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Attachment and pairbonding

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Relative to other primates, Homo sapiens are born immature. To survive, they require intensive provisioning and nurturance across many years. One evolved mechanism for fostering such caregiving is for parents to *pairbond* — to develop and sustain a deep emotional connection to each other — which bolsters fathers' contributions to childrearing. Such paternal investment increases the likelihood that offspring survive long enough to reproduce. On average, once a pairbond has formed, partners typically provide each other with emotional and motivational support and, ultimately, promote each other's psychological and physical health. Furthermore, they tend to exert themselves to sustain the pairbonded relationship over time, including by engaging in biased cognitive processing to derogate alternative romantic partners.

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Humans develop deep emotional attachments to mating partners. Chimpanzees and bonobos do not.

Discovering why humans pairbond — while our closest genetic relatives do not — has revealed profound insights that are challenging traditional evolutionary perspectives on the nature of human mating. In this article, we situate human pairbonding within a broad evolutionary framework that addresses why and how pairbonds evolved in the genus Homo. We discuss current theoretical perspectives on pairbonding in humans and examine the various ways that people who have built a pairbond exert themselves to maintain it. We conclude with an exhortation for an expansive evolutionary psychology of human mating, one that complements the emphasis on adaptations that help the two sexes snooker each other with an emphasis on adaptations that help them collaborate to develop loving and stable family units [1•,2••,3,4••].

The evolution of pairbonds in the genus Homo

The term *pairbond* refers to a relationship between two adult conspecifics that is characterized by affection, stability, reciprocity, and proximity seeking [5]. The archeological and anthropological records suggest that pairbonding entered the human lineage around two million years ago, around four million years after the lineage split off from those of chimpanzees and bonobos [6]. The advent of pairbonding roughly coincided with the moment at which enormous increases in brain size — and, consequently, cranium size — began to exceed the capacity limits of the birth canal. Specifically, as our ancestors became bipedal, selection pressures reengineered the pelvis in a manner that constrained the width of the birth canal. This reengineered pelvis caused problems when subsequent selection pressures favored larger brains. Evolution addressed this obstetric challenge by timing childbirth to earlier stages of organismic development, which increased infant altriciality [4••,7]. Indeed, when calibrated to norms based on other primates, human infants are born 12 months premature [8]. Consequently, during their first year of postnatal life, they are essentially 'extra-uterine fetuses' [9] — organisms that are incapable of engaging in even the most basic behavior required for survival. This evolutionary moment, which corresponded to the emergence of the Homo lineage, also witnessed two additional developments that made pairbonds especially functional: the advent of meat eating and coordinated hunting [10] and the controlled use of fire [11].

Why did pairbonds evolve in the genus Homo?

Even as our evolutionary ancestors entered the world in an increasingly altricial state, optimal postnatal development of their increasingly large and sophisticated brains required a calorie-rich and nutrient-rich diet [12]. In conjunction, these factors led to substantially longer *neoteny* — the period during which offspring survival depends upon caregiving from older conspecifics — and a greater need for intensive resource investment for offspring survival. In contrast to the young in other Great Ape species, who largely provision for themselves after weaning [13], children in forager societies do not provision as many calories as they consume until many years later — by one estimate, until they are 18 years old [14]. This prolonged dependence allows for particularly sophisticated socialization processes — the sort of brain growth required to develop the complex social and technological skills required of our group-living ancestors. Meanwhile, the interbirth interval of 3–4 years among human hunter–gatherers [15] is considerably shorter than among other Great Ape species [13], which means that human females are, relative to their closest evolutionary

relatives, especially likely to have multiple highly dependent offspring simultaneously [4••].

These factors converged to make human mothers especially dependent upon others for assistance with survival and childrearing [16], and fathers began playing a much larger role in helping their offspring survive until they were themselves able to reproduce. Indeed, several lines of evidence suggest that infant survival became increasingly linked to paternal investment [17–19]. For example, in a study of the Ache, a hunter–gatherer culture in Paraguay, child mortality by age 15 was 20% when the father lived with the child, but it was 45% when, because of divorce or death, he did not [20]. Scholars are converging on the view that the primary mechanism through which evolution increased paternal investment was a deep emotional bond between the mother and the father of young children [2••,3,4••,6,16,21–28]. This bond motivates mothers and (of particular relevance to the present discussion) fathers to develop a long-term relationship predicated on mutual love and affection, and it would have had the additional benefit of helping mothers of young children acquire high-quality food and protect their food stores against theft.

How did pairbonds evolve in the genus Homo?

The prevailing analysis for this pairbonding mechanism begins with the observation that evolution is more of a tinkering than an engineering process, scaffolding later adaptations on top of earlier adaptations rather than creating new adaptations *ex nihilo* [29,30]. It appears that, in the genus Homo, pairbonds were scaffolded on top of infant–caregiver attachment bonds [6,25,26,31,32].

Although most primate species lack pairbonds, they do exhibit infant–caregiver attachment bonds, whose emergence coincided with the emergence of the lineage that led to the apes and Old World Monkeys around 35 million years ago [33,34]. Perhaps the most famous studies of infant–caregiver attachment bonds in primates were those conducted by the American psychologist Harry F. Harlow in the mid-20th century [35], which emphasized the importance of gentle physical contact in an infant rhesus monkey's tendency to bond with its mother. Around that time, the English psychiatrist John Bowlby was studying the consequences of parental loss among orphans, which inspired him to develop attachment theory, a broad, interdisciplinary perspective on infant–caregiver attachment bonds [36]. According to attachment theory, the infant–caregiver bond served to promote offspring survival, and the strength of the bond is indexed by the extent to which the infant, first, seeks physical proximity to the caregiver; second, experiences emotional distress upon separation from the caregiver; third, experiences comfort (a haven of safety) from the caregiver when feeling distressed and fourth, uses the caregiver as a secure base from which she can explore the environment.

The evolution of pairbonds in the human lineage two million years ago was, it appears, an *exaptation* of the sorts of infant–caregiver attachment bonds that long characterized that lineage — a shift of the adaptive function of the affectional bonding system. Just as feathers that had initially evolved for birds' temperature regulation were subsequently exapted for flight, the affectional bonding system that had initially evolved to increase mothers' investments in their offspring was, two million years ago, exapted for pairbonding [6,21]. To be sure, pairbonds differ from infant–caregiver bonds in major ways, especially regarding sexual behavior and the bidirectional nature of caregiving. But they also exhibit striking parallels: both types of bonds are characterized by desire for physical proximity, intimate physical contact, and so forth [37]. It seems that new selection pressures arising two million years ago — especially those resulting from the combination of smaller birth canals and larger brains — redeployed for pairbonding purposes the emotional bonding system that had initial evolved to foster infant-caregiving bonds. Indeed, the primary self-report measure of pairbond strength [38] taps the same four functions Bowlby emphasized for the infant–caregiver bond: proximity-seeking, separation distress, safe haven, and secure base.

The development and maintenance of pairbonds

In Western cultures today, it takes about two years for a full-fledged pairbond to form — a bond in which the romantic partner is the primary person one turns to for all four of these primary attachment functions [39]. However, the process of developing a potential pairbond begins much sooner than that, sometimes in the first moments of interaction with a partner one finds romantically intriguing [40]. People experience this proto-pairbonding as a form of attachment-related anxiety regarding the potential partner — as agreement with self-report items like 'I need a lot of reassurance that this person cares about me' and 'I feel uncertain about this person's true feelings for me.' This attachment-related anxiety is linked to efforts to deepen the potential pairbond. For example, the extent to which people report such attachment-related anxiety predicts an increased likelihood of contacting the partner after interacting with him or her for 4 min at a speed-dating event [40]. Even at this early stage, and continuing as a fledgling relationship deepens over time, people are especially likely to pairbond with a partner who is successful at helping them fulfill their needs and goals [41] and who are especially attracted to them (relative to other potential partners) [42].

Most of these potential relationships fizzle out before becoming full-fledged pairbonds. But those that persist and flourish show the sorts of attachment-related features that characterize healthy infant–caregiver bonds [43]. As demonstrated by Feeney and Collins [44•], for example,

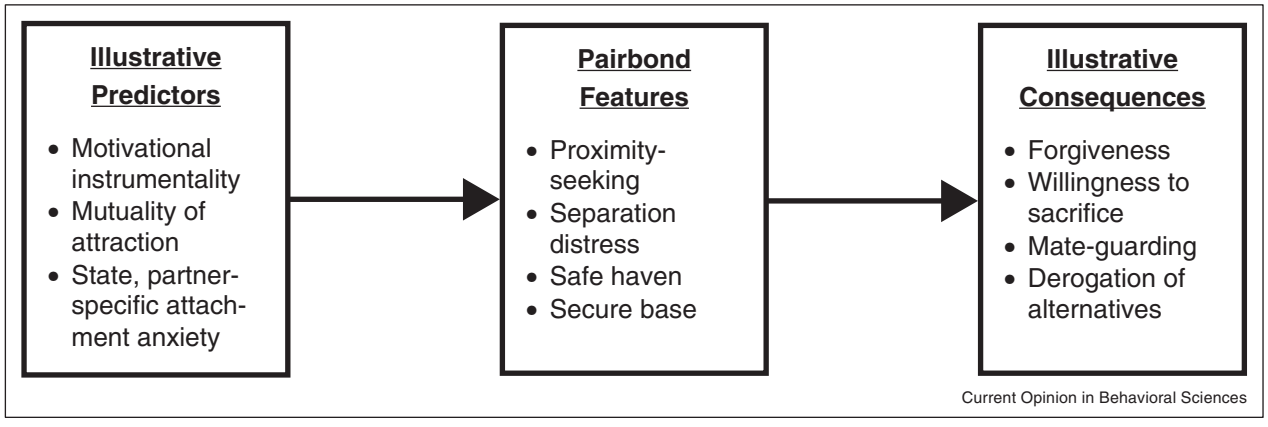
pairbonded individuals serve as robust safe havens and secure bases for each other. They help each other thrive rather than crumble when confronting adversity (safe haven), and they help each other achieve personal growth rather than stagnation in the absence of adversity (secure base). More generally, they help to regulate each other's emotion, physiology, cognition, and behavior in a manner that ultimately promotes both partners' psychological and physical health [45,46].

Once formed, these full-fledged attachment bonds tend to be resilient. Many pairbonded relationships dissolve, of course, but a remarkable feature of pairbonds is how hard people work to maintain them over time. To the extent that people feel strongly committed to their pairbonded relationship — that is, psychologically attached to it and oriented toward maintaining the relationship well into the future — they work to protect it from a torrent of potential threats. Some threats come from within the relationship. For example, highly committed people are especially likely to forgive partner transgressions [47] and to prefer that both partners make painful sacrifices to strengthen the relationship's chances of persisting for the long-term [48•]. Other threats come from outside the relationship, particularly from alternative romantic partners.

From the perspective of a pairbonded individual, the threat posed by romantic alternatives comes in two distinct forms. First, these alternatives might be romantic rivals for one's partner's affections, in which case one's efforts to protect the pairbond are called *mate guarding*. People pursue a broad range of mate guarding tactics, including derogating the romantic rival, expressing love and affection for the partner, and being vigilant for signs that the partner might be interested in the rival [49]. In addition, mate guarding effects appear to be especially strong in situations where the romantic rival poses are larger-then-typical threat [50,51]. In one study, for example, participants who were strongly concerned about threats posed by romantic rivals (but not those who were weakly concerned) were especially vigilant to physically attractive rivals when mate-guarding considerations were experimentally primed [52]. In another study, participants who are prone toward romantic jealousy (but not those who are not so prone) were especially vigilant to physically attractive rivals when infidelity was experimentally primed [53]. Whether mate-guarding tactics are successful in protecting the pairbond — rather than, say, undermining the pairbond by souring it with jealousy and conflict — is an open question [2•], but there is little doubt that these tactics are at least *intended* to protect the bond.

Second, alternatives might be romantic rivals for one's own affections, in which case one's efforts to protect the pairbond are called *derogation of alternatives* [54•]. In the seminal study investigating this process, dating partners who were highly committed to their current romantic relationship were especially likely to assess an alternative romantic partner as unappealing, but only if that partner was objectively attractive [55]. This commitment-related derogation of alternatives tends to be especially robust among people who view their relationship as an important part of their identity [56] and who are dispositionally comfortable with the sort of psychological closeness and intimacy that are fundamental to the pairbond [57]. The motivated derogation or neglect of romantic alternatives even influences basic perceptual processes. For example, relative to dating individuals who were assigned to write an essay about a time when they felt extremely happy, dating individuals who were assigned to write an essay about a time when they experienced strong feelings of love for their partner paid less visual attention to attractive (but not unattractive) alternative partners at an early, automatic stage of the perception process [58]. In addition, consistent with the idea that the pairbonding process can begin within the opening moments of interaction with

Figure 1



Summary of our discussion of proximal predictors and consequences of pairbonds.

an appealing potential partner [40], mutual romantic interest during a first interaction with a stranger causes people to pay less visual attention to attractive alternative potential partners [59]. Figure 1 summarizes our discussion of proximal predictors and consequences of pairbonds.

Conclusion

Pairbonding characterizes fewer than 5% of mammalian species [60], but it is arguably the defining feature of human mating tendencies. These pairbonds serve the ultimate evolutionary function by increasing the likelihood that one's offspring survive long enough to reproduce. More proximally, they tend to promote loving and stable family units that promote the mental and physical health of all involved. In contrast to evolutionary models that emphasize how mating partners frequently deceive each other — by, for example, sneaking off to become impregnated by a masculine man when one is fertile or to impregnate women other than one's primary partner — the present analysis emphasizes the evolutionary benefits of building and sustaining a deep emotional connection with one's mating partner.

Conflict of interest statement

Nothing declared.

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