiver and reflexive behavior on the part of the infant (e.g., crying, sucking, clinging). In time, the infant learns to associate the caregiver with comfort and alleviation of distress (safe haven). Typically around 8 months of age, and concurrent with the onset of self-produced locomotion and stranger wariness, the infant begins to protest separations and to use the caregiver as a base of security for exploration. Separation distress is the accepted indicator that an attachment bond is fully formed. Note that these components, which together define attachment, do not emerge simultaneously but in sequence.

Although multiple attachments are the norm, attachment figures are not treated equivalently. An infant shows clear discrimination and consistent preferences for the primary caregiver (Colin, 1985, 1987; Cummings, 1980). Even if several caregivers are regularly available, an infant reliably seeks and maintains proximity to one, especially when distressed (Ainsworth, 1967, 1982). The infant also exhibits more intense protest upon being separated from the primary attachment figure as compared to others (Schaffer & Emerson, 1965), and in unfamiliar settings is most reassured by this figure's presence (Ricciuti, 1974; Shill, Solyom, & Biven, 1984). The primary attachment figure is not simply one among a coterie of possible protectors, but the individual with whom the infant has a privileged relationship. Bowlby (1958, 1969/1982) referred to this tendency to form one special attachment as "monotropy," and he considered it a crucial aspect of the survival-enhancing function of attachment.

Over the course of development, changes are to be expected in the composition and structure of individuals' attachment hierarchies. New people may be added and/or others dropped. According to Bowlby, parental figures tend to be permanent members of the attachment hierarchy, but eventually assume a position secondary in importance to the pair-bond partner. Exactly when and how this change from complementary (parental) to reciprocal (peer) attachment comes about was not specified within attachment theory. We explored these questions of timing and process in two related studies. (For more details, see Hazan & Zeifman, 1994.)

Study 1: Attachment Behavior in Childhood and Adolescence

Background and Objectives

Peer relationships during childhood and adolescence are usually characterized as "affiliative"—that is, as functionally distinct from parental attachments and presumably regulated by a different behavioral system. Although there is obvious overlap in the behaviors that typify these two types of social bonds (e.g., friendly approaches, sharing), affiliative relationships primarily provide stimulation and increase arousal, in contrast to the arousal-moderating and security-enhancing provisions of attachment bonds. Yet a review of the research suggests that *some* components of attachment may be present in peer relationships fairly early in development.

By age 3, children are capable of sustaining complex social interactions with agemates (Gottman, 1983; Rubin, 1980). Not only do they possess the necessary skills for engaging their peers, but they show a growing interest in doing so. The preference for spending time with peers relative to parents increases steadily. Thus, one aspect of attachment—proximity seeking—seems to be present in and typical of peer relationships by childhood, although such relationships would not quality as attachments in the full sense of the term.

By middle childhood, youngsters are capable of developing more intimate relationships with their peers (Buhrmester & Furman, 1986, 1987; Buhrmester & Prager, 1995; Furman & Buhrmester, 1985; Hartup, 1983; Lewis, 1982) and increasingly turn to them for comfort. There is evidence that by late adolescence, peers come to be preferred over parents as sources of emotional support (Steinberg & Silverberg, 1986). The confiding and support-seeking aspects of peer relationships appear to be functionally similar to the parent-directed safe-haven behavior of infancy and early childhood.

In sum, there may be normative developmental changes in the *target* of different attachment behaviors, such that some get redirected toward peers during childhood and adolescence. On the basis of these kinds of findings, we reasoned that a key to understanding the transfer of attachment from parents to peers might lie in an analysis of attachment at the component level.

Method

We developed an interview measure of the four components of attachment and administered it (individually) to a diverse cross-section of over 100 children and adolescents ranging in age from 6 to 17. In constructing the interview items, we operated on the assumption that the components would be functionally and psychologically equivalent to their behavioral manifestations in infancy. For each, we asked several related questions: questions pertaining to proximity maintenance (e.g., "Whom do you like to spend time with, be near to?"); safe haven ("Whom do you turn to when you're upset, feeling down?"); separation distress ("Whom do you hate to be away from, miss most during separations?"); and secure base ("Whom do you feel you can always count on, know would do almost anything for you?"). Subjects were asked to respond to each of the questions by naming the single most preferred person in each situation.

Because we were primarily interested in the distinction between parental figures and peers, responses were grouped into these two categories. The "parents" category included mothers, fathers, stepparents, and grandparents; "peers" included friends, boyfriends, and girlfriends. Together, the two categories covered 91% of the responses. The consistency of responses to items within each component was generally high, but consistency across components was not. That is, participants tended to name the same person for all items measuring one component, but often named different people in response to items measuring other components. This can be taken as evidence of the internal consistency of the components, as well as their distinctiveness. Several age-related changes in the target of attachment behaviors were observed.

Results and Discussion

Nearly all children and adolescents in the sample were peer-oriented in terms of proximity seeking. That is, they preferred to spend their time in the company of peers rather than parents. In regard to the safe-haven component, there was an apparent shift between the ages of 8 and 14, with peers coming to be preferred over parents as sources of comfort and emotional support. For the majority, parents continued to serve as bases of security and as the primary sources of separation distress. Only among the oldest adolescents (the 15- to 17-year-old group) did we find what could be considered full-blown attachments to peers—that is, peer relationships containing all four components. Of this minority who considered a peer to be their primary attachment figure, the overwhelming majority (83%) named a boyfriend or girlfriend—that is, a *romantic* partner. Our findings are consistent with those of other studies that have documented developmental changes in the constellation of social relationships during the transition from childhood to adolescence (Blyth, Hill, & Theil, 1982; Furman & Wehner, 1994).

Study 2: Attachment Behavior in Adulthood

Background and Objectives

Research on the formation and development of romantic relationships suggests that whether attachment features are present—and, if so, which ones—may depend on how long a couple has been together. For example, romantic couples typically experience on especially strong desire for physical proximity and contact in the initial stages of a relationship (Berscheid, 1985), whereas the provision of mutual support and care becomes more important in later stages (Reedy, Birren, & Schaie, 1981; Sternberg, 1986). Similarly, reactions to separations seem to vary according to relationship length and stage (Weiss, 1988). Thus, in adult–adult relationships as well as infant–caregiver relationships, the presence or absence of attachment components may depend on the stage of relationship development.

Method

We administered essentially the same interview used in our child/adolescent study to an equally diverse sample of over 100 adults ranging in age from 18 to 82, but this time we grouped subjects by stage of relationship development, rather than by age. Three relationship status groups were identified: "not in a romantic relationship," "in a romantic relationship for less than 2 years," and

"in a romantic relationship for 2 or more years." It is important to note that these cutoffs were empirically derived. Other cutoffs were examined, but the data indicated that relationships of less than 2 years' duration were qualitatively different from those of longer duration, at least in the components we measured.

The data also suggested response categories that differed in two ways from those used in the previous study. First, siblings were named more often than they had been by younger subjects. (This was especially true for our oldest participants, many of whose parents were no longer living.) Second, peers were subdivided into the two most common response categories: friends and romantic partners. When we averaged across components, 85% of all responses were covered by the following three categories: "parent/adult sibling," "friend," and "romantic partner."

Results and Discussion

The adults were clearly peer-oriented in both proximity-seeking and safe-haven behaviors. Nearly all of our adult respondents reported a preference for spending time with and seeking emotional support from their friends and/or partners rather than their parents or siblings. But findings for the other two components varied as a function of relationship status. Subjects involved in romantic relationships of at least 2 years' duration overwhelmingly named partners in response to the items covering separation distress and secure base (compared to approximately one-third of those in the under-2-years group, and none in the less-than-1-year subgroup of this group). Those in shorter-term romantic relationships and those without partners tended to name a parent as the individual whose absence was most distressing and whose presence served as a base of security.

Conclusions

In the introduction, we have posed the question of whether romantic relationships (i.e., pair bonds) are true attachments. Evidence that they are would support Bowlby's claims that the attachment system is active throughout the lifespan and that sexual partners assume the role of attachment figures in adult life. Moreover, such evidence would provide empirical justification for the common practice of using romantic relationships as the context for investigating adult attachment phenomena. We reasoned that a logical starting point for addressing this question was to discover first whether romantic relationships meet the definitional criteria of attachment. In addition, it was necessary to demonstrate that romantic partners assume preeminent status in the attachment hierarchy by replacing parental figures as the predominant source of emotional security.

The results of these two studies (and a replication of the second by Fraley & Davis, 1997) are consistent with and thus provide preliminary support for Bowlby's hypothesis. Full-blown attachments, among adolescent as well as adult subjects, were observed almost exclusively in two kinds of social relationships—with parents or with romantic partners. By this standard, pair bonds quality as bona fide attachments. Furthermore, and just as Bowlby predicted, pair-bond partners did assume the status of primary attachment figures (by being preferred over parents).

The findings may also reveal something about the basic processes by which primary attachments are transferred from parents to peers. The establishment of a goal-corrected partnership in early childhood facilitates social exploration. As such, the endpoint in the development of complementary attachments to parents serves as the starting point for reciprocal attachments to peers. Increased time spent in the company of peers fosters mutual confiding, comforting, and a reliance on peers as havens of safety, thereby paving the way for attachment formation. However, it is important to note that most of our adolescent and adult subjects were not attached—in the technical sense—to their friends. Peer relationships meeting the definitional criteria of attachment were almost exclusively of the romantic variety.

Apparently sex plays a central role in peer attachment. Sexual maturation may serve as a catalyst for redirecting social attention and activity toward mating, as is the case in many other species (Hinde, 1983). Furthermore, sexual exchanges create a social context that is conducive to attachment formation. (We return to this issue below.)

THE NATURE OF THE BOND IN PAIR BONDS

So far, evidence has been presented that pair-bond relationships are characterized by the same features as infant–caregiver attachments and develop according to the same process, at least in terms of the sequence in which various components come into play. These findings alone provide support for the assertion that the same behavioral system is involved in pair bonds and in infant–caregiver relationships. But the similarities do not end there, nor should they. If the attachment system is operative in pair bonds, its effects would be expected to be far more pervasive, and to be conspicuous in other aspects of relationship functioning. In fact, the congruences are far-reaching. They include the nature of physical contact that typifies and distinguishes attachment bonds; the factors that influence the selection of attachment figures; reactions to attachment disruption and loss; and the role of attachment in biological and psychological fitness. We discuss each of these in turn.

Physical Contact

Freud was among the first to write about the striking similarities in the physical intimacy that typifies lovers and mother–infant pairs. Like caregivers and their infants, adult sexual partners (at least initially) spend much time engaged in mutual gazing, cuddling, nuzzling, suckling, and kissing, in the context of prolonged face-to-face, skin-to-skin, belly-to-belly contact and the touching of body parts otherwise considered "private." What we find interesting and particularly compelling is that in virtually every culture, these most intimate of human interpersonal exchanges are limited to parent–infant and pair-bond relationships (Eibl-Eibesfeldt, 1975). Although some forms of intimate contact may occur in isolation within other types of social relationships (e.g., kissing among friends), their collective occurrence is typically more restricted.

The universal existence of prohibitions against physical intimacy outside recognized pair bonds (at least for females) has generally been attributed to the fact that copulations outside such bonds reduce confidence in paternity. Such restrictions may also reflect an implicit understanding that close physical contact with another can lead to a subsidiary emotional bond that will jeopardize a primary one. In subcultures where extrarelationship sexual contact is permitted, efforts to avoid emotional involvement are common. For example, prostitutes commonly refuse to engage in kissing, nuzzling, and other forms of intimate face-to-face contact with their clients (Nass & Fisher, 1988). Members of gay male couples who consensually engage in extrarelationship sexual activity usually reserve kissing and cuddling for their primary partners (Blumstein & Schwartz, 1983). And ground rules among so-called "swinging" heterosexual couples often forbid regular or frequent sexual contact with the same person (O'Neill & O'Neill, 1972). Such practices may serve the ultimate function of maintaining paternity confidence (e.g., heightened arousal could foster more effective sperm competition; see Baker & Bellis, 1995) while preventing the proximate mechanism of repeated physical intimacy leading to bonding. If an emotional bond is not desired in the context of a physically intimate relationship, special steps must be taken to protect against its formation.

There is some evidence that the chemical basis for the effects of close physical contact may be the same for lovers and for mother–infant pairs. Oxytocin, a substance released during suckling/nursing interactions and thought to induce infant attachment and maternal caregiving, is also released at sexual climax and has been implicated in the cuddling that often follows sexual intercourse (i.e., "afterplay"; Carter, 1992). Cuddling, or contact as was demonstrated by Harlow, is crucial for the establishment of emotional bonds.

In sum, pair bonds and infant–caregiver relationships show conspicuous similarities in the nature of physical contact, and these differentiate them from other classes of social relationships. The consequence of repeated interactions of this uniquely intimate sort is the development of a specific and distinctive type of bond—namely an attachment. It follows that the attachment system is active in both.

Selection Criteria

If pair-bond relationships involve the attachment system, one would expect at least some overlap between infants and adult romantic partners in the criteria on which selections are based. But the attributes that make one a good mother or father are not necessarily the same qualities that make one appealing as a sexual partner. There is the additional complication of well-documented sex differences in mate selection criteria, which are attributed to differences in parental investment that are present and influential even before conception (Trivers, 1972).

Differential parental investment theory holds that sexual encounters will have potentially different consequences for males and females. Males have an abundant supply of small sperm

cells, which are produced at a rate of approximately 500 million per day (Zimmerman, Maude, & Moldawar, 1965), whereas females have a far more limited supply of large egg cells, which are produced at a rate of about one per month during a much shorter period of life. Added to this are the female burdens of gestation and lactation, requiring years of investment. For males, whose contribution to offspring can be as limited as a few sperm, the most effective strategy may be to take advantage of all opportunities for sex with fertile partners. The female, for whom every sexual encounter is potentially quite costly, may be expected to be far choosier in accepting or encouraging copulations. Once her egg is fertilized, she has to forgo other reproductive opportunities for a relatively long time. Her most effective strategy may thus be to limit her sexual encounters to males who possess and appear willing to share valuable resources with her and the offspring she will have to nurture.

In a survey of 37 cultures, Buss (1989) found that sex differences in mate selection criteria are consistent with male–female differences in parental investment. For example, males generally assign greater importance than females to the physical appearance of potential mates, preferring partners who look youthful and healthy—both of which are reasonably good indices of fertility (Buss, 1989; Symons, 1979). In contrast, females typically care more than males about the social status and earning power of potential partners; this is a sensible mate selection strategy for ensuring that offspring are well provided for.

Although these differences in mate selection criteria are reliably found, sex differences are negligible when it comes to evaluating potential partners for a long- versus a short-term relationship (Kenrick, Groth, Trost, & Sadalla, 1993). Given that we humans tend to reproduce in the context of long-term relationships, short-term strategies may be less relevant to understanding mating in our species. Moreover, although sex differences in the relative importance of such traits as physical appearance and social status are reliable, less attention is given to the fact that *neither* trait is assigned highest priority by *either* sex. For both men and women, the most highly valued qualities in a potential mate are "kind/understanding" and "intelligent" (Buss, 1989). In choosing among potential reproductive partners, males *and* females prefer those who are responsive and competent, and these traits matter more to them than wealth or beauty.

It follows from the norm of assortative mating that men and women tend to choose partners who are similar to themselves on numerous dimensions, including socioeconomic status and physical attractiveness (Berscheid, 1985; Berscheid & Reis, 1997; Hinsz, 1989; Rubin, 1973). This may reflect the more general tendency to prefer what is familiar. In the case of mating, preexisting similarities draw potential partners into the same activities and social circles, thereby increasing familiarity, and similarity can create a false sense of familiarity. The word "familiar" comes from the Latin *familia,* which connotes family or household. Others who are similar can seem like family members and may be especially appealing partners for kin relationships.

We find it noteworthy that the factors found to exert the greatest influence on the selection of pair-bond partners are so similar to those used by infants in "choosing" among potential attachment figures. In the case of infants, "preference" is given to individuals who are kind, responsive, competent, and familiar—especially in the context of distress alleviation. The one who most consistently and most competently reduces the discomfort caused by hunger, soiled diapers, fatigue, illness, and strange environments (i.e., the *primary* caregiver) is the one to whom an infant is most likely to become attached (Bowlby, 1958, 1969/1982). Such considerations make perfect sense in the choice of attachment figures during infancy. But why should adults be sensitive to cues of familiarity, responsiveness, or competence in potential reproductive partners? More importantly, why should they care more about these qualities than about cues of fertility or resources?

It is because pair-bond relationships are relatively enduring that attachment-relevant criteria are taken into account when mates are selected. Further evidence that mating decisions are not reducible to sex differences in parental investment comes from studies of facial attractiveness. In a series of detailed analyses involving facial-metric methods and cross-cultural samples, Cunningham, Druen, and Barbee (1997) have sought to identify the features that make potential sexual partners most appealing. Although the findings vary somewhat (and systematically) as a function of gender, the combination of features judged to be most attractive is much the same for men and women. Sexual appeal—whether the individual being evaluated is male or female—is significantly enhanced by the co-occurrence of three types of facial features: expressive, neotenous, and sexual-maturational. Expressive features (e.g., size of smile area) serve as cues of warmth and sensitivity. Neotenous features (e.g., large eyes) signal vulnerability and need for nurturance. Facial features associated with sexual maturation (e.g., prominent cheekbones) function as cues of reproductive capability.

We have noted earlier that prototypical pair bonds are hypothesized to involve the integration of three social-behavioral systems: sexual mating, caregiving (parenting), and attachment. Cunningham et al.'s (1997) findings lend support to this conceptualization of pair bonds. Why should females find neotenous features (which signal vulnerability) appealing in a male if their primary concern is to choose a mate who will provide protection and resources? Why should males be drawn to expressive (attachment-affording) qualities in a female if their objective is to select a mate who is young and fertile? And why, as Buss found, should both males and females give highest priority to qualities indicating a mate's suitability for satisfying attachment needs? Bowlby anticipated the answer: Pair bonds are regulated by multiple behavioral systems, each of which influences mate selection, and one of which is attachment. Clearly it is important to choose a mate who is fertile, but studies have shown that well over 90% of all postpubescent young people are (Symons, 1979). Attachment is relevant to mating because we humans need to select reproductive partners who will be good parents and good companions.

Reactions to Separation and Loss

Additional evidence that attachment is an integral part of pair-bond relationships comes from the literature on bereavement, as well as from studies of routine marital separation. The original inspiration for attachment theory came from Bowlby's observations of infants and children separated from their primary caregivers. He found it remarkable that the separations were so distressing, given that the children's nutritional and hygienic needs were being met quite adequately by surrogates. Even more striking was the similarity across children in how they responded. Bowlby identified what appeared to be a universal pattern of reactions, which he labeled the "protest–despair–detachment" sequence. The initial reaction is characterized by agitation, hyperactivity, crying, resistance to others' offers of comfort, and extreme anxiety, often to the point of panic. Eventually this active protest subsides, only to be replaced by a period of lethargy, inactivity, despair, and disrupted sleeping and eating behavior. In time, a degree of emotional detachment from the lost attachment figure facilitates the resumption of normal, preseparation activities and functioning.

If the attachment system is operative in pair bonds, adult reactions to the loss of a partner should be similar. In fact, they are. Several studies have documented essentially the same sequence in adults grieving for the loss of a spouse: initial anxiety and panic, followed by lethargy and depression, and eventually by recovery through emotional detachment (Hazan & Shaver, 1992; Parkes & Weiss, 1983; Weiss, 1975) or emotional reorganization (Fraley & Shaver, Chapter 32, this volume). This sequence of reactions is not limited to situations of permanent loss. Even brief, routine separations are enough to trigger the same pattern of responses in marital partners (Vormbrock, 1993).

It makes good adaptive sense to react with anxiety and protest to even the temporary "loss" of an individual who serves as a primary source of emotional and/or physical security. The fact that this reaction is the norm among adults separated from their long-term partners, and is *not* the normal reaction to the loss of other kinds of social ties, is yet another indication that the attachment system is active in pair bonds.

Physical and Psychological Health Effects

The notion that attachment is a very real biological need, at least in early life, was established in studies of infants reared in orphanages and other institutional settings (Robertson, 1953; Spitz, 1946). Although adults are clearly less dependent on social bonds for basic survival, there is ample evidence that they incur health benefits from having such bonds, and suffer health decrements as a consequence of the absence or loss of these bonds. Relationship disruption (especially divorce) makes one more susceptible to a wide range of physical and psychological ills, including disease, impaired immune functioning, accidents, substance abuse, suicide, and various other forms of psychopathology (e.g., Bloom, Asher, & White, 1978; Goodwin, Hurt, Key, & Sarrett, 1987; Lynch, 1977; Uchino, Cacioppo, & Kiecolt-Glaser, 1996).

Obviously, the detrimental health effects of disrupted adult relationships cannot in and of themselves serve as conclusive evidence that such bonds are true attachments. Many different unex-

pected and undesirable events have been shown to induce high levels of stress (Holmes & Rahe, 1967), which in turn can undermine both physical and psychological well-being. But several additional findings bolster the present assertions.

First, among the most common stressors, attachment-related losses cause the most subjective distress. Death of a spouse is the leading stressful event on the Social Readjustment Rating Scale, followed by divorce and marital separation (Holmes & Rahe, 1967). Second, a number of investigations have helped to highlight the distinctiveness of attachment relationships. For instance, Weiss (1973) found that loneliness takes at least two distinct forms, depending on whether social deprivation is due to the absence of an intimate companion (which he labeled "emotional loneliness") or a lack of friends ("social loneliness"). This distinction was supported by the results of a national survey, which found the two types to be associated with different antecedents and symptoms (Rubenstein & Shaver, 1982). Consistent with Weiss's theory, the loss or absence of a pair-bond relationship was found to be associated with emotional loneliness and feelings of "desperation" and anxiety. In contrast, a lack of friendship predicted social loneliness, which was experienced as "restless boredom." Additional corroboration comes from a recent study by Stroebe, Stroebe, Abakoumkin, and Schut (1996), who found that social support in the form of friendship did not help alleviate the distress of losing a spouse. And Vormbrock's (1993) review of the literature on war- and job-related routine marital separations led to a similar conclusion: The social provisions of pair bonds are sufficiently distinctive that other social relationships—even close friendships or kin ties—cannot compensate for their loss. Interestingly, Vormbrock did find that renewing relationships with parental *attachment* figures was helpful in moderating the anxiety caused by spousal absence.

If attachment bonds have exceptional effects on physical and psychological functioning, such effects should be absent not only in other types of relationships, but even in the kinds of relationships that typically develop into attachments but that have yet to achieve that status. This appears to be the case. Early maternal deprivation is associated with long-term developmental consequences *only* if it occurs after an attachment bond between infant and mother has been established (Bowlby, 1958). Separations prior to 8 months of age do not increase the probability of poor developmental outcomes. Earlier in this chapter, we have reported our finding that most romantic relationships qualified as attachments only after they had endured for at least 2 years. Weiss (1988) found that widows and widowers married for less than 2 years did not show the same sequence of reactions (protest–despair–detachment/reorganization) as those grieving for the loss of longer-term bonds.

In sum, the results of a number of studies indicate that bonds between adult partners and infant–caregiver pairs are similarly and uniquely powerful in their impact on physical and psychological well-being. Other kinds of interpersonal relationships offer valuable social provisions, but emotional security does not appear to be one of them; otherwise disruptions would give rise to anxiety, which they do not. If separation distress is the marker of attachment, then bonds between long-term adult partners clearly qualify.

THE FUNCTION OF ATTACHMENT IN ADULT LIFE

Evolutionary thinking figured prominently in Bowlby's theory. The attachment system, he argued, is a species-typical characteristic that evolved to serve a protective, survival-enhancing function. In the EEA, an infant who identified, became attached to, and then stayed close to a protector had significantly better chances of living to reproductive age than an infant who failed to develop such bonds. His hypotheses concerning the function of attachment and its evolutionary origins pose a challenge for adult attachment research and theory.

Some evolutionary theorists (e.g., Kirkpatrick, 1998) have rejected the notion that the attachment system is integral to pair bonds by reasoning as follows: Reflexively seeking proximity in the face of danger would have been adaptive for infants but maladaptive for adults. Specifically, a propensity to seek protection from a mate, rather than aiding in the fight against some external threat, would have been more likely to jeopardize adult survival. Moreover, the fact that human females are generally smaller and weaker than their male counterparts makes it particularly doubtful that men could have gained a survival advantage by turning to their female partners for refuge in the face of danger. Therefore, attachment cannot serve the same protective function in adulthood that it does in infancy. Furthermore, given the unlikelihood that an entire system will be retained yet undergo a qualitative change in its function, pair bonds cannot involve the attachment system. The flaws in this line of reasoning include a limited conceptualization of protection, misplaced emphasis on survival rather than on reproductive success, and a failure to acknowledge normative developmental change in the system and related behaviors.

One major shortcoming of this argument is its limited conceptualization of the protective function of attachment. Although the risk of predation in the EEA was undoubtedly reduced for infants who became attached to their caregivers, the benefits of the bond would have extended far beyond this specific type of protection. Then and now, attachments also help ensure that infants receive adequate routine care in the form of food, warmth, shelter, guidance, and monitoring—all of which enhance survival. Clearly the protective function of attachment is not limited to brawn, even in infancy.

By relying on a narrow definition of protection, the argument also fails to take into account normative developmental change in the behavioral manifestations of attachment. Very young and vulnerable infants do indeed rely entirely on their caregivers for protection and sustenance. But increases in maturity and competence are associated with corresponding decreases in the most primitive forms of attachment behavior, such as reflexive proximity seeking. Although older children and adolescents continue to depend on parents for many aspects of care, they do not typically run to them for physical cover at the slightest hint of danger. Their developing capacities for self-protection and self-reliance, however, do not mean that they no longer benefit from having someone who is deeply committed to and invested in their welfare looking out for them, and reliably available to help if needed.

To expect attachment to be manifested in exactly the same behaviors in infancy and adulthood is to ignore ontogenic reality; to require pair-bond relationships to be typified by infantile behavior in order to qualify as true attachments is misguided. The mere fact that behavior during disparate phases of development is not identical is insufficient proof that such behavior subserves different functions (Tinbergen, 1963). Feeding behavior, for example, also changes dramatically from infancy to adulthood, yet the basic function is the same.

In the preceding sections, we have reviewed a diverse set of empirical findings that together provide strong support for Bowlby's claims that the attachment system is active in adult life and integral to pair bonds. Relationships with long-term partners qualify as attachments in the technical sense by containing all four defining components. This fact makes them similar to infant–caregiver bonds and distinct from other kinds of social ties, even close relationships with friends and kin. The processes by which pair bonds and infant–caregiver relationships develop appear to be quite similar. The nature of physical contact that typifies these two types of relationships also serves to distinguish them from other classes of social bonds. In addition, there is considerable overlap in the criteria used to select attachment figures in infancy and mates in adulthood. A similar sequence of reactions characterizes the responses of infants separated from primary caregivers and adults separated from long-term partners—a sequence not observed in reaction to other types of social loss. And the mental and physical health effects of infant attachments and pair-bond relationships appear to be uniquely and similarly profound and pervasive. In the absence of a compelling alternative explanation of these multiple and varied similarities, the postulation that they are due to the active involvement of the same behavioral system is not only the most parsimonious explanation of the facts; in our view, it is the only logical conclusion to be drawn from them.

But what about the question of function? To seriously evaluate the possibility that attachment serves the same protective function in adulthood as in infancy requires that "protection" be defined in a manner that encompasses its [illegible] meaning and acknowledges normative developmental change. An answer to the function question, however, calls for more than simply establishing that pair-bond partners provide each other with protection. It must be established that such protection would have afforded adaptive advantage by translating reliably into enhanced survival and reproductive success in the EEA. Hence a key to understanding the function of attachment in adulthood lies in an examination of the circumstances in which pair bonding evolved.

The Evolution of Pair Bonds

If human reproductive success required nothing more than conception, reproductive partners could part ways as soon as a viable pregnancy was achieved. In actuality, however, the vast ma-

jority of human males and females opt to remain with the same partner for a more extended period of time (Eibl-Eibesfeldt, 1989; Mellen, 1981). This trend is thought to have followed a birthing crisis in which an infant's large head, housing a more fully developed brain, could not easily pass through the birth canal of our bipedal female ancestors (Trevathan, 1987). Infants who were born prematurely, with less developed brains and smaller heads, were more likely to survive (as were their mothers). Immaturity at birth also offered the advantage of a longer period of learning during a time of heightened neural plasticity. This would have been a distinct advantage in a species with such complex social organization as our own. However, with the benefits of premature birth came new risks and challenges. The effort required to care adequately for such dependent offspring during such a protracted period of immaturity, along with the major tasks of socialization and training, made paternal investment an advantage if not a necessity. Exceptionally helpless and vulnerable offspring would have had rather poor chances of surviving to reproductive age or developing the necessary skills for their own eventual mating and parenting roles without an adequately strong force to keep fathers around and involved.

Many unique features of human sexuality appear to have evolved for the purpose of fostering and maintaining an enduring bond between reproductive partners. The most striking change in our reproductive physiology, in comparison to that of other mammalian species, is the loss or absence of outward signs of estrus in the female. Most mammals mate only during the short estrus periods of the female, but human sexual desire and activity are not so restricted. Women can be sexually receptive during any phase of their reproductive cycle, despite the fact that conception is possible only during a small fraction of it. This physiological adaptation enables the couple to maintain a continuous tie on the basis of sexual reward (Eibl-Eibesfeldt, 1975). Hidden ovulation may also serve to diminish the benefits of straying. Males of many diverse species guard their mates during periods of sexual receptivity so as to ensure paternity. When a female's fertile period has ended, a male can safely move on to another receptive partner. However, if ovulation is hidden, making it impossible for the male to determine just when fertilization will be possible, his optimal strategy may shift toward guarding and remaining with the same sexual partner for longer periods of time (Alcock, 1989).

Genital differences between us and our closest primate relatives also suggest the important role of sex in maintaining the integrity of the human pair bond. For example, the average length of the erect human penis is 13 cm, compared with approximately 3 cm for the gorilla (which is a much larger animal in terms of overall body size). Although penis size alone is not an accurate predictor of monogamous versus polygamous mating patterns among primates, the exceptional length of the erect human penis, in marked contrast to that of all the great apes, made possible a wide variety of copulatory positions, including more intimate face-to-face, mutually ventral (i.e., bond-promoting) positions. In addition, by increasing the probability of female orgasm, it may have served to heighten the female's readiness for engaging in sexual activity, thereby strengthening the bond with her mate (Short, 1979).

The physiological changes associated with sexual climax may also stimulate bond formation between partners. As noted previously, orgasms trigger a release of oxytocin in both males and females (Carter, 1992), resulting in a state of calm and contentment. It also stimulates a desire for continued close physical contact and cuddling, again increasing the chances that a bond will develop.

When the adaptive problem of immature offspring and the corresponding need for paternal investment arose in the course of human evolution, our species—by virtue of its altricial nature—already had available a well-designed, specialized, flexible, but reliable mechanism for ensuring that two individuals would be highly motivated to stay together and vigorously resist being separated. The mechanism was attachment. In light of the generally conservative tendencies of evolution and natural selection, it is highly probable that this preexisting mechanism would have been exploited for the purpose of keeping reproductive partners together. Pair bonds are primarily reproductive relationships, but sex serves more than a reproductive function in our species. The unique features of human reproductive physiology and anatomy help to ensure that partners will engage in the kinds of intimate exchanges known to stimulate attachment formation.

Reproductive Advantages of Pair Bonds

In our species, reproductive success requires negotiation of at least three adaptive challenges:

surviving to reproductive age, mating, and providing adequate care to offspring so that they too will survive to reproduce. We have just argued that the relative immaturity of human newborns created a situation in the EEA in which survival depended not only on their forming a strong bond to a protector, but also on the joint investment of their parents. This necessitated a mechanism that would hold reproductive partners together for an extended period of time. We have proposed that the attachment system, which had evolved to ensure an enduring bond between infants and caregivers, was exploited for this additional purpose. But the advantages of pair bonding extend beyond its role in offspring survival: Benefits include enhanced survival and reproductive fitness for *mates,* as well as their offspring.

There is mounting evidence that offspring mating strategies may depend critically on the pair-bond status of parents, especially mothers. Adolescents from father-absent homes show precocious sexual interest, relatively early sexual maturation, more negative attitudes toward potential mates, and less interest in long-term relationships than do their counterparts reared in father-present homes (Belsky, Chapter 7, this volume; Draper & Belsky, 1990; Draper & Harpending, 1982; Surbey, 1990). In other words, if parents choose not to remain together, their children are more likely to adopt approaches to mating that emphasize quantity over quality. Parental divorce has also been found to affect offspring mating behavior. Female children of divorce tend to fear closeness and have difficulty establishing committed relationships, whereas the effects for males are evidenced in a lack of achievement orientation (Wallerstein, 1994) and lower socioeconomic status (Lillard & Gerner, in press). Thus the failure of reproductive partners to maintain long-term bonds may have a negative effect on the mating appeal and success of their offspring.

Whether opportunistic, short-term mating strategies are inferior to stable, long-term approaches is the source of much current debate (e.g., Belsky, Chapter 7, this volume; Buss, 1997; Chisholm, 1996). Most research and theorizing on short- versus long-term mating presume that they represent mutually exclusive strategies. That is, individuals choose to engage in copulation with multiple partners or to opt instead for a monogamous relationship. In reality, both males and females can establish enduring pair bonds and still pursue short-term mating opportunities outside these bonds. According to life history theory (Stearns, 1992), organisms possess a finite amount of resources that must be allocated across various evolutionary challenges, including survival, growth, mating, and parental investment. Local circumstances determine the balance of time and energy an individual devotes to each. From this perspective, it may be most sensible for adolescents from unstable families to adopt a strategy of mating early and often. Thus, both long- and short-term strategies can be viewed as reasonable and comparably adaptive responses to different ecologies.

Although it is clearly advantageous for humans to be capable of facultative mating adaptations that take account of varying ecological conditions (Buss & Schmitt, 1993; Daly & Wilson, 1988), the correlates of short- and long-term mating strategies are not supportive of the view that they are different but essentially equal (see Belsky, Chapter 7, this volume, for an alternative viewpoint). The ability to adjust behavior to nonoptimal circumstances is obviously important, but such adjustments are unlikely to produce optimal results. Take feeding behavior, for example. Survival depends on the regular intake of food, and if humans are hungry enough, they will consume garbage to stay alive. But refuse is unlikely to have the same nutritional value as a well-rounded meal, nor is it expected to support physical development equally well. Likewise, quick and frequent copulation coupled with an avoidance of parental investment may be the best available strategy in some circumstances, but it hardly qualifies as generally optimal. For instance, infant mortality rates are higher among children without an investing father (Hill & Hurtado, 1995). It has also been found that women suffering from infertility of unknown biological cause tend to have an avoidant attachment style (Justo, Maia, Ferreira-Diniz, Santos, & Moreira, 1997). In the currency of evolution, a superior strategy is one that ensures survival and enhances reproductive success. It is a matter of empirical fact that pair-bonds not only contribute to the survival of offspring, but also leave them better equipped to attract and retain mates of their own, which in turn would be expected to improve the reproductive fitness of their own offspring.

In addition to the multiple direct and indirect benefits that accrue to the progeny of stable pair bonds, there are also advantages for the mates themselves. There is at least one indication that long-term bonds between partners directly enhance the partners' own reproductive success. It is well documented that women ovulate more

regularly if they are in a stable sexual relationship (e.g., Cutler, Garcia, Huggins, & Preti, 1985; Veith, Buck, Getzlaf, Van Dalfsen, & Slade, 1983). They also tend to continue ovulating into their middle years and to reach menopause significantly later if sexual activity is consistent. Earlier, we have cited evidence that partners in long-term relationships enjoy more robust physical and mental health. Clearly, the more fit an individual is, the better able he or she is to function in all the various roles adults are required to fill—including those of mate, parent, and grandparent. A healthy member of any social group is more valued and more valuable (and, we might add, more capable of protecting self as well as loved ones). A stable bond with a trusted and reliable companion also promotes the kind of exploration and productive engagement in activity on which family welfare depends (Hazan & Shaver, 1990). As for the protective aspects of this kind of companionship, adults too need someone to look out for them and keep track of them—someone to initiate a search if they fail to show up at the expected time, to care for them when they are sick, dress their wounds, help defend them against external threats, reassure them, and keep them warm at night.

What is the function of attachment in adult life? On the basis of the evidence, we would argue that the attachment system serves essentially the same purpose in adulthood as it does in infancy. It cements an enduring emotional bond between individuals that translates today, as it did in the EEA, into differential survival and reproductive success.

A MODEL OF ADULT ATTACHMENT FORMATION

In arguing that attachment is an integral part of adult pair bonds, we have hinted at the processes by which a sexual partner comes to replace parents in the hierarchy of attachment relationships. In this final major section of the chapter, we offer a more detailed account of these processes. Although we have incorporated many diverse empirical findings to support our perspective, the model we propose is largely theoretical. Firm conclusions about how two adults make the transformation from relative indifference to profound psychological and physiological interdependence must therefore await the results of more direct tests.

Before we present the model, a few caveats are in order. In contrast to the preponderance of attachment research, which emphasizes individual differences, our model stresses normative processes. There is good reason to expect that the processes will vary somewhat as a function of the working models that individual couple members bring to a relationship, but there is not space for a discussion of all these various possibilities. Also, in our effort to build a persuasive case that pair bonds are true attachments, we have necessarily stressed the similarities between pair bonds and infant–caregiver relationships over their differences. The differences are both numerous and profound, but three strike us as particularly important.

First, the reciprocal nature of prototypical adult attachments means dual roles for the partners. Each mate uses the other as an attachment figure and source of security; each also serves as an attachment figure and provider of security to the other. This implicates not only the attachment system, but the caregiving (parenting) system as well. And because pair-bond members are sexual partners, the sexual mating system is also involved. Therefore, adult attachments are qualitatively different from infant attachments by virtue of their mutuality and sexual nature.

Second, we have referred earlier to the crucial role of physical contact in fostering attachment formation. The motivation for proximity seeking is another major source of difference between infants and adults. When an infant approaches or signals the caregiver for contact, distress alleviation is often the goal. Babies are, after all, helpless to meet their own physical needs. Although adult partners also turn to each other for comfort, sexual attraction is a major impetus for contact, especially in the initial phases of relationship development.

Third, a consideration of the evolutionary roots of pair-bond attachment highlights yet another fundamental difference between lovers and parent–child pairs. Beyond the reality that infants cannot survive without protection and care, in most instances they are also biologically related to their caregivers. The issue of genetic relatedness is an important one. Although the expected fitness of mates is correlated (due to their shared genetic interests), it is generally assumed that this correlation can be reversed rather easily, as in the case of sexual infidelity, whereas the genetic interests of relatives are forever linked (Daly & Wilson, 1996). This presumes that mates are not genetically related. In fact, with the exception of first-degree relatives, a high degree of inbreeding has been the norm in our species (Thornhill, 1991). In a survey of 370 cultures, fully 26% prescribed or strongly preferred marriage between cousins (Broude, 1994). Moreover, the low incidence of interracial marriage and the prevalence of look-alike partners (Hinsz, 1989) indicate that individuals tend to select mates from their own genetic pool. Although mates will not typically be first-degree relatives, they are still more likely to be "related" than two randomly selected individuals.

It is also worth noting that attachment is not synonymous with sexual fidelity. Results of genetic analyses provide objective evidence that even so-called "monogamous" species engage in copulations outside pair bonds (Carter et al., 1997; Mendoza & Mason, 1997). Our goal is not to argue that because pair bonds are regulated by the attachment system, they are therefore indissoluble or even as durable as parent–offspring bonds. The current high rate of divorce, particularly in Western cultures, is but one indication that relationships between mates are more fragile. Nevertheless, a close examination of the data reveals that the majority of marriages that end in divorce do so within the first few years—perhaps before an attachment has been established—and that breakups are significantly less common among couples who have at least one child (Fisher, 1992). Once partners have become attached and/or commingled their genes, their relationship is more likely to endure.

How do adults become attached to each other? Bowlby identified four phases in the development of infant–caregiver attachments. We propose a parallel four-phase process model to integrate and explain the phenomenology of pair-bond development. We have adopted Bowlby's labels for each of the phases and supplemented them with their hypothesized romantic-relationship equivalents. (See Zeifman & Hazan, 1997, for a more detailed explication of the model.)

Preattachment: Attraction and Flirting

Specific attachments in infancy take months to develop and are typically not evident until the second half of the first year of life. However, the propensities that facilitate their formation are present almost from birth. In infancy, the preattachment phase is characterized by a readiness for and inherent interest in social interaction. Very young babies are rather indiscriminate in their social signaling and generally welcome approaches from virtually anyone who appears friendly. Their vocalizations and body language make it clear that they find such exchanges stimulating and exciting. The eventual development of an exclusive bond begins with openness to the types of social interaction that support its formation.

This combination of preparedness for social engagement and relatively promiscuous signaling of interest is at the heart of adult flirting. The telling behaviors are universally recognizable: smiling, making eye contact, talking animatedly (with heightened pitch, inflection, and volume), and exaggerated gestures and facial expressions. Eibl-Eibesfeldt (1989) called this unique and distinctive pattern of behavior the "proceptive program."

Is there any reason to believe that adult flirtation involves the attachment system? It seems more likely that the excitement and arousal associated with flirtatious exchanges are due to the activation of the sexual mating system, rather than to attachment per se. We acknowledge the predominantly sexual nature of adult flirtation, but we also find it telling that flirting individuals are responsive to attachment-relevant cues. When flirtations are initiated with more than immediate sexual gratification as the goal, and more specifically with the hope or possibility of a more lasting association, attachment-relevant cues such as warmth, responsiveness, and reciprocal liking are particularly important (Aron, Dutton, Aron, & Iverson, 1989; Backman & Secord, 1959; Clark, Shaver, & Abrahams, in press; Curtis & Miller, 1986). That is, the "attachment-worthiness" of potential partners is a consideration in and has an effect on the sexual attraction itself.

In order for an attachment bond to develop between two individuals, they first have to be drawn together. The motivations for social proximity seeking no doubt vary as a function of many individual characteristics, including age. Sexual attraction helps to ensure that adults will seek and maintain close proximity to individuals to whom they may become attached.

Attachment in the Making: Falling in Love

Sometime between 2 and 3 months of age, the indiscriminate signaling of an infant becomes more selective. The infant begins to direct social signals preferentially toward the individual who has played a primary role in his or her care, especially in distress alleviation. The vocal and physical interactions of a caregiver–infant dyad during

this phase take on the appearance of synchrony and attunement. Prolonged mutual gazing, nuzzling, and cuddling also reflect the increasingly intimate nature of the relationship.

Similar behaviors are typical of a new couple. As adults make the transition from attraction to falling in love, their interactions become smoother and more intimate. Still, the predominant psychological and physical states that accompany infatuation are ones of heightened arousal. Sleeplessness, reduced food intake, and (paradoxically) unbounded energy are common features of in-love experiences (Tennov, 1979). Nevertheless, there is a noticeable increase in behaviors that have a more calming than arousing effect. For example, reassuring, "parental" forms of physical contact, such as hand holding or placing an arm around the other's shoulder, are typical among new lovers and can be contrasted with the less intimate and more arousing touches that typify flirtations or purely sexual encounters. Also, as noted earlier, sexual climax triggers a release of oxytocin (Carter, 1992), effecting a sense of subjective well-being in the arms of the partner.

This trend toward increasingly comforting exchanges is not limited to physical contact. Changes in voice quality can also be noted, including soothing whispers and "baby talk." Whereas self-disclosures in the preattachment stage are usually limited to positive or neutral facts, adults begin to share more personal information as they fall in love, including stories of painful experiences and fears (Altman & Taylor, 1973). Revelations of this type may constitute a test of commitment and future reliability, as well as a bid for acceptance and care. As the members of a couple start to serve as mutual sources of emotional support, their relationship takes on an additional component of attachment—namely, safe haven.

Clear-Cut Attachment: Loving

At what point does a relationship partner become an attachment figure? The answer may lie in the predictable changes that occur as partners make the transition from being in love to loving each other. For example, the frequency of sexual activity declines (Fisher, 1992; Traupmann & Hatfield, 1981), while the importance of emotional supportiveness and nurturance increases (Kotler, 1985; Reedy et al., 1981). As couple members become increasingly familiar with each other, simply being together is no longer as arousal-inducing, and arousal is insufficient to maintain their satisfaction with the relationship. This constitutes a major change in the way partners relate to each other and may signal a qualitative change in the nature of the bond between them.

Leibowitz (1983) has proposed an explanation for the arousing-to-comforting transformation that occurs in developing romantic relationships. He hypothesizes that the arousal that accompanies infatuation is mediated by phenylethylamine, which is similar in its effects to amphetamines. Eventual habituation to phenylethylamine is thought to stimulate the production and release of endorphins, which induce a contrasting state of calm and contentment. It is worth noting that in diverse species, opioid administration ameliorates the disorganizing effects of separation, whereas opioid blockage exacerbates them (Panksepp, Siviy, & Normansell, 1985). In addition to alleviating anxiety, opioids are powerful conditioning agents. Through classical conditioning, stimuli paired with opioid drugs rapidly become associated with their calming effects and are strongly preferred. Moreover, such preferences are extremely difficult to extinguish.

Opioid conditioning is the expected result of repeated anxiety- and/or tension-alleviating interactions. Exchanges of this kind are a common feature of both infant–caregiver relationships and adult romantic relationships. When a parent comforts a crying infant, the parent becomes associated (in the infant's mind and brain) with the alleviation of distress. Similarly, through repeated comforting exchanges, including the release of tension brought about by sexual climax, a lover comes to be associated with stress reduction and calming. Relationships that develop into attachment bonds appear to be those in which heightened physiological arousal is repeatedly attenuated by the same person and in a context of close bodily contact. As such, attachment may involve the conditioning of an individual's opioid system to the stimulus of a specific other.

The transition from an arousal-enhancing to an arousal-moderating effect of the partner's presence signals clear-cut (adult) attachment. The "flip side" of each partner's ability to calm the other reflects the presence of another attachment component—separation distress.

Goal-Corrected Partnership: The Postromance Phase (or Life as Usual)

An important change takes place sometime between the second and third years of life in the way infants (now toddlers) relate to their primary caregivers. The frequency of attachment behavior decreases, and the need for close physical contact is somewhat attenuated. Children exhibit increased interest in exploration, especially social contact with peers. The reliability of the caregiver is well established, and the resulting confidence and security provide support for nonattachment activities. Attention is shifted from the attachment figure to the external world.

A parallel transformation occurs in the development of relationships between adult pairs. Physical contact, mutual gazing, sexual exchanges, and other bond-promoting behaviors decline in frequency. The mental energy consumed by preoccupation with the partner and the relationship is freed up to be redirected toward other real-world obligations and interests (e.g., friendships and work obligations), which are often neglected by individuals in the throes of romantic passion. At this point, the bond between partners is not as readily apparent in their overt interactions, but beneath the surface lies a profound emotional interdependence (Berscheid, 1983).

Hofer (1984; see also Polan & Hofer, Chapter 8, this volume) has proposed that this deeper interdependence involves the coregulation of physiological systems. In essence, each partner has come to serve as one of the external cues or stimuli that provide regulatory input to internal systems (just as light–dark cycles influence sleep). Hofer refers to this physiological interdependence as "entrainment." The removal of the cues provided by the partner help to explain the disorganization—both psychological and physiological—that follows the loss of a long-term partner. The emotional security inherent in such close bonds makes the distress of even brief separations understandable.

This psychological and physiological tether, once established, may not be obvious in the day-to-day, routine interactions between members of a pair bond. Nor is the deep emotional connection between parents and their offspring as older children or adolescents easily observed under normal circumstances. But having an individual who can be trusted and depended on for long-term accessibility and assistance makes it easier for humans of all ages to go about the daily business of exploring and learning about the environment, and making whatever contribution to it they are capable of. A goal-corrected partnership—in childhood as well as adulthood—serves as a base of security from which to operate in the world.

CONCLUSIONS

Our primary goal in this chapter has been to evaluate the claim that attachment is integral to pair bonds. The evidence we have reviewed indicates that such bonds are similar in many respects to the one interpersonal tie that most researchers agree does involve the attachment system—infant–caregiver bonds. Furthermore, the similarities extend far beyond the superficial to include fundamental features, functions, dynamics, and processes. From this extensive evidence, we conclude that attachment is indeed integral to pair bonds.

Critics of this viewpoint (e.g., Kirkpatrick, 1998) acknowledge the many resemblances between infant–caregiver and romantic relationships, but reject such evidence as circumstantial. Research and theory in the social sciences are built almost entirely on a foundation of circumstantial evidence. Few if any of our most interesting and cherished constructs can be directly observed or measured, and attachment is no different. Even in infancy, the evidence is circumstantial. Proximity maintenance and separation distress, as well as safe-haven and secure-base behaviors, are the data from which the existence and regulatory role of the attachment behavioral system are *inferred.* Evidence that the attachment system is operative in pair bonds is by necessity indirect, but is no less solid. Given the consistency and strength with which extant findings support Bowlby's pair-bond attachment hypothesis, it would make sense to reject it only if there were an alternative that could provide a more parsimonious explanation of the facts.

As for the functions of attachment in adult life, we have argued that they are essentially the same as in infancy. The attachment system helps to ensure the development of an enduring bond that enhances survival and reproductive fitness in direct as well as indirect ways. Pair bonds are not simply mutually beneficial alliances based on the principles of reciprocal altruism. Instead, they involve a profound psychological and physiological interdependence, such that the absence or loss of one partner can be literally life-threatening for the other.

Bowlby's original hypotheses concerning pair-bond attachment were based on little more than his formidable powers of observation and deep

insights into human affectional behavior. In the time since their formulation, a substantial body of empirical data on relationships has been amassed—one that, on the whole, supports his initial speculations (see Feeney, Chapter 17, this volume). The evidence indicates that attachment needs persist from the cradle to the grave. And, just as Bowlby surmised, in adulthood such needs are satisfied by pair bonds.

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