

SEX AND THE PSYCHOLOGICAL TETHER

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The scientific study of relationships is a relatively new but rapidly growing field that crosses several disciplines (Duck, 1988; Perlman & Jones, 1993). A review of this now voluminous empirical literature indicates that sexual aspects of relationships have not been the focus of much research. Yet sex is a very important ingredient of some relationships, most notably romantic ones. Sex researchers (e.g., Kinsey, Masters & Johnson) have emphasized the physical more than the psychological aspects of sex, and have focused on *individual* sexual behavior and response rather than on sexual *relationships* between individuals. Relationship researchers have virtually ignored the sexual aspects of relationships, especially relative to such phenomena as intimacy, trust, jealousy, equity, communication, and commitment (McKinney & Sprecher, 1991). As Berscheid (1988) says, this omission is like leaving the tiger out of a recipe for tiger soup.

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Within attachment theory (Bowlby, 1969/1982, 1973, 1980, 1988), sex is viewed as an integral part of adult romantic relationships. Nevertheless, issues concerning the multiple functions of sex within a relationship and its changing nature and importance over the course of a developing relationship have not been systematically addressed within attachment theory or research. These issues will be explored in this chapter.

In the first part of the chapter, we present results from two recent studies which indicate that, beyond infancy, attachments are formed almost exclusively with sexual partners. In the second part, we draw upon empirical findings from diverse sources and disciplines to derive a conceptualization of the role of sexual interest and sexual behavior in adolescent and adult attachment relationships.

ATTACHMENT FORMATION AND TRANSFER

Ethological attachment theory (Bowlby, 1969/1982, 1973, 1980) grew out of the observation that infants and young children behave in ways that maintain a degree of physical proximity to their primary caregivers and are distressed by separations from them. On the basis of his observations and the well-documented similarity of behavior in nonhuman primates (Harlow, 1958), Bowlby postulated the existence of an inborn behavioral system that evolved to protect infants from danger and maximize safe exploration by regulating proximity to a caregiver. According to this control-systems model, the infant has a 'set-goal' for caregiver proximity; a discrepancy between the set-goal and actual proximity activates the system. Once sufficient proximity is restored, the attachment system becomes quiescent, potentiating the activation of other behavioral systems such as exploration or affiliation. Bowlby argued that these various inborn behavioral systems, which help ensure that important needs are met, developed as a result of selection pressures over the course of human evolution. Like other species whose young are born relatively immature and require a long period of care and protection if they are to survive, humans are innately predisposed to form attachment bonds (Bowlby, 1969/1982).

Defining Attachment

Attachments are defined in terms of four components: proximity seeking, separation protest, safe haven, and secure base (Ainsworth, Blehar, Waters & Wall, 1978; Bowlby, 1988). The components are most readily observable in the behavior of infants in relation to their caregivers. Infants tend to *seek and maintain proximity* to an attachment figure and *resist separations*. In the presence of the attachment figure, they usually show interest

in exploring the physical environment. Movement away from the attachment figure for exploratory purposes is referred to as the *secure base* function of attachment. If a threat is perceived, infants will typically cease exploratory activity and retreat to their attachment figures for comfort and reassurance – referred to as the *safe haven* function. (The components are represented in Figure 1.)

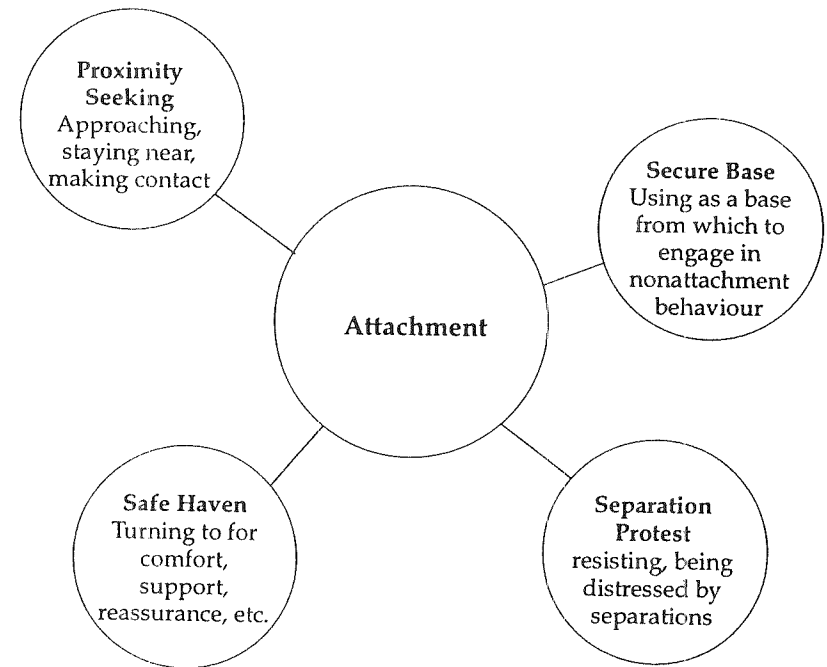


Figure 1. The components of attachment

A basic assumption of Bowlby's theory is that attachment behavior characterizes humans across the life span, from 'the cradle to the grave' (Bowlby, 1979). Until recently, researchers have focused almost exclusively on attachment during infancy and childhood. In the last several years, however, adult relationship researchers have begun to test the life span developmental implications of attachment theory (e.g., Bartholomew, 1990; Collins & Read, 1990; Feeney & Noller, 1990; Hazan & Shaver, 1987; Kirkpatrick & Davis, in press; Kobak & Hazan, 1991; Main, Kaplan & Cassidy, 1985; Simpson, 1990). Results of these and other studies provide robust evidence in support of Bowlby's original claims concerning the nature of

evidence in support of Bowlby's original claims concerning the nature of attachment relationships and their importance throughout life. Further, the findings are consistent with the claim that the *dynamics* of attachment (i.e., the activation and deactivation of the attachment system and its effects on other systems) as well as the *features and functions* of attachment relationships (e.g., safe haven, secure base) are essentially the same in infancy and adulthood.

Although infant and adult attachments are similar in many respects, they also differ in important ways (Weiss, 1982). One of the most significant developmental changes occurring between infancy and adulthood is in the *mutuality* of attachments. During infancy and childhood, attachment relationships are complementary (i.e., asymmetric). Infants seek security from their attachment figures but do not provide security in return; attachment figures provide care to, but do not typically seek care from, their infants. Two different behavioral systems are presumed to be involved: the infant's attachment system and the attachment figure's caregiving system.

In contrast, adult attachment relationships are expected to be more reciprocal (i.e., symmetric), with each member of the dyad serving both as a provider and a recipient of care, a seeker of security as well as a target of security-seeking (Bowlby, 1969; Weiss, 1982). Another difference is that, in adulthood, reciprocal attachments are assumed to be formed primarily with sexual partners. Thus, in the course of normative development, sex becomes an integral part of attachment. The prototype of a reciprocal peer attachment (pair bond) is one that involves the integration of three behavioral systems – attachment, caregiving, and sexual mating (Bowlby, 1969; Shaver, Hazan & Bradshaw, 1988). (See Figure 2.)

There are, of course, other developmental changes in attachment. A typical 12-month old cries when his or her caregiver leaves the immediate vicinity, whereas a 36-month old can happily spend an entire day in nursery school. By adulthood, attached pairs can endure long separations without undue distress, although sudden, permanent, or greatly extended separations do evoke anxiety and protest behaviors (Weiss, 1988; Vormbrock, 1993). Most infants need actual physical contact when distressed but, by early childhood, can be soothed by telephone contact or even by verbal reassurances that contact is forthcoming. Adults can derive comfort from the mere belief that contact will be possible at some future point. Nevertheless, actual physical contact continues to serve as a necessary ingredient for maintaining the attachment bond and feelings of security for both children and adults.

Thus, attachment theory predicts developmental changes as well as continuities. Whereas the dynamics and functions of attachment are hypothesized to be similar across the life span, *structural* changes – specifically the shift from complementary to reciprocal attachments and the integration

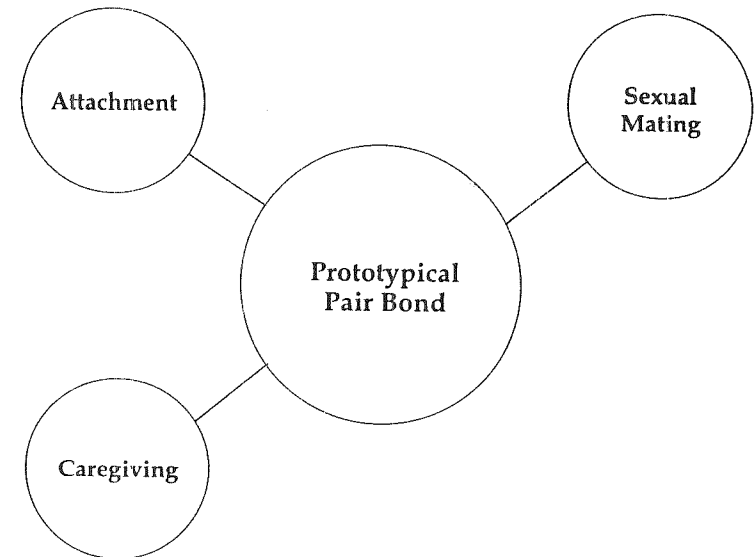


Figure 2. The components of a prototypical pair bond

of sex – are predicted to occur as one moves from infancy, through childhood and adolescence, into adulthood.

Given the opportunity, all normal human infants become attached to their primary caregiver, typically within the first eight months of life. Whether secondary attachments to other people are formed simultaneously or only after a primary attachment has been established is open to debate, but there is no doubt that infants and children *do* form multiple attachments. Bonds that satisfy the criteria for being attachments – for instance that include proximity maintenance and safe haven and secure base behaviors – are commonly developed with several people.

Although multiple attachments are the norm, attachment figures are not treated equivalently. Infants show clear discrimination and consistent preferences for the *primary* caregiver (Colin, 1985, 1987; Cummings, 1980; Farran & Ramey, 1977). Even if several caregivers are regularly available, infants reliably seek and maintain proximity to one, especially when tired or ill (Ainsworth, 1967, 1982). Infants also exhibit more intense protest on being left by the primary attachment figure as compared to others (Schaffer & Emerson, 1964) and, in unfamiliar settings, are most reassured by the presence of the primary figure (Ricciuti, 1974; Shill, Solyom & Biven, 1984).

Bowlby (1969/1982) referred to this tendency of a child to form a special attachment to one person as 'monotropy'.

Multiple attachments are hypothesized to be hierarchically arranged. At the top of the hierarchy is the primary attachment figure. Over the course of development, many changes may occur in the content and structure of an individual's attachment hierarchy. People may be added to or dropped from the hierarchy. Parental figures tend to be permanent members of the hierarchy, although their positions naturally change as a child matures. Bowlby hypothesized that, with the formation of a pair bond in adulthood, the sexual partner assumes the position of primary attachment figure and ascends to the top of the hierarchy. When and by what process this change occurs is not specified within attachment theory.

Study 1: Age-Related Changes in the Target of Attachment Behaviors

Background and objectives

The shift from complementary to reciprocal attachments constitutes a major life transition but little is known about how and when primary attachment bonds are transferred from parents to peers, or how the bonds themselves are transformed in the process. What is known about this transition comes largely from the empirical literature on child and adolescent peer relations.

Peer relationships during this period of development are best characterized as affiliative relationships, which are functionally different from attachment relationships and believed to be regulated by a different behavioral system. The primary function of affiliative relationships is to provide stimulation and pleasure (as opposed to the comfort and security provisions of attachment relationships). However, a review of the existing research suggests that *some* components of attachment are evident in peer relationships during childhood and adolescence. For example, interest in and attraction to peers begins early in development. By about age 3, children are capable of engaging in complex social interactions with age-mates and show increasing interest in them (Gottman, 1983; Rubin, 1980). More and more time is spent in the company of peers relative to parents. Thus, one component of attachment – proximity seeking – is present in peer relationships by early childhood, although such relationships do not qualify as attachments in the full sense of the term.

By middle childhood, children become capable of developing intimate relationships with their peers (Furman & Buhrmester, 1985; Hartup, 1983; Lewis, 1982) and increasingly turn to each other for comfort. The confiding and emotional support evident in peer relationships at this age appears to be functionally similar to the safe haven behaviors observed in infancy. By

late adolescence, peers come to be preferred over parents as sources of emotional support (Steinberg & Silverberg, 1986).

Thus, it appears that there may be developmental changes in the *target* of different attachment behaviors, such that between childhood and adolescence some components of attachment get shifted from parents to peers. The nature and timing of this transfer and the processes by which it is accomplished are not easily delineated on the basis of existing research or theory. Based on evidence that peer relationships do not typically satisfy all the definitional criteria of attachment but, depending on the age of the individuals, are characterized by some attachment features, we thought a key to understanding the transfer of attachment from parents to peers might lie in analysis of attachment at the level of components.

Method

We developed an interview measure of the four components of attachment and administered it to a cross-section of over 100 children and adolescents ranging in age from 6 to 17. Subjects were recruited through local public and private schools and community centers representing a wide variety of religious, ethnic, racial, and socioeconomic groups. Interviews were conducted individually by a trained interviewer and were videotaped.

In constructing the interview and the attachment-component items, we operated on the assumption that the components would be functionally and psychologically equivalent to their behavioral manifestations as observed in infants. For each component, we asked several questions: proximity seeking (Whom do you like to be close to, spend time with, etc.); safe haven (Whom do you turn to for comfort when you're upset, feeling down, etc.); separation protest (Whom do you not like to be away from, miss most during separations, etc.); and secure base (Whom do you feel you can always count on, know will be available if needed, etc.). Subjects were asked to respond to each of the questions by naming a single person (i.e., the *preferred* person in each situation).

Because we were primarily interested in the distinction between parental figures and peers, we categorized responses as either parent or peer and calculated proportions based on these two categories. The parent category included mothers, fathers, stepparents, and grandparents; the peer category included friends and romantic partners (i.e., boyfriends and girlfriends). Averaged across components, 91 per cent of all responses fell into one of these two categories. Uncommon responses (ranging from 2 to 9% across items) included siblings, teachers, aunts, uncles, and 'nobody'.

Whereas the consistency of responses to items within each component was generally high, consistency across components was not. The relatively low cross-component consistency was due to the fact that some subjects

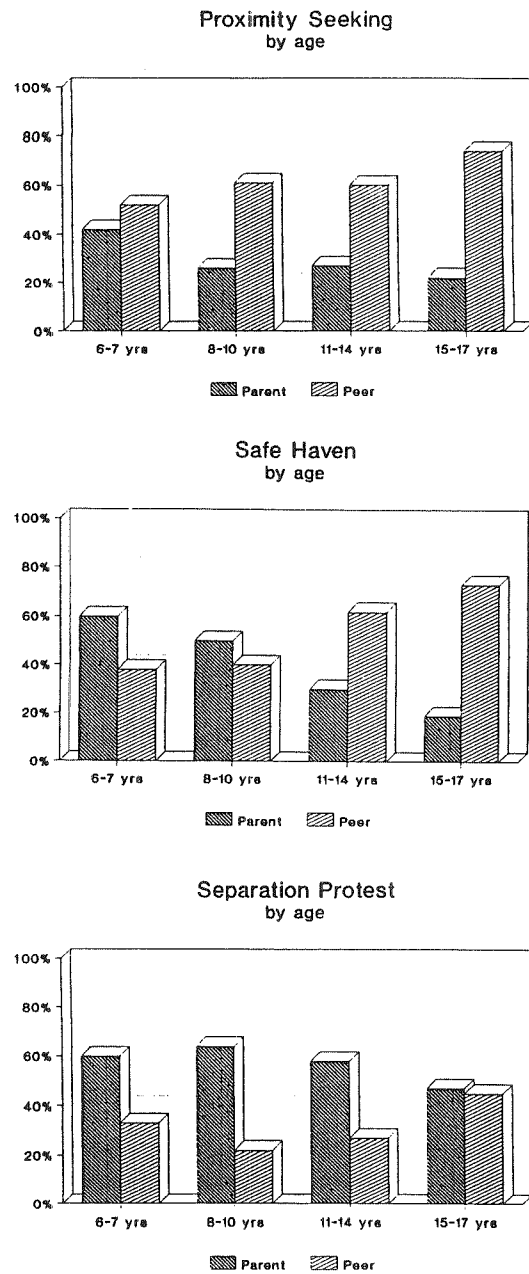


Figure 3. The target of four components of attachment by age

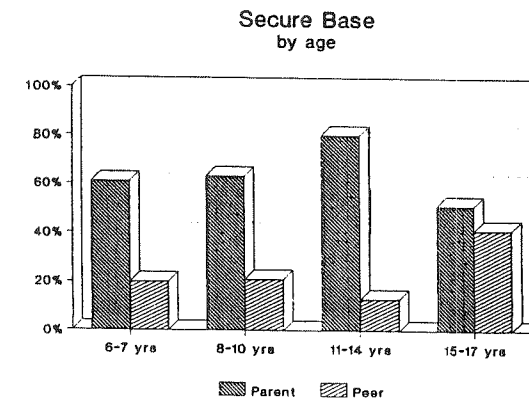


Figure 3. The target of four components of attachment by age (continued)

named a parent on all items; others named a parent on all questions for one component and a peer for all on another. This finding can be taken as evidence of the distinctiveness of the components. The results are presented in Figure 3.

Results and discussion

The most obvious trend in the data is evident in the differences between the first and second graphs, and between the top and bottom halves of the figure. 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. If we look at the safe haven component (second graph), it is apparent that a marked shift occurs between the ages of 8 and 14, with peers coming to be preferred over parents as sources of comfort and emotional support. Comparing the top and bottom halves of the figure, it is evident that until late adolescence, parents continue to serve as bases of security and targets of separation protest. Only in late adolescence (the 15–17-year-old group) do we begin to see what can be considered full-blown attachments – that is, relationships that contain all the defining features of attachment. Further analysis of the late adolescence group revealed that of this minority (41%) who considered a peer to be their primary attachment figure, the overwhelming majority (83%) named a romantic partner.

We also assessed individual differences in attachment style with a modified version of Hazan and Shaver's (1987) attachment measure. The analyses of the individual differences data are not yet completed, but preliminary results show some reliable group differences. For example, of

the small minority of the subjects who said they had 'nobody' to whom they could turn for comfort or on whom they could depend for support, over two-thirds were avoidantly attached. Although slightly less than half (48%) of the subjects were classified as insecurely attached (avoidant or ambivalent), they constituted the majority (71%) of adolescents who had formed romantic attachments. One interpretation of this finding is that insecure attachments to parents encourage early (perhaps premature) peer attachments.

According to the results of Study 1, attachments are transferred from parents to peers component by component in a sequence that begins with proximity seeking, followed by safe haven, and finally separation protest and secure base. In a sense, peer attachments are 'explored' from the parental base of security. It seems plausible that proximity seeking and safe haven behaviors are largely a matter of convenience. As children enter the school system and begin to spend the majority of their day in the company of peers, peers not only become the preferred targets of proximity seeking behaviors but also are convenient sources of emotional support and comfort. The true markers of attachment (i.e., separation protest and secure base) are reserved for parents or, in the case of the older adolescents, romantic partners. The first complete reciprocal peer attachments (i.e., those containing all four components) are romantic attachments, relationships in which sex or sexual attraction is an integral part.

Study 2: Relationship Status-Related Changes in the Target of Attachment Behaviors

Background and objectives

By what process are reciprocal attachments formed and what is the time course of this process? In infancy, attachment formation proceeds through a series of stages, 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 proximity, maintained by the caregiver as well as by selective signaling on the part of the infant. By the eighth or tenth month, infants begin to engage in safe haven and secure base behaviors, and show strong resistance to being separated from their primary caregivers. Eventually, the relationship becomes more exclusive; by the end of the first year of life, infants vigorously reject the caregiving advances of strangers and, not uncommonly, even offers of comfort from secondary attachment figures. It is noteworthy that the components that together define the attachment bond do not emerge simultaneously, but rather in sequence. The emergence of separation protest and secure base behaviors indicate that an attachment bond is fully formed.

To date, there are no published studies of attachment formation in adulthood, but existing data on relationship formation and development suggest that whether and which attachment components are present may depend on how long a couple has been together. For example, romantic couples typically experience a strong desire for physical proximity and contact, especially in the initial stages of a relationship (Berscheid, 1984). The provision of mutual support and caregiving appear to become more important in later stages (Reedy, Birren & Schaie, 1981; Sternberg, 1986). Similarly, the incidence and intensity of separation distress seems to vary according to relationship length and stage (Weiss, 1988). Thus, in adult relationships, as in infant-caregiver relationships, the presence or absence of attachment components may be partially determined by the stage of relationship development.

Method

To address the question of how reciprocal attachments are formed in adulthood, we administered the same interview used in Study One to an equally diverse sample of 120 adults, ranging in age from 18 to 82. Participants were recruited in a manner similar to the first study – that is, by posting notices in sociodemographically diverse settings (e.g., businesses and community centers). In this study, we grouped the adults by *stage* of romantic relationship development rather than by age. Three relationship status groups were identified: not in a romantic relationship, in a romantic relationship for less than two years, in a romantic relationship for two 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 fewer than two years duration were qualitatively different from those of longer duration, at least in the components we measured. The data also suggested response categories that differ in two ways from those used in Study One. First, siblings were named more often than they had been by younger subjects. (This was especially true for our oldest subjects, many of whose parents were no longer living.) Second, peers were subdivided into the two most common responses: friends and romantic partners. Averaging across components, 85 per cent of all responses are covered by the following three categories: parent/sibling, friend, and romantic partner. Uncommon responses (e.g., therapist, God, a pet, a son or daughter) – interesting in their own right (Kirkpatrick & Shaver, 1990) but too few to analyze – were excluded from the analyses. Results are presented in Figure 4.

Results and discussion

The results of this study replicate those of Study One: Full-blown attachments are almost exclusively limited to parents or romantic partners. Like children and adolescents, adults seem to be peer-oriented in their

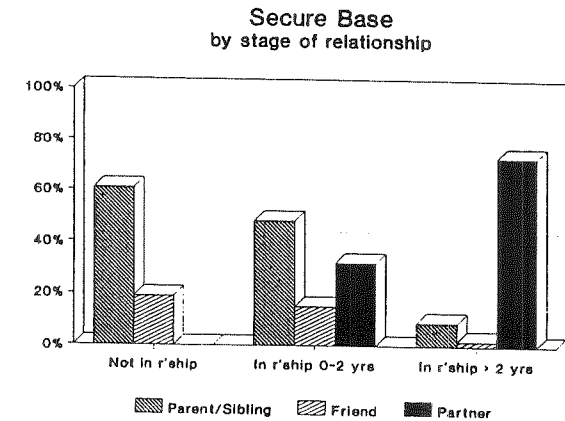
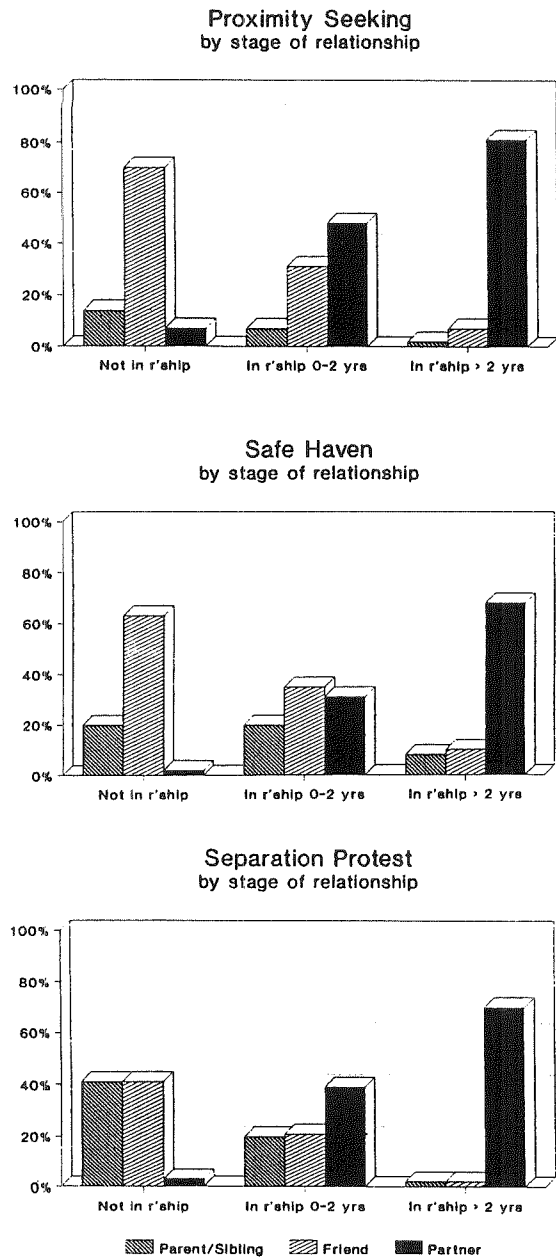


Figure 4. The target of four components of attachment by stage of relationship (continued)

proximity-seeking and safe haven behaviors (see first and second graphs), but either parent- or partner-oriented on separation protest and secure base, depending on whether and for how long they had a partner. Additionally, the results indicate that the process of reciprocal attachment formation takes approximately two years. Nearly all of the relationships of two or more years duration contained all four components of attachment, compared with only about one third of relationships in the under-two-years group.

We found gender differences on two of the components: Females who had partners were more likely than their male counterparts to name a sibling (most often, a sister) in response to the safe haven questions about whom they turn to for emotional support. On the separation protest items about who is missed during separations, 15 per cent of the subjects named their children; of these, 90 per cent were women.

We also found some attachment style differences. Avoidantly attached subjects reported less interest in spending time with or being close to their partners, and were more likely than secure or ambivalent subjects to say they sought support from and counted on 'nobody'. Ambivalently attached subjects, more than secure or avoidant subjects, reported seeking support from someone other than their partners.

The overall pattern of results suggests that reciprocal attachments, like complementary attachments, begin with proximity seeking (a desire for closeness and contact). Eventually, the safe haven component (seeking emotional support and comfort) is added. If the relationship endures beyond two years, a fully developed attachment is likely to have formed.

Figure 4. The target of four components of attachment by stage of relationship

Complete attachments (i.e., containing all four components) are formed with either parents or romantic partners.

Although both parent and partner attachments begin with proximity-seeking, it is likely that the motivation for seeking closeness is different for infants and children than it is for adolescents or adults. In infancy, proximity-seeking is dominated by (though not limited to) the need to alleviate distress and maintain 'felt security' (Sroufe & Waters, 1977). In early childhood, contact with parents diminishes and peers are increasingly approached, albeit for their interest and stimulation value rather than for security. In late adolescence and in adulthood, proximity seeking is often directed toward romantic partners, suggesting sexual attraction as a primary motivating force.

The results of both studies are consistent with Bowlby's claims that, early in life, attachment relationships are formed with parental figures and, later in life, with sexual partners. Despite differences in the underlying motivation for seeking proximity (to parents or peers), such closeness provides a context that fosters intimacy and mutual caregiving and, in time, reliance on the relationship as a base of security from which separations are resisted. The establishment of a fully-developed attachment in infancy and childhood, the endpoint of complementary attachments to parents, may be the starting point of the process of reciprocal (peer) attachment formation. Sexual attraction and behavior appear to play a central role in the culmination of this process.

SEX AND ATTACHMENT

The very first relationship in the life of a typical human is one in which cuddling, suckling, kissing, prolonged skin-to-skin, face-to-face, and belly-to-belly contact, extended mutual gazing, and the touching of body parts otherwise considered 'private' are all permissible. Although some of these behaviors may occur in isolation within the context of other types of social relationships (e.g., kissing among friends), their joint occurrence in infancy is usually restricted to the infant-caregiver relationship. When this complex behavioral package later re-emerges, it is typically restricted to romantic relationships.

Physical Contact and Attachment

Until the 1950's, it was a widely-held belief among psychologists that the reason an infant becomes attached to his or her mother is because, through nursing, the mother becomes associated with the satisfaction of a basic hunger drive. The fact that mother love was inextricably tied to the

provision of food was one of the few aspects of human psychology on which behaviorists and psychoanalysts agreed. Harlow (1958) simultaneously stunned the psychological community and revolutionized thinking about social attachments by demonstrating conclusively, through a series of studies with nonhuman primates, that the provision of contact comfort was a primary factor in attachment formation. By experimentally separating the provisions of food and contact comfort through the ingenious design of surrogate mothers, Harlow established that primates become attached to the supplier of opportunities to cuddle and cling.

Infant rhesus monkeys, like other nonhuman primates, spend their first weeks of life in continuous, mutually ventral contact with their mothers (Suomi, 1990). In this position, the infants not only experience the contact comfort that Harlow found to be so important for their development, but also have easy access to nourishment. Within weeks, the infant-mother relationship has many of the same features as those of human infant-caregiver dyads (Harlow & Harlow, 1965). Around the end of the first month of life, rhesus infants begin to use their mothers as a secure base for exploration, venturing away from her on forays of ever-increasing frequency, duration, and distance (Suomi, 1983). If, while exploring, the infant becomes frightened or fatigued, mother is immediately sought out for safe haven and comfort.

Often during periods of exploratory activity, infants initiate social interactions with peers and, through contact in the form of mutual grooming, establish affiliative ties. Naturally, as contact with peers increases, contact with the mother decreases. Eventually, peer contacts come to include sexual play (Suomi, 1990). Despite the dramatic change that occurs in time spent with mother relative to time spent with peers, mother continues to serve as the base of security for affiliative exploration. The infant's motivation for seeking proximity and contact with peers is different than the motivation for seeking contact with the mother; peers are approached for stimulation, whereas mothers are approached for comfort. The form of physical contact also differs between the two, with ventral contact being exclusive to the mother-infant relationship.

There is much more variability among human infants in the amount of physical contact they have with their caregivers. For example, Japanese infants are rarely separated from their mothers during the first months of life (Miyake, Chen & Campos, 1985), and do not typically sleep in a separate room or even a separate bed from the parents. Very young Kung infants spend the whole of their day in physical contact with mother and, at night, sleep next to her (Konner, 1982). In contrast, physical separations from caregivers are a common experience of infants in many Western cultures (e.g., Grossmann & Grossmann, 1981). Despite these cultural variations in amount of contact, the *nature and quality* of the contact between primary

caregivers and their infants is quite similar. Compared to contact with others in the social group, contact with caregivers is more likely to be mutually ventral and of extended duration, and includes more kissing and nuzzling (Schaffer, 1971). Ventral contact tends to be more soothing than other forms of contact, especially when accompanied by opportunities for sucking. In this way the primary caregiver becomes associated with feelings of security and the alleviation of distress (Main, 1990). Thus, as in non-human primates, human attachments develop out of experiences of physical contact of a distinct nature.

In adulthood, close physical contact usually takes the form of sexual intimacy and is generally exclusive to marriage or romantic partnerships. Prohibitions against sexual behavior in other social relationships are rampant in Western society and religion, and seem to be present in some form or another in all cultures studied to date (Alcock, 1989). The fact that in most societies there are prohibitions against sex outside the pair bond relationship may be due in part to an implicit understanding that close physical contact with another could lead to an emotional bond that would jeopardize the primary one. Even in sub-cultures where extra-relationship 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). Gay males who regularly participate in extra-relationship sexual activities reserve kissing and cuddling for the primary partner (Blumstein & Schwartz, 1983). Ground rules among so-called 'swinging' heterosexual couples often forbid repeated sexual contact with the same person (O'Neill & O'Neill, 1972). A plausible interpretation of these findings is that repeated intimate physical contact naturally fosters attachment formation. If an emotional bond is not desired, special steps must be taken to protect against its formation.

In summary, there is abundant evidence that close physical contact is centrally important to attachment formation. Further, the contact that promotes and characterizes attachment relationships is qualitatively different from the various kinds of contact observed in other social relationships. Specifically, intimate (e.g., mutually ventral, face-to-face) contact and the feelings of security that it fosters appears to be the cornerstone of attachment formation.

The Biology of Attachment

The notion that attachment is a very real biological need rather than a luxury was established in studies of infants reared in orphanages and other institutional settings. Despite that fact that infants' nutritional and hygienic needs were being adequately met, because of high infant to nurse ratios and

staff turnover rates, infants were not afforded an opportunity to develop attachment bonds. The results of attachment deprivation were shocking. Infants showed retarded growth and weight gain and displayed dulled affect characteristic of adult depression, and many died (Robertson, 1953; Spitz, 1946). Gardner (1972) studied the development of physically normal, nonabused infants who had received adequate physical care but were deprived of emotional care, especially physical affection. These home-reared infants showed many of the same abnormalities as institution-reared infants, including apathy, rigid body postures, and depression. Moreover, in the absence of organic abnormalities or nutritional deprivation, the infants were severely retarded in their physical growth – a condition Gardner called *deprivation dwarfism*. Thus, the fulfillment of attachment needs appears to be essential to the physical as well as the psychological well-being of human infants.

Bowlby stressed the importance of the protective functions of the attachment relationship and hypothesized that attachment behaviors developed because of their survival value in the environment of evolutionary adaptedness. Because human infants are incapable of caring for themselves at birth, it is adaptive for them to form an attachment to an adult who can provide food, care, and protection from predators. More recently, psychobiological researchers are discovering many additional ways in which attachment behaviors serve to enhance the health and well-being of infants. For example, Field and her colleagues demonstrated that premature infants who received tactile/kinesthetic stimulation in the form of a body massage gained weight more rapidly, and were discharged from the hospital earlier, than infants in a standard care control group (Scafidi *et al.* 1990). Contact with a caregiver serves many biologically critical functions for human infants who have poorly developed mechanisms for temperature regulation and arousal modulation at birth. There is also evidence that caregiver contact helps to regulate other physiological systems, such as heart rate and REM cycles (Field, 1985; Hofer, 1987).

Although adults are clearly less dependent on an attachment bond for basic survival, there is ample evidence that adults incur health benefits from having close personal relationships, and suffer health decrements from the loss of an attachment relationship. Disruption, especially through divorce, makes one more susceptible to everything from automobile accidents to alcohol abuse to admission into a psychiatric facility (Bloom, Asher & White, 1978). In addition, the grieving and lonely are more vulnerable to disease, according to studies of their hearts and immune systems (e.g., Keicolt-Glaser, Garner, *et al.* 1984; Kieicolt-Glaser, Ricker, *et al.* 1984; Lynch, 1977), and at greater risk of death from cancer (Goodwin, Hurt, Key & Sarret, 1987). Social deficiencies and losses jeopardize not only health and

happiness but job performance and achievement as well (Baruch, Barnett & Rivers, 1983; Lee & Kanungo, 1984; Vaillant, 1977).

Like relationship dissolution, relationship formation can have real physiological effects, including changes in brain chemistry and activity. For example, the development of romantic relationships can be divided into two phases – the attraction phase and the attachment phase (Mellen, 1981; Walsh, 1981). The two phases are hypothesized to correspond to distinct neurotransmitter and limbic system activity (Liebowitz, 1983). Evidence suggests that the experience of romantic love is mediated by naturally occurring amphetamine-like substances, especially phenylethylamine (PEA). Like other stimulants, PEA produces heightened arousal, awareness, and activity. It may be implicated in the 'high' that is experienced when an individual is in love, and the noticeable decrements in need for food and sleep. PEA also has mild hallucinogenic effects, which may be partially responsible for the well-known tendency of new lovers to idealize each other (Tennov, 1979; Walsh, 1981). Eventually, the brain habituates to the high PEA levels, at which time it is hypothesized that endogenous opiates – endorphins – take over and the so-called attachment phase begins. Endorphin release is accompanied by feelings of security and contentment, a sense that all is right with the world, and have long been associated with the formation of affectional bonds between infant and caregiver (Panksepp, Siviy & Normansell, 1985). For all romantic relationships, the point at which the attraction phase ends – approximately two years into the relationship according to our own data and findings reported by Tennov (1979) and Money (1980) – is the time when a relationship either begins to deteriorate or is transformed into a more enduring attachment bond.

Pair Bonds: The Integration of Attachment, Caregiving, and Sex

Attachment theory postulates that adult attachments involve the integration of three distinct behavioral systems: attachment, caregiving, and sexual mating. The term *integration* implies not only a dynamic coordination of the systems themselves but also that their regulation will be centered on one specific person. This person – the primary attachment figure – will serve simultaneously as the sexual partner and the primary provider and recipient of comfort and emotional support.

The hypothesized links between sex, caregiving, and attachment are strengthened by demonstrations that early attachment deprivation affects later sexual functioning and caregiving. For example, rhesus monkeys who were not given an opportunity to form attachments during infancy developed gross abnormalities in their sexual behavior as adults (Harlow & Harlow, 1965). Although they were reproductively normal in the physiological sense (e.g., sperm production, menstrual cycles), they showed

severe deficits in the display and sequencing of the motor movements involved in copulation. When females deprived of early attachments were inseminated by artificial means (because they were sexually incompetent and incapable of being impregnated by natural means), they demonstrated highly abnormal and even violent caregiving responses toward their newborn young (Harlow & Harlow, 1962).

For obvious ethical reasons, there is no direct empirical evidence for the effects of early attachment experiences on sexual and caregiving functioning among humans, but there are some data that bear on the issue. According to retrospective accounts, for example, dysfunctional early attachment relationships are a common precursor of adulthood sexual deviance (Sroufe & Fleeson, 1986). A correlation has also been found between retrospective reports of maternal rejection during childhood and adult sexual promiscuity (Brennan, Shaver & Tobey, 1991). Securely attached adults appear to be more skilled at providing care to their offspring (Main *et al.* 1985), are more responsive to their infants' distress (Main, 1990), and are more caring and supportive toward their adult partners (Kunze & Shaver, see pages 205–237).

Although attachment bonds formed in adulthood typically include elements of attachment, caregiving, and sex, the relative importance of these different elements appears to change as a relationship develops (Berscheid & Walster, 1974; Levinger & Snoek, 1972; Lewis & Spanier, 1979; Taylor & Altman, 1987; Walster & Walster, 1978). In general, sex is more important in the initial phase of a relationship, when sexual attraction and interest are at their peak (Traupmann & Hatfield, 1981). As a relationship develops, the degree to which a partner provides comfort and emotional support becomes increasingly important (Reedy, Birren & Schaie, 1981). Kotler (1985) reported that sensitive and responsive care, not sexual attraction, was the most accurate predictor of relationship longevity. In attachment terms, what eventually comes to matter most is whether the partner serves as a haven of safety and a secure base.

Attachments at any age develop in the context of close physical proximity and intimate contact. Therefore, in order for an attachment to form, there must be a strong force promoting closeness. In infancy, proximity seeking is motivated by the need for security (Bowlby, 1969/1982); in adulthood, the primary motivating force is likely to be sexual attraction (Berscheid, 1988). In both types of relationships – between infants and caregivers and between adult romantic partners – the frequency and intensity of intimate contact diminishes somewhat once an attachment bond had been established. Nonetheless, sexual attraction is what brings two adults together, and sex is what holds them together long enough for an emotional bond – a psychological tether – to form. (See Table 1 for a summary of the attraction and attachment phases of a relationship.)

Table 1. A Summary of the Attraction and Attachment Phases of a Romantic Relationship

	<i>Attraction Phase (attachment-in- the-making)</i>	<i>Attachment Phase</i>	<i>Sources</i>
<i>Time Course</i>	0–2 years	beyond 2 years	Fisher, Hazan & Zeifman, Liebowitz, Money, Tennov
<i>Attachment Components</i>	proximity seeking, then safe haven	proximity seeking, safe haven, separation protest, secure base	Hazan & Zeifman
<i>Importance of Sex</i>	high	low to moderate	Berscheid & Walster, Reedy <i>et al.</i>
<i>Importance of Caregiving</i>	low to moderate	high	Kotler, Reedy <i>et al.</i>
<i>Biology/ Neuro-chemistry</i>	PEA, amphetamine-like substances	endorphins, opiate-like substances	Fisher, Liebowitz, Money, Panksepp <i>et al.</i>
<i>Phenomenology</i>	arousal, elation	calm, contentment	Berscheid, Liebowitz, Tennov
<i>Evolutionary Function</i>	bring couples together long enough to foster pregnancy	keep couples together to raise young	Eibl-Eibesfeldt, Fisher, Mellen, Walsh

The Evolution of Human Sexuality and Attachment

Evolutionary theory offers an explanation of the links between sex and attachment. In order for reproductive fitness to be maximized, individuals have to survive to reproductive age, successfully mate, and then provide care and protection to their offspring so that they, too, survive to reproduce (Mellen, 1981; Trivers, 1972). Successful human mating thus involves more than fertilizing an egg. Reproduction alone is not sufficient for the survival of a species whose young have a long period of dependency. Individuals not only need to be attracted to a sexual partner but also must remain with the partner long enough to see their progeny through the most vulnerable period of development – infancy.

It is likely that in the environment in which we evolved, caring for young was physically costly for the female and greatly reduced her mobility, thus

increasing the importance of male caregiving for the survival of offspring. The natural cycle of conception, pregnancy, and weaning in non-Western human societies is approximately four years. Selection pressures, then, should have operated in such a way as to ensure that couples stay together for at least that long. Interestingly, worldwide census data show that more relationships end at the four-year mark than at any other time (Fisher, 1992). Of course, most couples remain together well beyond this point, some for reasons of love and attachment and others because the anticipated costs of breaking up are perceived to be too great (Levinger, 1976; Rusbult, 1983; Stanley & Markman, 1992). Nevertheless, the four-year point that marks the end of the natural child rearing cycle is a point at which relationships may be more vulnerable to dissolution.

Many unique features of human sexuality seem to have evolved so as to enhance the development and maintenance of emotional bonds between sexual partners. The most striking change in our reproductive physiology in comparison to other mammalian species is the loss of outward signs of estrus in the female. Mammals usually mate only during the short estrus periods of the female, whereas human sexual desire is not limited to certain seasons or reproductive cycles. Women may be sexually receptive during any phase of their reproductive cycle despite the fact that conception is possible only during a small fraction of the cycle. This physiological adaptation enables the couple to maintain a continuous tie on the basis of sexual reward (Eibl-Eibesfeldt, 1975).

The evolution of 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 13cm, compared with approximately 3 cm for the gorilla, a much larger animal in terms of overall body size. The large size of the erect human penis, in marked contrast to that of all the great apes, undoubtedly made possible a wide variety of copulatory positions (including more intimate face-to-face, mutually ventral positions) which may have served to enhance the sexual pleasure of both partners and increase the probability of female orgasm (Short, 1979). The ability of the human female to experience an orgasm comparable (at least!) to that of the male may then serve to increase the female's readiness to engage in sexual behavior and strengthen her emotional bond to her mate (Eibl-Eibesfeldt, 1975).

Just as the continuous sexual receptivity of the human female strengthens the relationship bond by enhancing sexual rewards, hidden ovulation may strengthen the relationship bond by diminishing the apparent rewards of straying. Males of many diverse species guard their mates during periods of sexual receptivity so as to ensure fertilization by their own sperm and not that of another male's. When fertilization is accomplished or the fertile period has ended, the male is likely to 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, the optimal male mating strategy may shift toward remaining with and guarding the same sexual partner for longer periods of time. This is a common strategy for humans, who employ exceptionally prolonged, culturally institutionalized mate-guarding in the form of marriage (Alcock, 1989).

To summarize, because of the demands of a greatly protracted period of infancy in humans, the maintenance of a strong bond between parents became critically important to the survival of their offspring (Mellen, 1981). Several unique features of human reproductive physiology and anatomy, especially hidden ovulation in females and large penis size in males, suggest that we may have exploited sex for this purpose (Eibl-Eisbesfeldt, 1975; Short, 1979). If this is so, sex serves more than a reproductive function in humans. Sex strengthens and maintains the emotional and psychological bond – the attachment – between two paired adults.

Conclusions

The links between sex and the emotional bond that is attachment are many and varied, and the links appear to be naturally-occurring ones with solid foundations in biology. When we compare the behaviors that typify lover and infant-caregiver dyads, the similarities are striking and also serve to set these relationships apart from other kinds of social ties. Relationships between lovers and between parents and their infants are, in a sense, the prototypes of close relationships, and both are grounded in repeated and intimate physical contacts. Additional evidence for links comes from research findings indicating that attachment experiences during infancy and childhood can have an organizing effect on adult sexual behavior and functioning.

Attachments promote healthy functioning in people of all ages, and serve to buffer individuals against the stressors of life. From an evolutionary perspective, the connections between sex and attachment are not surprising. It is highly adaptive for parents to be psychologically and emotionally bonded to each other because it helps ensure the survival of their vulnerable offspring. The attachment bond that forms between adults also makes an important contribution to their own well-being and adjustment.

We are currently investigating the role of sex in the formation and maintenance of adult attachment relationships, and the influence of individual differences on sexual behavior in relationships. Differences in attachment style have been related to individual sexual behavior (Simpson & Gangestad, 1992), but not to individual behavior within a relationship. An attachment model not only helps to predict how individual differences can

influence the nature and course of relationships but also the critical periods when relationships of all types will be more vulnerable to breakup. These predictions can be examined empirically.

Attachment theory advanced the study of infant-mother interactions because it linked the psychological processes of attachment to their underlying motivational and biological states. The field of adult relationship research has yet to explore the links between sexual attraction and behavior and the psychological processes operating within attachment relationships. This omission is surprising because sex is the definitive behavior of adult romantic relationships, and sex provides the motivation for the kind of physical contact that fosters the formation and maintenance of affectional bonds between adult lovers. It is possible that this psychological tether between mates, which serves them and their progeny so well, would not develop were it not for the strong sexual forces that motivate them to seek each other out.

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