

Human Mate Choice, Evolution of

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Abstract

Evolutionary perspectives on human mating have generated a substantial corpus of work that reveals important sex differences in mate choice and preferences. Both men and women engage in multiple mating strategies, from long-term committed relationships to short-term sexual liaisons. This article summarizes how sex-specific adaptive problems faced by our ancestors shaped men's mate choices, including preferences for cues to fertility, sexual availability, faithfulness, and numerous partners; and women's mate choices, including preferences for cues to ambition, dependability, and investment potential. We also examine how these preferences differ in long-term compared to short-term mating contexts. Understanding the evolved nature of these differences is crucial not only in expanding understanding of human mating behaviors, but also in understanding the sexual conflict that results from sex differences in mate choice.

There are robust sex differences in men's and women's preferences for a romantic partner as a result of differences in mating-related adaptive problems recurrently faced by men and women over human evolutionary history. Mate choice also differs as a function of the type of relationship men and women are seeking. Using the lens of sexual strategies theory (Buss and Schmitt, 1993), this article highlights how men's and women's mate choice preferences help them solve sex-specific and temporal-specific mating-related adaptive problems.

Mating Strategies

Humans use a complex set of mating strategies. One of these strategies is long-term mating, which typically involves heavy commitment, pair-bonding, investment by both parents in offspring, and a reported feeling of being in love (e.g., Buss, 2003; Symons, 1979; Trivers, 1972). At the other end of the mating spectrum is short-term mating, which typically involves much less commitment and investment and places a greater emphasis on sexual behavior than long-term mating (e.g., Buss and Schmitt, 1993; Buss, 2003). Men and women can both employ a combination of mating strategies; that is, they can alternate between long-term and short-term mating or use some intermediate mating strategy. They may also use a dual mating strategy of maintaining a long-term relationship while seeking extra-pair copulations (Buss and Schmitt, 1993; Gangestad and Simpson, 2000; Schmitt et al., 2001a; Schmitt, 2005).

The frequency at which men and women employ each strategy differs partly as a function of their minimum obligatory parental investment. At a minimum women must bear the costs of gestation and lactation, whereas at a minimum men need only to contribute sperm and a few moments of their time (Trivers, 1972). The greater minimum obligatory parental investment women bear should cause them to be selective in their mating habits. The high metabolic costs of gestation and lactation and the decreased survival odds for children raised by a single mother (Daly and Wilson, 1988; Geary, 2007; Hewlett, 1988; Hill and Hurtado, 1996; Hrdy, 2007) further suggest women benefit by allocating more effort to a long-term

relationship with an investing partner than to many casual relationships. Additionally, once a woman is pregnant she cannot become more pregnant by having sex with additional men, further suggesting the direct reproductive benefits to women of mating with multiple men are minimal. Alternatively, men's minimum parental obligation indicates they can be less selective in their mating habits, at least in short-term or polygynous mating contexts. Inseminating one woman does not necessarily prevent a man from inseminating additional women, suggesting the reproductive benefit to men of mating with multiple women is large (Trivers, 1972). Stated differently, for men a major constraint on their reproductive success historically has been sexual access to fertile women. Men and women historically have faced different mating-related adaptive problems as a result of these and other key differences in their reproductive biology, including internal female fertilization, lactation, and sharper age-graded fertility for women compared to men. These adaptive problems and how men and women solve them will be discussed below.

Men's Mating Strategies and Mate Choice

Short-Term Mating

As a result of men's minimum parental obligation, one effective method for men to increase their reproductive success is to increase the number of their sexual partners (Buss and Schmitt, 1993; Symons, 1979), suggesting they may benefit more from adopting a short-term mating strategy than a long-term strategy. For example, a man who already had one child could double his reproductive success by engaging in an additional short-term mateship resulting in pregnancy and successful childbirth, all else equal. Previous research suggests historically it was not the amount of times a man impregnated one woman that increased his reproductive success but instead it was the number of women he impregnated that mattered (see Betzig, 1988 for review).

Therefore one adaptive problem ancestral men would have to solve in order to increase their reproductive success would be the problem of partner number (Symons, 1979). One way to solve this would be to have sexual desire for a large number of

sexual partners. Over ancestral history those men with this desire would theoretically have had more sexual partners, increasing their reproductive success more than men who did not possess this desire, suggesting men may have evolved a preference for sexual variety (Symons, 1979). In support of this, men report wanting to have a greater number of sexual partners than women across various time periods from the next month to the rest of their lifetime (Buss and Schmitt, 1993; Schmitt et al., 2001b; 2003; Simpson and Gangestad, 1991). Men also report having sexual fantasies about a greater number of sexual partners than do women (Ellis and Symons, 1990). Additionally men can solve the adaptive problem of acquiring multiple sexual partners by relaxing their standards – lower standards increase the chances they will find a partner (Buss and Schmitt, 1993). Kenrick et al. (1990) asked men to report their minimum acceptable threshold for a sexual partner, a date, and a marriage partner. Men reported lower standards for sexual partners than for dates or marriage partners on qualities, such as intelligence (Kenrick et al., 1990). Men also report lower standards for sexual partners or one-night stands than do women (Buss and Schmitt, 1993; Greitemeyer, 2005; Kenrick et al., 1990, 1993; Li and Kenrick, 2006; Regan, 1998a,b; Schieb, 2001; Schützwohl et al., 2009). Along with lowering their standards for a sexual partner, men can increase the numbers of partners they have by decreasing the amount of time they wait to engage in sexual intercourse with a new partner (Buss and Schmitt, 1993). When asked how long they would have to know someone before having sex, men were more willing to have sex after less time elapsed than were women (Buss and Schmitt, 1993; Schmitt et al., 2001c, 2003). Sexual attraction to a partner more quickly develops in men than in women (Clark and Hatfield, 1989; Clark et al., 1999; Hald and Høgh-Olesen, 2010; Rubin et al., 1981) and men frequently misperceive women's friendliness as a signal of sexual interest (Abbey, 1982; Haselton, 2003; Haselton and Buss, 2000; Perilloux et al., in press).

Not only did ancestral men have to solve the problem of partner number, but they also needed to determine which women were available to mate with and which of those women were fertile. Those men who spent time trying to mate with women who were not sexually accessible would produce less offspring than men who selected mates who were sexually accessible. Similarly, men trying to mate with women who were unable to conceive, such as those already pregnant, lactating, prepubescent, or menopausal would have left fewer offspring than men who selected fertile partners (Symons, 1979). This suggests men have evolved mate preference mechanisms that have two primary functions: select women who are available and displaying cues to fertility (Buss and Schmitt, 1993; Singh, 1993; see Buss, 2003 for review). Men value promiscuity and devalue prudishness and sexual inexperience in potential short-term partners, suggesting a preference for sexually accessible women (Buss and Schmitt, 1993; Oliver and Sedikides, 1992; Schmitt et al., 2001a). Additionally, evidence indicates men prefer women who are younger than they are and the age gap in preferences and actual mate selections tends to increase with men's age (Buss, 1989; Buunk et al., 2001; Greenlees and McGrew, 1994; Kenrick and Keefe, 1992). Youth in women is an

indication of future reproductive potential, that is the potential for having a larger number of children in the future (Buss, 2003; Symons, 1979).

Men's psychological mechanisms recurrently used estrogen-dependent physiological cues to successfully estimate the age and hence reproductive value of prospective partners. Age-related cues include feminine facial and vocal qualities, smooth and clear skin, full lips, thick full hair, firm and symmetrical breasts, and small waists relative to the size of hips (Feinberg et al., 2006; Fink et al., 2001; Marlowe, 1998; Singh, 1993, 1995, 2002; Thornhill and Gangestad, 2008; Thornhill and Grammar, 1999). Women possessing these traits are perceived to be physically attractive, are highly desired as potential mates by men, and have high levels of estrogen and progesterone, which both increase conception likelihood (Jasienska et al., 2004; Singh, 2002; see Sugiyama, 2005 for review).

To be successful at mating with multiple partners, men also need to avoid getting entangled in a committed relationship and having to provide investment (Buss, 2003; Buss and Schmitt, 1993; Symons, 1979). Mating with a woman who required a large amount of investment or time from a man would decrease his opportunities to mate with other women. One way men can solve this problem is to prefer women who will not require a relationship or investment. Men perceive a commitment with a short-term partner as undesirable in comparison to a commitment with a long-term partner (Buss and Schmitt, 1993). Another way men can solve the problem of avoiding commitment is to experience a negative affective shift after sexual intercourse (Haselton and Buss, 2001). Men who pursue a short-term mating strategy rate first sexual encounters as better than later ones, lose interest in partners after a few days, weeks, or months, and decrease their perceptions of a partner's physical attractiveness after having sexual intercourse with her, and this perception continues to decrease further with time (Haselton and Buss, 2001). Ancestrally men who experienced a negative affective shift after sexual intercourse could more quickly detach from a potential long-term relationship than men who did not experience such a shift, providing those men with more time to acquire multiple mates.

Long-Term Mating

Although these findings suggest ancestrally men could best increase their reproductive success by employing a short-term mating strategy, men could also benefit by employing a long-term mating strategy. Seeking out multiple mates can take time and energy away from actual mating. Men can save that time and energy by staying with one long-term partner (Buss, 2003). Men who engage in short-term mating can never be certain that any offspring produced are theirs because they cannot be certain they have sole reproductive access to any of their partners. To solve this problem of paternity uncertainty, men can maintain a long-term relationship that provides them exclusive reproductive access to a woman (Alexander and Noonan, 1979; Buss and Schmitt, 1993; Thornhill and Gangestad, 2008), particularly if they employ mate guarding tactics to prevent insemination from other men (Buss, 1988a; Buss et al., 1992; Buss and Shackelford, 1997; Daly et al.,

1982; Shackelford et al., 2005a). Additionally, because high-quality women are highly desired by men, they can be choosier and demand more time and investment from men before they engage in sexual intercourse (Buss, 2003; Buss and Shackelford, 2008; Symons, 1979). By being willing to enter a long-term relationship, men may be able to obtain women of higher quality than if they attempt multiple short-term matings (Buss and Schmitt, 1993; Gangestad and Simpson, 1990; Symons, 1979; Thornhill and Gangestad, 2008). Although men might produce fewer offspring by not having multiple partners, they could still increase their reproductive success by producing high-quality offspring who would not only be likely to survive but who eventually would be highly sought after as mates. Additionally, regardless of offspring quality, the survival rate of offspring is increased when investment is provided by both parents (Daly and Wilson, 1988; Geary, 2007; Hewlett, 1988; Hill and Hurtado, 1996; Hrdy, 2007).

Evidence shows that men do engage in long-term mating. When asked how much they are currently seeking a long-term mate, men do not differ from women in their desire to find a long-term mate (Buss and Schmitt, 1993; but see Schmitt et al., 2001b for sex difference). Men place a greater emphasis on faithfulness and chastity in a long-term mate than in a short-term mate (Buss, 1989; Buss and Barnes, 1986; Buss and Schmitt, 1993; Buss et al., 2001). Furthermore, men view promiscuous behavior in potential long-term mates as undesirable (Buss and Schmitt, 1993). A preference for long-term mates possessing these traits helped ancestral men solve the adaptive problem of paternity uncertainty because faithful and chaste women would be less likely to be promiscuous (see Buss, 2003 for review).

Ancestrally, attempting to solely pursue short-term mating would have been a high-risk strategy for men. Given that highly desirable women can successfully demand large investment (Buss and Shackelford, 2008), and that women in general prefer long-term relationships (see below), men who attempted to only engage in short-term mating risked being shut out of the mating game entirely (Buss and Schmitt, 1993; Buss, 2003; Schmitt, 2005). It is more likely ancestral men pursued some combination of serial long-term relationships with occasional opportunistic short-term mating or extra-pair copulations, especially those men high enough in status or with enough resources to cross the polygyny threshold (Andersson, 1994; Daly and Wilson, 1983; Gangestad, 1993; Marlowe, 2000; Schmitt, 2005). This has changed drastically in the modern first-world environment – the anonymity of modern society makes it easier for men to deceive women into brief casual sexual liaisons at low costs to the men (Carroll et al., 1985; Garcia and Reiber, 2008; Paul and Hayes, 2002; Paul et al., 2000; Reiber and Garcia, 2010; Uecker and Regnerus, 2010). This is because the modern environment parasitizes men's evolved mating mechanisms, which gives the impression adopting a short-term mating strategy is universally the most beneficial mating strategy for men (see Jonason et al., 2009 as an example of this fallacy). However, men are not equally successful at short-term mating. Men possessing characteristics deemed highly valuable to women seeking short-term mates (see below) are considerably more successful than men who do

not possess those characteristics (Jackson and Kirkpatrick, 2007; Landolt et al., 1995; Li and Kenrick, 2006). These findings indicate that men can rely on a suite of mating strategies to increase their reproductive success, and that men's mate preferences shift as a function of the type of strategy currently being executed.

Of course, these mating strategies are all enacted within different cultural contexts that sometimes constrain and sometimes enable one mating strategy over another (e.g., Gangestad et al., 2006). In cultures that cloister, veil, or guard women, for example, opportunities for short-term mating are severely restricted. In more sexually permissive cultures and in large cities that offer greater anonymity, short-term mating strategies are easier to implement.

Women's Mating Strategies and Mate Choice

Long-Term Mating

Women have a greater minimum obligatory parental investment than men, making them more selective in their mating decisions (Trivers, 1972). In traditional societies, which best resemble those of our ancestors, women spend much of their adult life either pregnant or lactating, and therefore are limited in the number of offspring they can produce (Sugiyama, 2005). Ancestrally, the most effective way for most women to increase their reproductive success was to heavily invest in each offspring produced to insure offspring lived until reproductive age. Paternal investment would have increased the likelihood of offspring survival and future success on the mating market (Geary, 2007; Hewlett, 1988; Hill and Hurtado, 1996; Hrdy, 2007). Therefore, ancestral women who were better at selecting and obtaining mates who were willing and able to invest in their offspring were more likely to leave surviving offspring than women who did not select, or could not obtain, investing partners (Buss, 1989, 2003; Buss and Schmitt, 1993; Schmitt, 2005; Symons, 1979).

Women's mating mechanisms, therefore, must solve the adaptive problem of determining investment ability in potential partners. Ancestrally, women could have ascertained this by a man's potential for accruing resources, which in the modern environment equates with monetary resources (Symons, 1979; Buss, 2003). Ancestral men with the ability to accrue resources were better able to provide tangible investment, such as shelter and food, than could men who lacked this ability. Women who selected men who could accrue resources as partners would have produced more offspring who survived than women who chose other men. In modern environments, women consistently rate qualities synonymous with economic resources, such as good earning capacity, wealth, good financial prospects, and a reliable future career, as more important for a potential long-term mate to possess than do men (e.g., Bereczkei et al., 1997; Buss, 1989; Buss and Barnes, 1986; Buss and Schmitt, 1993; Buss et al., 2001; Greenlees and McGrew, 1994; Kenrick et al., 1993, 1990; Pawlowski and Dunbar, 1999; Sprecher et al., 1994; Waynforth and Dunbar, 1995). Ambition is correlated with the drive and ability to acquire resources, and women prefer long-term partners who are ambitious (e.g., Buss, 1989; Buss and Barnes, 1986; Buss et al., 2001; Kenrick et al., 1993, 1990) and will even prefer

ambitious yet physically unattractive men to nonambitious yet physically attractive men (Sriharan et al., 2010; Townsend and Wasserman, 1998; Wilbur and Campbell, 2010). Another way women can determine a man's potential to acquire economic resources is to evaluate his social status. Men with higher social status tend to accrue greater resources than do men with lower social status. Women prefer long-term mates with high social status (e.g., Buss, 1989; Kenrick et al., 1993, 1990; Li et al., 2002; Rajeci et al., 1991; Townsend and Levy, 1990 a,b). Additionally, women tend to rate men low in these qualities as undesirable as a long-term mate (Buss and Schmitt, 1993).

Just determining a man's investment ability would not have been enough for ancestral women to insure offspring survivability. They also had to solve the adaptive problem of determining if the man would be willing to invest his resources and time specifically in her and any potential offspring. It would not help offspring survival if a man had plentiful resources but spread them among many women or diverted them to another woman's offspring (Buss et al., 1992; Symons, 1979). One marker of this willingness is a man's commitment to the relationship, which can be determined by cues of fidelity and love (Buss, 2003). In one study, women rated acts of resource display, such as 'surprised her with a gift' and 'bought a special present for her' as indicative of a man being in love. Also rated highly were acts indicative of fidelity, such as 'remained faithful when they were separated for more than a month' and 'gave up going out with other women for her' (Buss, 1988b). Similarly men interested in keeping a mate frequently use resource display and commitment-increase retention tactics (Buss, 1988a; Buss and Shackelford, 1997; Shackelford et al., 2005). These behaviors indicate a man is willing to commit his resources and time to one woman and their joint offspring, increasing the chances offspring will receive necessary investment to survive.

The odds that offspring would have survived ancestrally also could have been increased by selecting long-term mates who provided not just resources, but who also displayed characteristics indicative of being a good parent and being willing to help raise offspring. Offspring raised by both biological parents have an increased likelihood of surviving than do offspring raised by one parent (Daly and Wilson, 1988; Geary, 2007; Hewlett, 1988; Hill and Hurtado, 1996; Hrdy, 2007). Cues indicating potential good parenting skills include dependability and emotional stability, kindness and sincerity, and similar personalities, interests and backgrounds (see Buss, 2003 for review). Women consistently rate these characteristics as important for potential long-term mates to possess. Kindness, dependability, and emotional stability often rank at the top of women's list of required preferences for a long-term partner (Buss, 1989; Buss and Barnes, 1986; Buss et al., 2001; Evans and Brase, 2007; Fletcher et al., 2004; Kenrick et al., 1993, 1990; Li et al., 2002; Regan, 1988a; Scheib, 2001). Women can assess a man's ability to be a good parent by observing his interactions with children. Interacting with children increases women's perceptions of a man's attractiveness in comparison to perceptions of his attractiveness when he is alone (Brase, 2006; La Cerra, 1995). Additionally, women appear to be able to detect men's interest in infants simply by viewing images of men's faces.

Women rate men expressing greater interest in infants as more attractive potential long-term mates than men who do not show such interest (Roney et al., 2006). Women whose psychological mechanisms led them to select men possessing these traits and with an interest in children would have had more help raising offspring, increasing offspring survivability, and ultimately the women's own reproductive success, than would women whose psychological mechanisms led them to select other men as partners. Although long-term mating is extremely beneficial to women, there are contexts in which women can also benefit from engaging in short-term mating.

Short-Term Mating

Pregnancy and lactation require large amounts of investment and resources but parental investment can have diminishing returns (Cashdan, 1993; Low, 1990). Therefore if women can obtain their own resources, they do not necessarily stand to benefit from obtaining *more* resources from a potential mate. Ancestrally women may have obtained their own resources through their family and could therefore afford to trade-off requiring investment from potential partners for other noninvestment qualities (Gangestad, 1993). In these cases, women would actually benefit by shifting toward a more short-term mating strategy (Gangestad and Simpson, 2000) because men of high presumptive genetic quality often choose to focus more effort on short-term mateships rather than long-term mateships (Apicella and Marlowe, 2007; Buss, 2003; Marlowe, 1999; in birds: Møller and Thornhill, 1998; Rhodes et al., 2005; Schmitt, 2005; Thornhill and Gangestad, 2008). Ancestrally women could have also obtained resources by having a long-term committed partner. When this occurred, women may have chosen to risk the certain investment from their long-term partner by engaging in extra-pair copulations with men of high presumptive genetic quality (Buss, 2003; Gangestad and Simpson, 2000; Greiling and Buss, 2000; Thornhill and Gangestad, 2008). What this suggests is women may have evolved adaptations for employing either a short-term mating strategy or a dual mating strategy, but these adaptations evolved to solve different mating-related adaptive problems than did men's (Buss, 2003; Buss and Schmitt, 1993; Gangestad and Simpson, 2000; Greiling and Buss, 2000; Schmitt et al., 2001a; Schmitt, 2005; Thornhill and Gangestad, 2008).

Unlike for men, there is no direct or linear increase to a woman's reproductive success by having sexual intercourse with multiple partners. Instead, women can increase their reproductive success, in principle, by having sexual intercourse with men possessing 'good genes' (e.g., Gangestad and Simpson, 2000; Greiling and Buss, 2000; Simpson and Gangestad, 1991; Thornhill and Gangestad, 2008; Trivers, 1972). Good genes are currently thought to be those indicative of good health and increased chances of survivability (see Andersson, 1994 for review). Mating with a man possessing good genes therefore increases chances for offspring survival. Additionally, because women who employ a short-term mating strategy tend to prefer men who advertise their good genes, mating with a man who possesses good genes should increase the chances a woman's male offspring will be able to find a mate and produce offspring, thereby increasing her

reproductive success ('sexy sons' hypothesis; Buss, 2003; Fisher, 1930; Kokko et al., 2002; Smith, 1984; Thornhill and Gangestad, 2008).

If women recurrently engaged in short-term mating to obtain partners with 'good genes,' then their psychological mechanisms should have evolved to solve the adaptive problem of detecting genetic quality of potential partners (Thornhill and Gangestad, 2008). Ancestral women who selected partners with good genetic quality would have been more likely to produce offspring with increased survival odds than women who selected partners with decreased genetic quality.

Women obviously cannot detect underlying genetic quality in a potential mate, but instead can use statistically correlated phenotypic markers of good genes. One such set of phenotypic markers are those indicating masculinity (Frederick and Haselton, 2007; Penton-Voak et al., 1999; Thornhill and Gangestad, 1993, 1999). Masculinity is positively correlated with body symmetry, and a high degree of body symmetry indicates low amounts of developmental instability. Developmental instability is a measure of ability to overcome exposure to prenatal pathogens and mutations. Therefore, men with low levels of developmental instability can be considered to have higher fitness and better genes than men with greater amounts of developmental instability (Gangestad and Simpson, 2000; Gangestad and Thornhill, 1997; Gangestad et al., 1994; Thornhill and Gangestad, 1999, 2008). Women interested in short-term mating rate men displaying characteristics perceived as masculine as more attractive than those appearing more feminine (Gangestad, 1993; Johnston et al., 2001; Penton-Voak et al., 2003, 1999) and prefer to short-term mate with men considered attractive (Buss and Schmitt, 1993; Greiling and Buss, 2000; Kenrick et al., 1993; Li and Kenrick, 2006; Rhodes et al., 2005; Simpson and Gangestad, 1992; Wiederman and Dubois, 1998; Wilbur and Campbell, 2010). These findings suggest women have evolved psychological mechanisms functioning to select short-term partners with high genetic quality.

Women may not engage in short-term mating solely to obtain good genes for their offspring. Instead, given the great importance of long-term relationships to women, they may engage in short-term mating to assess a man as a potential long-term partner (Buss and Schmitt, 1993; Buss, 2003; Greiling and Buss, 2000; Shackelford et al., 2004). Choosing a poor long-term partner would have been extremely costly to ancestral women, especially in exogamous societies, which would have left women without physically close familial support (Buss, 2003; Buss and Schmitt, 1993). Women who used short-term mating to assess potential partners for long-term relationships, and were able to correctly determine which ones would make a good long-term partner, would have had greater reproductive success than those women who could not make such determinations (Buss, 2003; Buss and Schmitt, 1993). Women should, therefore, have evolved psychological mechanisms to solve the adaptive problem of partner assessment.

Women can solve the problem of partner assessment by selecting short-term partners with similar characteristics to highly preferred long-term partners (Buss and Schmitt, 1993). When considering potential short-term partners, women

consider a man's financial resources and generosity important (Wiederman and Dubois, 1998) – two traits women seeking long-term partners also consider important (Buss, 1989; Buss and Barnes, 1986; Buss et al., 2001; Kenrick et al., 1993, 1990; Li et al., 2002; Scheib, 2001). In general, women's preferences for potential short-term partners are as stringent as their preferences for a long-term mate, suggesting they may use short-term mating as an assessment strategy (Buss and Schmitt, 1993; Li and Kenrick, 2006; Kenrick et al., 1993, 1990; Regan, 1998a,b; Shackelford et al., 2004; Sprecher and Regan, 2002; Surbey and Conohan, 2000). The assessment problem can also be solved by specifically decreasing preferences for traits in short-term partners that are detrimental to quality if present in a long-term partner. For example, women should not want a promiscuous long-term partner due to the risk of costly investment loss, and if using short-term mating as an assessment tool, should also express a decreased interest in promiscuous men as short-term partners (Buss, 2003; Buss and Schmitt, 1993; Schmitt et al., 2001b). Women seeking a short-term partner rate promiscuity as undesirable in their potential mates (Buss and Schmitt, 1993; Schmitt et al., 2001b; Wiederman and Dubois, 1998). Additionally if women use short-term mating as an assessment strategy for a long-term relationship, they should experience an affective shift after having sexual intercourse with men who would be good long-term partners to promote the formation of a long-term pair bond (Haselton and Buss, 2001). These findings suggest women do engage in short-term mating to assess men as potential long-term partners, although men too might use short-term mating to gauge long-term quality.

Women may also engage in short-term mating to acquire immediate resources instead of the promise of future resource investment they seek in long-term partners. Ancestral women may have needed immediate resources, such as scarce game meat to help provision offspring, and could have acquired such highly valued resources by exchanging them for sex (Buss, 2003). For example, better hunters in the Aché (a traditional hunter-gatherer society) have more mistresses and those mistresses report having more illegitimate children by the more skilled hunters (Hill and Hurtado, 1996; Hill and Kaplan, 1988). If acquiring resources sooner rather than later helped women survive or produce more viable offspring, then women should have evolved psychological mechanisms for preferring as short-term partners men who are willing to provide immediate resources (Buss, 2003; Buss and Schmitt, 1993; Symons, 1979). Buss and Schmitt (1993) asked women to rate four behaviors related to early resource provisioning: 'spends a lot of money on me early on,' 'gives me gifts early on,' 'has an extravagant lifestyle,' and 'stingy early on.' Women valued the first three behaviors for potential short-term partners more than for long-term partners, but devalued the last behavior for potential short-term partners (Buss and Schmitt, 1993). Other research has corroborated these findings – when seeking a short-term partner women place a premium on immediate resource investment (Bereczkei et al., 1997; Fletcher et al., 2004; Kenrick et al., 1990, 1993; Regan, 1998 a,b; Townsend and Levy, 1990a,b). The strong demonstrated preference women seeking short-term partners have for immediate investment

suggests women do use short-term mating as an opportunity to obtain immediate material benefits for themselves or any current offspring.

Although long-term mating is often a more beneficial strategy to women's reproductive success than short-term mating, evidence suggests women do at times engage in short-term mating. Statistically speaking, every time a man has sex with a new partner, a woman is also having sex with a new partner. This suggests the mean number of sex partners for men and women must be identical, assuming an equal sex ratio in the mating pool (Buss, 2003; Greiling and Buss, 2000). Similarly, men's strong desire for sexual variety could not have evolved if ancestral men never obtained access to multiple sexual partners (Schmitt et al., 2001b; Schmitt et al., 2001c; Schmitt et al., 2003; Smith, 1984), suggesting that at least some ancestral women were willing to engage in brief sexual encounters with multiple men. In recent studies on hook-up behavior, between 50 and 75% of college women report engaging in at least one casual sexual encounter within the last year, and these numbers closely parallel college men's reports of their own casual sex behavior (Garcia and Reiber, 2008; Grello et al., 2006; Paul and Hayes, 2002; Paul et al., 2000; Reiber and Garcia, 2010; Uecker and Regnerus, 2010).

Additional support for women having an evolved short-term mating psychology comes from men's physiology. As a function of the risk of sperm competition, species' testes size is correlated with the species' specific mating strategies. Sperm competition occurs when the sperm of two or more males occupy a female's reproductive tract simultaneously (Baker and Bellis, 1993 a,b; Parker, 1970; Smith, 1984). More monogamous primate species face less risk of sperm competition and therefore have smaller testes relative to body size than do polygamous primate species. For example, male gorillas have sole reproductive access to a harem of female gorillas and their testes size is less than 0.1% of their total body weight, whereas male chimpanzees compete for access to fertile females and their testes are about 0.3% of their weight. Human male testes size falls in the middle of these two species, suggesting humans are not entirely monogamous such as the gorillas, or entirely promiscuous such as the chimpanzees (see Pound et al., 2006; Shackelford et al., 2005b, c for review). If human females did not engage in short-term mating, there would be no selection pressure on males' physiology to cope with the threat of sperm competition, and human testes would be proportionally similar to the testes of gorillas. However, because human testes are not proportionally similar to gorilla testes, it is reasonable to infer that across evolutionary history, human males did have to solve the adaptive problem of sperm competition some of the time, providing evidence for females occasionally employing some form of a short-term mating strategy. As with men, it is clear women rely on a suite of strategies and their mate preferences shift accordingly to match the current strategy being executed.

Conclusion

As a result of differences in minimum obligatory parental investment, men and women differ in how they can best

increase their reproductive success. When possible, men's reproductive success historically was best be increased through low-cost opportunistic mating or polygynous mating, whereas women's reproductive success is best increased through high-quality long-term investment mating. Although men and women both employ a variety of mating strategies, their preferences when pursuing these strategies fundamentally differ. One consequence of these sex differences is sexual conflict, jealousy, sexual aggression, sexual harassment, and rape are often products of differences in men's and women's mate preferences and desires. Understanding the evolved nature of men's and women's mate choice contributes to our understanding of these darker elements of human mating in addition to our broader understanding of mating psychology.

See also: Fertility Theory: Embodied-Capital Theory of Life History Evolution; Marriage Systems, Evolution of; Sociobiology: Overview.

Bibliography

- Abbey, A., 1982. Sex differences in attributions for friendly behavior: do males misperceive females' friendliness? *Journal of Personality and Social Psychology* 32, 830–838.
- Alexander, R.D., Noonan, K.M., 1979. Concealment of ovulation, parental care, and human social evolution. In: Chagnon, N.A., Irons, W. (Eds.), *Evolutionary Biology and Human Social Behavior: An Anthropological Perspective*. Duxbury Press, North Scituate, MA, pp. 402–435.
- Andersson, M., 1994. *Sexual Selection*. Princeton University Press, Princeton, NJ.
- Apicella, C.L., Marlowe, F.W., 2007. Men's reproductive investment decisions: mating, parenting, and self-perceived mate value. *Human Nature* 18, 22–34.
- Baker, R.R., Bellis, M.A., 1993a. Human sperm competition: ejaculate adjustment by males and the function of masturbation. *Animal Behaviour* 46, 861–885.
- Baker, R.R., Bellis, M.A., 1993b. Human sperm competition: ejaculate manipulation by females and a function for the female orgasm. *Animal Behaviour* 46, 887–909.
- Bereczkei, T., Voros, S., Gal, A., Bernath, L., 1997. Resources, attractiveness, family commitment: reproductive decisions in human mate choice. *Ethology* 103, 681–699.
- Betzig, L., 1988. Mating and parenting in Darwinian perspective. In: Betzig, L., Borgerhoff-Mulder, M., Turke, P. (Eds.), *Human Reproductive Behavior: A Darwinian Perspective*. Cambridge University Press, Cambridge, pp. 3–20.
- Brase, G.L., 2006. Cues of parental investment as a factor in attractiveness. *Evolution and Human Behavior* 27, 145–157.
- Buss, D.M., 1988a. From vigilance to violence: tactics of mate retention in American undergraduates. *Ethology & Sociobiology* 9, 291–317.
- Buss, D.M., 1988b. Love acts: the evolutionary biology of love. In: Sternberg, R.J., Barnes, M.L. (Eds.), *The Psychology of Love*. Yale University Press, New Haven, CT, pp. 100–118.
- Buss, D.M., 1989. Sex differences in human mate preferences: evolutionary hypotheses testing in 37 cultures. *Behavioral and Brain Sciences* 12, 1–49.
- Buss, D.M., 2003. *The Evolution of Desire: Strategies of Human Mating*, rev. ed. Free Press, New York.
- Buss, D.M., Barnes, M.F., 1986. Preferences in human mate selection. *Journal of Personality and Social Psychology* 50, 559–570.
- Buss, D.M., Larsen, R.J., Westen, D., Semmelroth, J., 1992. Sex differences in jealousy: evolution, physiology, and psychology. *Psychological Science* 3, 251–255.
- Buss, D.M., Schmitt, D.P., 1993. Sexual strategies theory: an evolutionary perspective on human mating. *Psychological Review* 100, 204–232.
- Buss, D.M., Shackelford, T.K., 1997. From vigilance to violence: mate retention tactics in married couples. *Journal of Personality and Social Psychology* 72, 346–361.
- Buss, D.M., Shackelford, T.K., 2008. Attractive women want it all: good genes, economic investment, parenting proclivities, and emotional commitment. *Evolutionary Psychology* 6, 134–146.
- Buss, D.M., Shackelford, T.K., Kirkpatrick, L.A., Larsen, R.J., 2001. A half century of American mate preferences: the cultural evolution of values. *Journal of Marriage and the Family* 63, 491–503.

- Buunk, B.P., Dijkstra, P., Kenrick, D.T., Warntjes, A., 2001. Age preferences for mates related to gender, own age, and involvement level. *Evolution and Human Behavior* 22, 241–250.
- Carroll, J.L., Volk, K.D., Hyde, J.S., 1985. Differences between males and females in motives for engaging in sexual intercourse. *Archives of Sexual Behavior* 14, 131–139.
- Cashdan, E., 1993. Attracting males: effects of parental investment on mate attraction strategies. *Ethology and Sociobiology* 14, 1–24.
- Clark, R.D., Hatfield, E., 1989. Gender differences in receptivity to sexual offers. *Journal of Psychology and Human Sexuality* 2, 39–55.
- Clark, C.L., Shaver, P.R., Abrahams, M.F., 1999. Strategic behaviors in romantic relationship initiation. *Personality and Social Psychology Bulletin* 25, 707–720.
- Daly, M., Wilson, M., 1983. *Sex, Evolution, and Behavior*, second ed. Willard Grant Press, Boston, MA.
- Daly, M., Wilson, M., 1988. Homicide. *Aldine de Gruyter*, Hawthorne, NY.
- Daly, M., Wilson, M., Weghorst, S.J., 1982. Male sexual jealousy. *Ethology and Sociobiology* 3, 11–27.
- Ellis, B.J., Symons, D., 1990. Sex differences in sexual fantasy: an evolutionary psychological approach. *The Journal of Sex Research* 27, 527–555.
- Evans, K., Brase, G.L., 2007. Assessing sex differences and similarities in mate preferences: above and beyond demand characteristics. *Journal of Social and Personal Relationships* 24, 781–791.
- Feinberg, D.R., Jones, B.C., Law Smith, M.J., Moore, F.R., DeBruine, L.M., Cornwell, R.E., et al., 2006. Menstrual cycle, trait estrogen level, and masculinity preferences in the human voice. *Hormones and Behavior* 49, 215–222.
- Fletcher, G.J.O., Tither, J.M., O'Loughlin, C., Friesen, M., Overall, N., 2004. Warm and homely or cold and beautiful? Sex differences in trading off traits in mate selection. *Personality and Social Psychology Bulletin* 30, 659–672.
- Fink, B., Grammer, K., Thornhill, R., 2001. Human (*Homo sapiens*) facial attractiveness in relation to skin texture and color. *Journal of Comparative Psychology* 115, 92–99.
- Fisher, R.A., 1930. *The Genetical Theory of Natural Selection*, third ed. Oxford University Press, USA, New York.
- Frederick, D.A., Haselton, M.G., 2007. Why is muscularity sexy? Tests of the fitness indicator hypothesis. *Personality and Social Psychology Bulletin* 33, 1167–1183.
- Gangestad, S.W., 1993. Sexual selection and physical attractiveness: Implication for mating dynamics. *Human Nature* 4, 205–236.
- Gangestad, S.W., Haselton, M.G., Buss, D.M., 2006. Evolutionary foundations of cultural variation: evoked culture and mate preferences. *Psychological Inquiry* 17, 75–95.
- Gangestad, S.W., Simpson, J.A., 1990. Toward an evolutionary history of female sociosexual variation. *Journal of Personality* 58, 69–96.
- Gangestad, S.W., Simpson, J.A., 2000. The evolution of human mating: the role of trade-offs and strategic pluralism. *Behavioral and Brain Sciences* 23, 675–687.
- Gangestad, S.W., Thornhill, R., 1997. The evolutionary psychology of extra-pair sex: the role of fluctuating asymmetry. *Evolution and Human Behavior* 18, 69–88.
- Gangestad, S.W., Thornhill, R., Yeo, R., 1994. Facial attractiveness, developmental stability, and fluctuating asymmetry. *Ethology and Sociobiology* 15, 73–85.
- Garcia, J.R., Reiber, C., 2008. Hook-up behavior: a biopsychosocial perspective. *Journal of Social, Evolutionary, and Cultural Psychology* 2, 192–208.
- Geary, D.C., 2007. Evolution of fatherhood. In: Salmon, C.A., Shackelford, T.K. (Eds.), *Family Relationships: An Evolutionary Perspective*. Oxford University Press, USA, New York, pp. 115–144.
- Greenlees, I.A., McGrew, W.C., 1994. Sex and age differences in preferences and tactics of mate attraction: analysis of published advertisements. *Ethology and Sociobiology* 15, 59–72.
- Greiling, H., Buss, D.M., 2000. Women's sexual strategies: the hidden dimension of short-term mating. *Personality and Individual Differences* 28, 929–963.
- Grello, C.M., Welsh, D.P., Harper, M.S., 2006. No strings attached: the nature of casual sex in college students. *The Journal of Sex Research* 43, 255–267.
- Greitemeyer, T., 2005. Receptivity to sexual offers as a function of sex, socioeconomic status, physical attractiveness, and intimacy of the offer. *Personal Relationships* 12, 373–386.
- Hald, G.M., Høgh-Olesen, H., 2010. Receptivity to sexual invitations from strangers of the opposite sex. *Evolution and Human Behavior* 31, 453–458.
- Haselton, M.G., 2003. The sexual overperception bias: evidence of a systematic bias in men from a survey of naturally occurring events. *Journal of Research in Personality* 37, 34–47.
- Haselton, M.G., Buss, D.M., 2000. Error management theory: a new perspective on biases in cross-sex mind reading. *Journal of Personality and Social Psychology* 78, 81–91.
- Haselton, M.G., Buss, D.M., 2001. The affective shift hypothesis: the functions of emotional changes following sexual intercourse. *Personal Relationships* 8, 357–369.
- Hewlett, B.S., 1988. Sexual selection and paternal investment among Aka pygmies. In: Betzig, L., Borgerhoff-Mulder, M., Turke, P. (Eds.), *Human Reproductive Behavior: A Darwinian Perspective*. Cambridge University Press, Cambridge, pp. 263–276.
- Hill, K., Hurtado, A., 1996. *Ache Life History: The Ecology and Demography of a Foraging People*. Aldine de Gruyter, Hawthorne, NY.
- Hill, K., Kaplan, H., 1988. Tradeoffs in male and female reproductive strategies among the ache: Part 1. In: Betzig, L., Borgerhoff-Mulder, M., Turke, P. (Eds.), *Human Reproductive Behavior: A Darwinian Perspective*. Cambridge University Press, Cambridge, pp. 277–289.
- Hrdy, S.B., 2007. Evolutionary context of human development: the cooperative breeding model. In: Salmon, C.A., Shackelford, T.K. (Eds.), *Family Relationships: An Evolutionary Perspective*. Oxford University Press, USA, New York, pp. 39–68.
- Jackson, J.J., Kirkpatrick, L.A., 2007. The structure and measurement of human mating strategies: toward a multidimensional model of sociosexuality. *Evolution and Human Behavior* 28, 382–391.
- Jasienska, G., Ziomkiewicz, A., Ellison, P.T., Lipson, S.F., Thune, I., 2004. Large breasts and narrow waists indicate high reproductive potential in women. *Proceedings of the Royal Society of London B* 271, 1213–1217.
- Johnston, V.S., Hagel, R., Franklin, M., Fink, B., Grammer, K., 2001. Male facial attractiveness: evidence for hormone-mediated adaptive design. *Evolution and Human Behavior* 22, 251–267.
- Jonason, P.K., Li, N.P., Cason, M.J., 2009. The "booty call": a compromise between men's and women's ideal mating strategies. *Journal of Sex Research* 46, 1–11.
- Kenrick, D.T., Groth, G.E., Trost, M.R., Sadalla, E.K., 1993. Integrating evolutionary and social exchange perspectives on relationships: effects of gender, self-appraisal, and involvement level on mate selection criteria. *Journal of Personality and Social Psychology* 64, 951–969.
- Kenrick, D.T., Keefe, R.C., 1992. Age preferences in mates reflect sex differences in reproductive strategies. *Behavioral and Brain Sciences* 15, 75–133.
- Kenrick, D.T., Sadalla, E.K., Groth, G.E., Trost, M.R., 1990. Evolution, traits, and the stages of human courtship: qualifying the parental investment model. *Journal of Personality* 58, 97–116.
- Kokko, H., Brooks, R., McNamara, J.M., Houston, A.I., 2002. The sexual selection continuum. *Proceedings of the Royal Society of London B* 269, 1331–1340.
- La Cerra, M.M. (1995). Evolved mate preferences in women: Psychological adaptations for assessing a man's willingness to invest in offspring (Doctoral dissertation). University of California, Santa Barbara (Dissertation Abstracts International: Section B: the Sciences & Engineering March 1995, vol. 55 (9-B), p. 4149).
- Landolt, M., Lalumière, M., Quinsey, V., 1995. Sex differences in intra-sex variations in human mating tactics: an evolutionary approach. *Ethology and Sociobiology* 16, 3–23.
- Li, N.P., Bailey, J.M., Kenrick, D.T., Linsenmeier, J.A.W., 2002. The necessities and luxuries of mate preferences: testing the tradeoffs. *Journal of Personality and Social Psychology* 82, 947–955.
- Li, N.P., Kenrick, D.T., 2006. Sex similarities and differences in preferences for short-term mates: what, whether, and why. *Journal of Personality and Social Psychology* 90, 468–489.
- Low, B.S., 1990. Sex, power and resources: male and female strategies of resource acquisition. *International Journal of Contemporary Sociology* 27, 49–73.
- Marlowe, F., 1998. The nubility hypothesis: the human breast as an honest signal of residual reproductive value. *Human Nature* 9, 263–271.
- Marlowe, F., 1999. Male care and mating effort among Hadza foragers. *Behavioral Ecology and Sociobiology* 46, 57–64.
- Marlowe, F., 2000. Paternal investment and the human mating system. *Behavioural Processes* 51, 45–61.
- Moller, A.P., Thornhill, R., 1998. Male parental care, differential parental investment by females, and sexual selection. *Animal Behaviour* 55, 1507–1515.
- Oliver, M.B., Sedikides, C., 1992. Effects of sexual permissiveness on desirability of partner as a function of low and high commitment to relationship. *Social Psychology Quarterly* 55, 321–333.
- Parker, G.A., 1970. Sperm competition and its evolutionary consequences in the insects. *Biological Reviews* 45, 525–567.
- Paul, E.L., Hayes, K.A., 2002. The casualties of 'casual' sex: a qualitative exploration of the phenomenology of college students' hookups. *Journal of Social and Personal Relationships* 19, 639–661.
- Paul, E.L., McManus, B., Hayes, K.A., 2000. "Hookups": characteristics and correlates of college students' spontaneous and anonymous sexual experiences. *The Journal of Sex Research* 37, 76–88.
- Pawlowski, B., Dunbar, R.I., 1999. Impact of market value on human mate choice decisions. *Proceedings of the Royal Society of London B* 266, 281–285.

- Penton-Voak, I.S., Little, A.C., Jones, B.C., Burt, D.M., Tiddeman, B.P., Perrett, D.I., 2003. Female condition influences preferences for sexual dimorphism in faces of male humans (*Homo sapiens*). *Journal of Comparative Psychology* 117, 264–271.
- Penton-Voak, I.S., Perrett, D.I., Castles, D.L., Kobayashi, T., Burt, D.M., Murray, L., et al., 1999. Menstrual cycle alters face preference. *Nature* 399, 741–742.
- Perilloux, C., Easton, J.A., Buss, D.M. The misperception of sexual interest: Who misperceives and who is misperceived? *Psychological Science*, in press.
- Pound, N., Shackelford, T.K., Goetz, A.T., 2006. Sperm competition in humans. In: Shackelford, T.K., Pound, N. (Eds.), *Sperm Competition in Humans: Classic and Contemporary Readings*. Springer, New York, pp. 3–31.
- Rajecki, D.W., Bledsoe, S.B., Rasmussen, J.L., 1991. Successful personal ads: gender differences and similarities in offers, stipulations, and outcomes. *Basic and Applied Social Psychology* 12, 457–469.
- Regan, P.C., 1998a. Minimum mate selection standards as a function of perceived mate value, relationship context, and gender. *Journal of Psychology and Human Sexuality* 10, 53–73.
- Regan, P.C., 1998b. What if you can't get what you want? Willingness to compromise ideal mate selection standards as a function of sex, mate value, and relationship context. *Personality and Social Psychology Bulletin* 24, 1294–1303.
- Reiber, C., Garcia, J.R., 2010. Hooking up: gender differences, evolution, and pluralistic ignorance. *Evolutionary Psychology* 8, 390–404.
- Rhodes, G., Simmons, L.W., Peters, M., 2005. Attractiveness and sexual behavior: does attractiveness enhance mating success? *Evolution and Human Behavior* 26, 186–201.
- Roney, J.R., Hanson, K.N., Durante, K.M., Maestripieri, D., 2006. Reading men's faces: women's mate attractiveness judgments track men's testosterone and interest in infants. *Proceedings of the Royal Society B* 273, 2169–2175.
- Rubin, Z., Peplau, L.A., Hill, C.T., 1981. Loving and leaving: sex differences in romantic attachments. *Sex Roles* 1, 821–836.
- Scheib, J.E., 2001. Context-specific mate choice criteria: women's trade-offs in the contexts of long-term and extra-pair mateships. *Personal Relationships* 8, 371–389.
- Schmitt, D.P., 2005. Fundamentals of human mating strategies. In: Buss, D.M. (Ed.), *The Handbook of Evolutionary Psychology*. Wiley, New York, pp. 258–291.
- Schmitt, D.P., 118 Members of International Sexuality Description Project, 2003. Universal sex differences in the desire for sexual variety: tests from 52 nations, 6 continents, and 13 islands. *Journal of Personality and Social Psychology* 85, 85–104.
- Schmitt, D.P., Couden, A., Baker, M., 2001a. The effects of sex and temporal context on feelings of romantic desire: an experimental evaluation of Sexual Strategies Theory. *Personality and Social Psychology Bulletin* 27, 833–847.
- Schmitt, D.P., Shackelford, T.K., Buss, D.M., 2001b. Are men really more 'oriented' toward short-term mating than women? A critical review of theory and research. *Psychology, Evolution & Gender* 3, 211–239.
- Schmitt, D.P., Shackelford, T.K., Duntley, J., Tooke, W., Buss, D.M., 2001c. The desire for sexual variety as a tool for understanding basic human mating strategies. *Personal Relationships* 8, 425–455.
- Schützwohl, A., Fuchs, A., McKibbin, W.F., Shackelford, T.K., 2009. How willing are you to accept sexual requests from slightly unattractive to exceptionally attractive imagined requestors? *Human Nature* 20, 282–293.
- Shackelford, T.K., Goetz, A.T., Buss, D.M., 2005a. Mate retention in marriage: further evidence of the reliability of the mate retention inventory. *Personality and Individual Differences* 39, 415–425.
- Shackelford, T.K., Goetz, A.T., LaMunyon, C.W., Quintus, B.J., Weekes-Shackelford, V.A., 2004. Sex differences in sexual psychology produce sex similar preferences for a short-term mate. *Archives of Sexual Behavior* 33, 405–412.
- Shackelford, T.K., Pound, N., Goetz, A.T., 2005b. Psychological and physiological adaptations to sperm competition in humans. *Review of General Psychology* 9, 228–248.
- Shackelford, T.K., Pound, N., Goetz, A.T., LaMunyon, C.W., 2005c. Female infidelity and sperm competition. In: Buss, D.M. (Ed.), *The Handbook of Evolutionary Psychology*. Wiley, New York, pp. 372–393.
- Simpson, J.A., Gangestad, S.W., 1991. Individual differences in sociosexuality: evidence for convergent and discriminant validity. *Journal of Personality and Social Psychology* 60, 870–883.
- Simpson, J.A., Gangestad, S.W., 1992. Sociosexuality and romantic partner choice. *Journal of Personality* 60, 31–51.
- Singh, D., 1993. Adaptive significance of waist-to-hip ratio and female physical attractiveness. *Journal of Personality and Social Psychology* 65, 293–307.
- Singh, D., 1995. Female health, attractiveness and desirability for relationships: role of breast asymmetry and waist-to-hip ratio. *Ethology and Sociobiology* 16, 465–481.
- Singh, D., 2002. Female mate value at a glance: relationship of waist-to-hip ratio to health, fecundity and attractiveness. *Neuroendocrinology Letters* 23, 81–91.
- Smith, R.L., 1984. Human sperm competition. In: Smith, R.L. (Ed.), *Sperm Competition and the Evolution of Mating Systems*. Academic Press, New York, pp. 601–659.
- Sprecher, S., Regan, P.C., 2002. Liking some things (in some people) more than others: Partner preferences in romantic relationships and friendships. *Journal of Social and Personal Relationships* 19, 463–481.
- Sprecher, S., Sullivan, Q., Hatfield, E., 1994. Mate selection preferences: gender differences examined in a national sample. *Journal of Personality and Social Psychology* 66, 1074–1080.
- Sritharan, R., Heilpern, K., Wilbur, C.J., Gawronski, B., 2010. I think I like you: spontaneous and deliberate evaluations of potential romantic partners in an online dating context. *European Journal of Social Psychology* 40, 1062–1077.
- Sugiyama, L.S., 2005. Physical attractiveness in adaptationist perspective. In: Buss, D.M. (Ed.), *The Handbook of Evolutionary Psychology*. Wiley, New York, pp. 292–343.
- Surbey, M.K., Conohan, C.D., 2000. Willingness to engage in casual sex: the role of parental qualities and perceived risk of aggression. *Human Nature* 11, 367–386.
- Symons, D., 1979. *The Evolution of Human Sexuality*. Oxford University Press, New York.
- Thornhill, R., Gangestad, S.W., 1993. Human facial beauty: averageness, symmetry and parasite resistance. *Human Nature* 4, 237–269.
- Thornhill, R., Gangestad, S.W., 1999. Facial attractiveness. *Trends in Cognitive Science* 3, 452–460.
- Thornhill, R., Gangestad, S.W., 2008. *The Evolutionary Biology of Human Female Sexuality*. Oxford University Press, New York.
- Thornhill, R., Grammar, K., 1999. The body and face of a woman: one ornament that signals quality? *Evolution and Human Behavior* 20, 105–120.
- Townsend, J.M., Levy, G.D., 1990a. Effects of potential partners' physical attractiveness and socioeconomic status on sexuality and partner selection. *Archives of Sexual Behavior* 19, 149–164.
- Townsend, J.M., Levy, G.D., 1990b. Effect of potential partners' costume and physical attractiveness on sexuality and partner selection. *Journal of Psychology: Interdisciplinary & Applied* 124, 371–389.
- Townsend, J.M., Wasserman, T., 1998. Sexual attractiveness: sex differences in assessment and criteria. *Evolution and Human Behavior* 19, 171–191.
- Trivers, R., 1972. Parental investment and sexual selection. In: Campbell, B. (Ed.), *Sexual Selection and the Descent of Man*. Aldine de Gruyter, New York, pp. 136–179.
- Uecker, J.E., Regnerus, M.D., 2010. Bare market: campus sex ratios, romantic relationships, and sexual behavior. *The Sociological Quarterly* 51, 408–435.
- Waynforth, D., Dunbar, R.I.M., 1995. Conditional mate choice strategies in humans: evidence from 'lonely hearts' advertisements. *Behaviour* 132, 755–779.
- Wiederman, M.W., Dubois, S.L., 1998. Evolution and sex differences in preferences for short-term mates: results from a policy capturing study. *Evolution and Human Behavior* 19, 153–170.
- Wilbur, C.J., Campbell, L., 2010. What do women want? an interactionist account of women's mate preferences. *Personality and Individual Differences* 49, 749–754.