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# Mate Preferences and Their Behavioral Manifestations

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## Abstract

Evolved mate preferences comprise a central causal process in Darwin's theory of sexual selection. Their powerful influences have been documented in all sexually reproducing species, including in sexual strategies in humans. This article reviews the science of human mate preferences and their myriad behavioral manifestations. We discuss sex differences and sex similarities in human sexual psychology, which vary according to short-term and long-term mating contexts. We review context-specific shifts in mating strategy depending on individual, social, and ecological qualities such as mate value, life history strategy, sex ratio, gender economic inequality, and cultural norms. We review the empirical evidence for the impact of mate preferences on actual mating decisions. Mate preferences also dramatically influence tactics of mate attraction, tactics of mate retention, patterns of deception, causes of sexual regret, attraction to cues to sexual exploitability, attraction to cues to fertility, attraction to cues to resources and protection, derogation of competitors, causes of breakups, and patterns of remarriage. We conclude by articulating unresolved issues and offer a future agenda for the science of human mating, including how humans invent novel cultural technologies to better implement ancient sexual strategies and how cultural evolution may be dramatically influencing our evolved mating psychology.



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## INTRODUCTION

In sexually reproducing species, no single decision is more important than the choice of a mate. Good mate choices can bring a bounty of reproductive benefits, such as genes for healthy immune functioning, physical protection, and provisioning of resources for self and offspring. Poor mate choices can usher in a cascade of costs—sexually transmitted diseases, a DNA packet with a high mutation load, reputational damage, and abandonment. These dramatic costs and benefits have imposed tremendous selection pressure over the 1.2 billion years since the origins of sexual reproduction. The forces of selection have forged evolved strategies of mating in all known and scientifically studied sexually reproducing species. Foremost among these strategies is preferential mate choice.

Darwin's (1859) original formulation of natural selection focused on survival selection, the evolution of adaptations that gave organisms advantage in the three struggles of life—struggles with the physical environment, with other species such as predators and parasites, and with members of one's own species. With the evolution of sexual reproduction, an entirely new form of evolution by selection came into existence—in this case, by sexual selection (Darwin 1871). Sexual selection describes the evolution of adaptations not because of their survival advantage, but rather because of their mating advantage.

Darwin described two key processes by which mating advantage could accrue—intrasexual competition and intersexual selection. In intrasexual competition, heritable qualities linked with success in same-sex contests are passed to future generations with greater frequency due to the increased sexual access of the victors. Qualities linked with losing intrasexual competitions disappear from the lineage because the vanquished fail in the mating game, and their genes die with them. Although Darwin linked intrasexual competition to physical contests, we now know that this logic is more general and can extend to scramble competition for territories or even competition to ascend status hierarchies (Buss 2016).

The core feature of intersexual selection, the second mechanism of sexual selection, is preferential mate choice. This process requires three key ingredients. First, there must be some consensus about the qualities desired in the other sex, although perfect agreement is not necessary. Second, desired qualities must be partly heritable. Third, the process must iterate through enough generations to effect an evolutionary change. The change comes about because those who successfully embody the desired qualities of the other sex have a mating advantage, are preferentially chosen, and thus pass on desired qualities with higher frequency. Individuals lacking desired qualities struggle to find mates and may be shut out of mating entirely, so undesirable qualities decrease in frequency over evolutionary time.

All known sexually reproducing species—including fruit flies, spiders, love bugs, frogs, hamsters, ring doves, penguins, dolphins, marmosets, baboons, and chimpanzees—have been shaped by sexual selection (Andersson 1994, Arnqvist & Rowe 2013). All have evolved mate preferences. All compete for desirable mates. It would defy scientific logic if humans were the sole species on earth, among the roughly 1.3 million sexually reproducing species, whose mating psychology was entirely untouched by sexual selection, entirely lacking evolved mate preferences, and totally bypassed by the process of intrasexual competition.

Abundant scientific evidence reveals that humans are no exception. We have not escaped the powerful forces of sexual selection over the 6 million years or so since we split from our common ancestor with chimpanzees. However, because humans have evolved multiple mating strategies that have many unique features, our evolved mate preferences and forms of mate competition are complex and differ in some key respects from those of other sexually reproducing species, including closely related primates (Gray 2013). Before describing evolved human mating strategies, it is



useful to briefly review the history of non-evolutionary theories of human mating prior to sexual strategies theory (SST) (Buss & Schmitt 1993).

### THEORIES OF MATING PRIOR TO SEXUAL STRATEGIES THEORY

Although the domain of human mating lay largely in the unexplored scientific shadows prior to evolutionary perspectives, there did exist a few theories. Freud (see Freud & Strachey 1964), for example, proposed that people seek mates who resemble their opposite-sex parents. Winch (1958) proposed that people seek mates who possess qualities that they themselves lack, a search for complementarity. Several theories posited that people seek mates who are similar to themselves (e.g., Cattell & Nesselroade 1967). Exchange and equity theories posited that people search for those with whom the exchange of valuable resources will be in approximate equilibrium or equity (e.g., Berscheid & Walster 1974, Clark & Reis 1988), although what qualified as a valuable resource was left unspecified.

All of these prior theories shared notable limitations. First, they were domain general with regard to content, failing to specify the primary dimensions on which similarity, complementarity, exchange, or equity might be based. This domain generality precluded predictions based on particular content domains such as economic resources, sexual resources, coalitional resources, or parental resources. Second, they were domain general with regard to context. For instance, they failed to specify temporal context. Short-term mating, casual sex, and extrapair infidelities were strikingly absent, the focus being exclusively on marriage or long-term mate choice. They also contained no premises explaining why mating goals might shift according to predictable developmental, situational, and ecologically contingent circumstances. Finally, and perhaps most importantly, all of these theories failed to provide an explanation of why humans would be motivated in the directions posited, whether those directions were toward similarity, complementarity, or equity. They lacked a causal account of the functional origins of these mating goals, i.e., the adaptive purposes for which they might have evolved. Perhaps because of this, all ignored the possibility that women and men might differ strategically in their mating psychology, and indeed, none contained any sex-differentiated premises or predictions.

We highlight these limitations to develop a set of minimum specifications of what a cogent theory of human mating should provide. It should identify the resource-relevant domains that are important in mate selection, such as sexual, economic, and parental resources. It should go beyond a sole focus on long-term committed mating, such as marriage, and specify different mating strategies that humans are known to initiate, including brief sexual encounters, serial mating, and extrapair copulations. A good theory of human mating should specify how mating strategies change according to predictable contexts, such as changes in mate value, shifts according to different sex ratios in the mating pool, and shifts according to whether a short-term or a long-term mating strategy is being pursued.

It should provide an account of the causal origins of human mating strategies. It should generate cogent hypotheses about the functions, if any, of each feature of human mating psychology, that is, the specific manner in which each feature solved an important adaptive problem. It should contain sex-differentiated components, since the process of sexual selection is the most powerful evolutionary force responsible for forging a somewhat sex-differentiated mating psychology (Andersson 1994, Buss 1995).

SST (Buss & Schmitt 1993) was the first theory that attempted to correct the deficiencies of prior mating theories and provide a rough sketch of some of the key complexities of human mating psychology. This sketch has been refined over the 25 years following the first formulation of SST, with additional complexities and context specificities, as well as hundreds of empirical tests of its



nine core hypotheses and 22 empirical predictions. We outline these complexities and empirical tests after briefly describing the core premises of SST.

## CORE PREMISES OF SEXUAL STRATEGIES THEORY

A core premise of SST is that humans have evolved a multifaceted mating psychology consisting of a complex suite of psychological adaptations, each of which evolved in response to evolutionarily recurrent adaptive challenges. Many of these challenges are subsumed under the rubric of sexual selection theory. The two broad adaptive problems that humans faced were (a) exerting fitness-enhancing preferential mate choice and (b) out-competing rivals for desirable mates.

Although in principle these are distinct challenges, they are conceptually related in two ways (Buss 1988a). First, the mate preferences of one sex dictate the domains of intrasexual competition in the other sex. If women prioritize bravery in the face of danger, for example, then that preference imposes selection pressure on men to out-compete their rivals in providing honest indicators of bravery. Conversely, forms of intrasexual competition can influence the evolution of mate preferences. If men compete with each other in forms of same-sex combat, such as wrestling, chest-pounding duels, or club fights (Puts 2016), then the informative variance produced by winning and losing contest competitions may create or amplify women's mate preferences for formidability or athletic prowess. Although the two processes of sexual selection are distinct, they can influence each other in reciprocal causation. With this conceptual background, we now outline the key premises of SST.

**Premise 1: Humans have evolved multiple mating strategies.** Both women and men have evolved a menu of mating strategies that include long-term committed mating, short-term mating, serial mating, and extrapair mating. Although variable in form and function, long-term matings tend to be characterized by high levels of commitment, pair bonding, and emotional involvement, while short-term matings such as one-night stands, brief hookups, and temporary liaisons tend to lack these features. Nonetheless, we fully recognize that these ends of the temporal continuum are rough proxies and do not fully capture the psychological complexities of the suite of mating strategies that lie along this continuum (Buss & Schmitt 1993).

**Premise 2: Each sexual strategy has specialized design features.** Because different adaptive problems must be solved when pursuing these different strategies, selection has forged a complex mating psychology designed to reap the benefits and minimize the costs of each strategy.

**Premise 3: Men and women are strategically similar in some domains.** In all domains in which men and women have faced similar adaptive challenges in mating, such as solving the commitment problem in long-term mating, men and women will be similar in their underlying mating psychology (Buss 1995).

**Premise 4: Women and men differ in mating strategies where they have recurrently faced different adaptive problems.** In domains in which men and women have faced different adaptive challenges recurrently throughout human evolutionary history, the sexes will differ in their mating psychology (Buss 1995).

**Premise 5: Sex differences in minimum obligatory parental investment and sexual selection have fashioned sex-differentiated forms of short-term mating.** Because women and men differ dramatically in the minimum obligatory investment to produce a single offspring (9 months of pregnancy for women versus one act of sex for men), selection has favored a sex-differentiated



suite of adaptations regarding short-term mating strategies and the circumstances in which they are implemented.

**Premise 6: Access to fertile women has historically been a key constraint on men's reproductive success, so selection has favored a psychology of short-term mating specially designed to overcome this constraint.** This key constraint on men includes solving at least four somewhat distinct adaptive challenges: (a) motivating access to a variety of sex partners, (b) identifying which women are sexually accessible, (c) identifying fertile women, and (d) minimizing commitment and investment in each short-term sexual partner.

**Premise 7: Women obtain several key adaptive benefits from short-term mating.** Women's short-term mating has been hypothesized to obtain at least four adaptive benefits: (a) securing immediate access to economic resources, (b) assaying prospective long-term mates, (c) obtaining genes superior to those of their regular mates, and (d) switching mates (Buss et al. 2017).

**Premise 8: Men and women have evolved long-term pair-bonded mating strategies that possess at least five common components.** Commonalities include (a) identifying potential partners who possess a similar mate-value trajectory as the selector; (b) identifying potential partners willing and able to commit over the long term; (c) identifying good long-term partner qualities, including an altruistically skewed welfare trade-off ratio (WTR); (d) identifying potential partners with good parenting skills (Buss 1991); and (e) identifying potential partners who are not encumbered by costly commitments, such as young needy children from former mateships.

**Premise 9: There are male-specific challenges of long-term mating.** Men have faced at least two sex-specific adaptive challenges when committing to a long-term mating strategy: (a) Men must identify women who are high in reproductive value (i.e., future reproductive potential), and (b), because fertilization occurs internally within women, men must solve the problem of paternity uncertainty so that investments get channeled to their own biological offspring.

**Premise 10: There are female-specific challenges of long-term mating.** These include (a) identifying men who have the ability to acquire and invest resources in her and her children, (b) identifying men who are willing to acquire and invest resources in her and her children, and (c) identifying men who are able and willing to offer physical protection to her and her children from aggressive conspecifics and other hostile forces of nature.

**Premise 11: The deployment of different sexual strategies, such as short-term and long-term strategies, is highly context dependent.** These contexts include (a) the individual's mate value; (b) the operational sex ratio in the relevant mating pool; (c) the strategies pursued by others in the mating pool; (d) the costs that might be incurred by the pursuit of each strategy, including sexually transmitted infections, reputational damage, and violence from allies, kin, or extant mates; and (e) ecological variables such as parasite prevalence, scarcity of food resources, intergroup warfare, sex-specific mortality, droughts, and other evolutionary bottlenecks.

**Premise 12: Sexual strategies are evolved solutions to common and sex-differentiated challenges of human mating.** The evolved psychological adaptations, including the many input contexts that differentially activate them, their information processing procedures, and their manifest behavioral output, are called sexual strategies. These strategies are evolved solutions to adaptive problems, with no conscious awareness implied regarding their origins, nature, or functionality.

Because some scholars have badly misrepresented SST, erroneously characterizing it as claiming that men are promiscuous and women are monogamous, we begin by focusing on women's short-term mating strategies in the hope that this will correct future misrepresentations.

## WOMEN'S SHORT-TERM MATING STRATEGIES

From its inception, SST has emphasized that women as well as men have evolved short-term mating strategies. Mathematically, the number of heterosexual short-term matings must be identical for the sexes given an equal sex ratio in the mating pool. Each time a man has a casual sexual encounter with a woman, a woman is simultaneously having a casual sexual encounter with a man, although of course they may construe the encounter differently. One person's one-night stand may be another person's failure to pair bond. Still, the fact is that some women in some circumstances initiate and willingly engage in short-term mating—whether in the form of hookups, friends with benefits, one-night stands, or extrapair sexual encounters. Moreover, they do so strategically.

Because ancestral women typically could not have dramatically increased their reproductive output by adding more sex partners (unless their regular partners were infertile), a key scientific puzzle has been whether adaptations for short-term mating exist in women, and if so, what their evolved function might be. Buss & Schmitt (1993) proposed four possible adaptive functions of women's short-term mating: immediate resources, good genes, evaluating short-term mates for long-term possibilities, and mate switching.

Although these four functions of women's short-term mating are alternative hypotheses, they are not in competition with each other in a zero-sum scientific contest. Women in circumstances of harsh winters or severe food shortages, for example, might use short-term mating as a desperate measure to obtain calories that might make the difference between survival and starvation for themselves and their children. Women in other circumstances, such as those in long-term mateships with men of low genetic quality, might use short-term mating to obtain better genes for their offspring—the hypothesis most vigorously advocated by many evolutionary scientists (e.g., Gangestad and Thornhill 2008, Gildersleeve et al. 2014). Some women, finding themselves in a cost-inflicting mateship or a mateship that has not lived up to its initial promise, or when an incrementally better option comes along, might use short-term mating as a mate switching tactic—a hypothesis most recently advocated Buss and colleagues (2017).

What do the empirical tests show? One of the first tests was conducted by Greiling & Buss (2000), who attempted to examine predictions from all of the functions noted above, except the good genes hypothesis, in four studies. They examined women's perceptions of an array of benefits from short-term mating, the likelihood of receiving those benefits, and the contexts in which short-term mating can occur, as well as benefit perceptions by women who actively pursued short-term mating. They found some evidence consistent with the resource acquisition and mate switching hypotheses, although these findings cannot be viewed as decisive or definitive.

### The Good Genes Hypothesis

Most research on the possible functions of women's short-term mating has focused on the good genes hypothesis. This is the view that women may benefit from short-term mating by securing access to men with especially high-quality genes that would not be as accessible via the route of long-term mating (Scheib et al. 1999). A wide range of evidence suggests that women particularly prefer certain attributes when short-term mating, some of which may reflect good genes sexual selection. For instance, women tend to place more emphasis on men's physical attractiveness when evaluating them for one-night stands compared to marriage partners (Kenrick et al. 1993,



Li 2007), and women tend to prefer masculine male faces for short-term more than for long-term mateships (Jones et al. 2018, Valentine et al. 2014). Moreover, women who chronically short-term mate (i.e., sociosexually unrestricted women) tend to emphasize physical attractiveness and sex appeal in potential mating partners more than do sociosexually restricted women (Muggeleton & Fincher 2017, Simpson & Gangestad 1992).

Another primary source of evidence for evaluating whether women shop for good genes in short-term mates has been shifts in women's mate preferences at ovulation. The logic of the dual mating hypothesis—a version of the good genes hypothesis—is that some women simultaneously pursue two mating strategies—obtaining investment and resources from one regular committed partner and obtaining superior genes from an affair partner. This hypothesis predicts that women will experience a mate preference shift around the brief window of ovulation, the only time in which a woman can conceive, to value hypothesized good genes qualities (e.g., symmetry, masculine features, physical attractiveness); that these preference shifts will center on short-term rather than long-term mating; and that sexual desire for men other than women's regular partners will peak.

The empirical evidence for these ovulatory mate preference shifts is somewhat mixed. One large meta-analysis reviewed 134 effects from 50 different studies and found some support for the predicted preference shifts, although the effect sizes tended to be small (Gildersleeve et al. 2014). A recent large-scale longitudinal study of 584 women, however, found no correlation between hormonally assessed ovulation status and preference for masculinity in male faces, although it did find that the general preference for masculine faces was more pronounced for short-term rather than long-term mateships (Jones et al. 2018). A preregistered study of 157 women did not find that women's preferences for masculine bodies increased at ovulation, as predicted by the dual mating strategy version of the good genes hypothesis (Jünger et al. 2018). Based on the studies conducted thus far, empirical support for the hypothesized dual mating function of women's short-term mating is weak or mixed.

The dual mating hypothesis has also been questioned on theoretical grounds (Buss & Shackelford 2008, Buss et al. 2017). First, to the degree that women do elevate their preferences for certain features such as masculinity at ovulation, these findings could be conceptually interpreted as a shift in women's self-perceived mate value rather than a switch to a preference for good genes (Buss & Shackelford 2008). It is known that women higher in mate value elevate their standards, desiring higher levels for many characteristics in a mate, including hypothesized good genes indicators, good partner qualities, and resources (Buss & Shackelford 2008). Conceptually, women are indeed higher in mate value when they are ovulating compared to when they are not ovulating, since they are maximally fecund at precisely this time in their cycle. Indirect evidence for ovulation shifts in women's mate value comes from a study of 26,000 online self-reports that tracked ovulation cycles, which found reliable increases in self-perceived desirability around ovulation—possibly a psychological tracking adaptation (Arslan et al. 2017).

Second, because all traits highly valued by women in long-term mating, including intelligence, emotional stability, dependability, ambition, and industriousness, show moderate heritability, it is not conceptually clear why masculine and symmetrical features should be singled out as special cases of good genes when the other qualities are not. To take one compelling example, intelligence shows somewhat higher heritability than most other traits and has been directly hypothesized to be a cardinal good genes indicator (e.g., Miller 2000), yet there is no evidence that women elevate the importance that they attach to intelligence at ovulation. In short, on both theoretical and empirical grounds, the dual mating hypothesis of women's short-term mating, although potentially applicable to a small subset of women pending future tests, can be regarded as questionable theoretically and not well supported empirically. In contrast, an alternative theory of women's short-term mating—the mate switching hypothesis—may be more promising.





## The Mate Switching Hypothesis

There are several variants of the mate switching hypothesis of women's short-term mating. One involves cultivating a backup mate should something befall a woman's regular mateship, such as a partner becoming injured or dying in a war, or simply in probabilistic anticipation of a potential breakup. This has been called the mate insurance function (Buss 2016). Another variant involves having a short-term sexual encounter to make it easier to divest oneself of an existing mate. A third variant involves trading up to a partner of higher mate value or one who offers more benefits and fewer costs than one's current partner. A fourth variant involves using short-term mating as a means of assaying one's mate value to evaluate whether there might exist more desirable and accessible potential partners in the mating market.

Few empirical studies have tested the mate switching hypothesis directly, but several independent findings plausibly converge on it. First, relationship dissatisfaction is one of the most powerful predictors of women's actual infidelity, but not of men's infidelity (Glass & Wright 1992). Second, relationship dissatisfaction predicts women's sexual interest in other men during both the fertile and luteal phases of the ovulation cycle (Gangestad et al. 2005). This finding is consistent with infidelity functioning as a means of mate switching, but it cannot be explained by the good genes at ovulation hypothesis, which predicts interest in other men only during the ovulation phase. Third, women's reported expressed benefits of extrapair mating include (a) finding a partner more desirable than their current partner, (b) making it easier to break up with their current partner, (c) being able to replace their current partner, and (d) discovering other potential partners who might be interested in a relationship (Greiling & Buss 2000). Fourth, the contexts that women report would incline them to infidelity include a partner who cannot hold down a job, meeting someone more successful than their current partner who seems interested in them, and meeting someone who is willing to spend a lot of time with them (Greiling & Buss 2000).

Fifth, 79% of women who have affairs report falling in love with their affair partner, in contrast to only one-third of men who have affairs (Glass & Wright 1992)—and love is an emotion hypothesized to come online primarily in long-term mating contexts (Buss 1988b, 2018). If the primary function of female infidelity was simply to secure superior genes from an affair partner, falling in love seems both superfluous and costly in that it potentially interferes with securing continued investment from a woman's regular partner.

Sixth, the qualities that women want in an affair partner are very similar to those that they want in a long-term committed mate (Greiling & Buss 2000, Kenrick et al. 1990). These include a minimum 70th percentile rank on being dependable, emotionally stable, successful, honest, intelligent, mature, and unselfish. These six clusters of empirical findings are consistent with the mate switching explanation for female infidelity but appear difficult to explain with the good genes hypothesis.

Moreover, one meta-analytic study of actual misattributed paternity put the rate at only 1.7% (Anderson 2006). A second meta-analytic study put the figure between 3.1% and 3.7% (Voracek et al. 2008). A large-scale study in Germany found a lower nonpaternity rate of 0.94% (Wolf et al. 2012). It is possible, of course, that misattributed paternity rates were higher in ancestral environments, and studies of more traditional cultures may shed light on this issue. For instance, among the seminomadic Himba of Namibia, 23% of children from arranged marriages, but none from love marriages, were cases of misattributed paternity (Scelza 2011). The vast majority of women appear to be securing both genes and investment from the same partner, which poses an empirical problem for the dual mating strategy variant of the good genes hypothesis.

Of course, the good genes and mate switching hypotheses are not mutually exclusive or inherently contradictory. A small minority of women in delimited contexts could successfully implement a dual mating strategy and secure good genes from an affair partner, while other women who have affairs are implementing one or another variant of mate switching. We suggest that the mate



switching hypothesis provides a more parsimonious explanation for the function of infidelity for most women (for a fuller elaboration of hypotheses about mate switching adaptations, including their inputs, decision rules, and outputs, see Buss et al. 2017).

### **Additional Functions of Short-Term Mating for Women**

The mate switching and good genes hypotheses, of course, do not exclude other key possible functions of female short-term mating. Other candidates include securing immediate resources or protection from affair partners (Greiling & Buss 2000, Symons 1979), instilling confusion about paternity to prevent infanticide or to elicit resources from multiple mates (Hrdy 1979), securing a fertility backup in the event that the regular mate proves infertile, seeking revenge on a current mate as a means of deterring his future infidelity, and screening men for qualities desired in a potential long-term mate (Greiling & Buss 2000). Although these alternative hypotheses for female short-term mating have some supporting evidence in delimited circumstances (Buss 2016, Scelza & Prall 2018), they cannot explain the panoply of findings that support the mate switching hypothesis regarding female infidelity. The key point is that mate switching may be the most frequent or primary function of female infidelity, in contrast to the common assumption among evolutionary scientists that good genes are the primary function.

### **MEN'S SHORT-TERM MATING STRATEGIES**

Because of the large sexual asymmetry in obligatory parental investment, a straightforward set of predictions follow from SST about sex differences in short-term mating. Buss & Schmitt (1993) originally specified four that directly pertain to sex differences in desires for sexual variety: Men will (a) express greater desire for or interest in short-term mates than will women, (b) desire larger numbers of sex partners than will women, (c) be willing to engage in sexual intercourse after less time has elapsed than will women, and (d) relax their mate preference standards in short-term mating contexts more than will women. The cross-cultural empirical tests of this body of predictions have provided powerful support for them (e.g., Buss & Schmitt 2011, table 1; Lippa 2009; Schmitt 2017).

Sex differences in desires for sexual variety are among the most robust and well-replicated of all effects in the psychological sciences, with effect sizes often reaching *ds* of 0.74 or greater. Men desire a larger number of sex partners than do women across time intervals ranging from a month to a lifetime. Men are more open than women are to one-night stands, friends with benefits, dating multiple people, having sex with multiple people, and engaging in threesomes (Gray et al. 2018). If men are married, they are more likely to desire extradyadic sex. Men are more likely to have sexual fantasies that involve short-term sex, multiple sex partners, and sex with total strangers. They are more likely to consume pornography depicting short-term sex devoid of context, emotion, and relationships. Men have more permissive attitudes toward casual sex (Petersen & Hyde 2010) and express a more unrestricted sociosexuality than do women. These findings have been supported by two large-scale independent cross-cultural studies, with not a single cultural exception (Lippa 2009, Schmitt 2005). Men, more so than women, relax their standards for low-cost short-term matings across an array of mate qualities, including personality, intelligence, and even attractiveness.

Not only are these sex differences robust across cultures, on some measures, the magnitude actually increases in more gender-egalitarian cultures. For example, sex differences in expressed comfortability with multiple casual sex partners are higher in Denmark, Norway, Finland, and Iceland than they are in less gender-egalitarian cultures such as Ethiopia, Nigeria, and Swaziland (Schmitt 2014).

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In short, voluminous empirical evidence supports key predictions from SST regarding predicted design features of men's short-term sexual psychology. Over the past 25 years, additional design features have been hypothesized and empirically tested, expanding SST well beyond its original articulation. These include hypotheses about sexual regret, cues to sexual exploitability, and forms of sexual deception.

### Sexual Regret

Sexual emotions experienced in the aftermath of a short-term sexual encounter dovetail with the large sex differences discovered in sexual desire. Men are less likely than women to experience the emotion of regret after short-term mating (Galperin et al. 2013), a finding replicated in Norway, one of the most sexually egalitarian cultures in the world (Bendixen et al. 2017, Kennair et al. 2018). For example, women, more than men, report experiencing regret about relationships that progress too fast sexually, having sex with a stranger, having sex with someone who faked commitment, and having a one-night stand. Men in the United States and in Norway are more likely than women to experience regret about missed sexual opportunities (Kennair et al. 2016). Men are less likely than women to experience regret in the aftermath of college campus hookups. Women are more likely than men to say that their ideal outcome of a hookup is a romantic relationship; men are more likely to say that their ideal outcome is more hookups.

### Sexual Exploitability

Several recent studies have shown that men prone to seeking short-term matings are especially attracted to women who show cues of sexual exploitability—women who might be easily seduced or easily deceived to have a brief sexual encounter (e.g., Goetz et al. 2012). Cues to sexual exploitability include seeming immature, intoxicated, reckless, flirtatious, or sleepy; wearing skimpy clothing; and showing an open body posture. Importantly, men do not find these sexual exploitability cues attractive at all in a potential long-term mate. Moreover, men dispositionally inclined to pursue short-term mating find these cues to be especially attractive, substantially more so than do men who dispositionally pursue a long-term mating strategy (Lewis et al. 2012).

### Strategic Interference and Sexual Deception

In 1993, when SST was first formulated, systematic studies of sexual deception had not yet been conducted; however, SST provided a precise prediction. Men will use deception as a means for obtaining short-term sexual access more often than will women. This prediction follows from strategic interference theory (Buss 1989a), which suggests that negative emotions such as anger and upset function to alert individuals when their preferred mating strategy is being blocked or impeded. These emotions help to mark interfering events in memory and motivate actions that function to eliminate the current interference or to avoid future forms of interference. Empirical studies support this prediction regarding sexual deception (Haselton et al. 2005). Three empirical studies in two different cultures found that men were more likely than women to exaggerate the depth of their feelings and commitment to gain short-term sexual access. Moreover, women so deceived, compared to men deceived in these ways, reported that they would experience more intense emotional upset—sex differences that show especially large effect sizes (*ds* ranging from 0.67 to 1.69 or greater).



### Do Men's Short-Term Mating Desires Translate Into Actual Mating Behavior?

Mating desires cannot evolve unless they translate into actual mating behavior some of the time. In field experiments, more men than women consent to sex when approached with requests by a stranger of the other sex—75% of men versus 0% of women (Clark & Hatfield 1989). These findings have been robustly replicated in behavioral experiments in other cultures, including Germany, Italy, and Denmark (e.g., Hald & Høgh-Olesen 2010, Schützwohl et al. 2009). For instance, Hald & Høgh-Olesen (2010) replicated these findings in Denmark, with 59% of single men and 0% of single women agreeing to a stranger's proposition, "Would you go to bed with me?"

Other studies also point to the expression of men's short-term sexual desires in actual behavior. Married men are more likely than married women to desire and actually have extramarital affairs (for a review of these results, see, e.g., Buss 2016). Men who have affairs are more likely than women who have affairs to have them with a larger number of affair partners. Men worldwide are more likely than women to become patrons of prostitutes, even in the most sexually egalitarian and sexually liberal countries in the world, such as Sweden, Denmark, and Norway. Indeed, 99% of those who purchase the sexual services of prostitutes are men. More men than women on college campuses seek hookups and friends with benefits, both of which represent casual sexual encounters with little or no commitment. In sum, the large sex differences postulated by SST in the psychology of short-term mating do indeed get expressed in many ways in actual mating behavior.

### MEN'S LONG-TERM MATING STRATEGIES

Humans stand out among primate species in that males sometimes devote tremendous time and resources to parental investment (Alexander & Noonan 1979). Among the roughly 5,416 species of mammals, only 3–5% engage in anything resembling long-term pair bonds or committed mating. Humans do engage in this type of mating. The potential reproductive benefits that human male ancestors would have reaped from long-term mating consisted primarily of monopolizing all of a woman's lifetime reproductive resources. Additional benefits include increasing the survival and reproductive success of children through paternal investment, reducing intrahousehold conflict, and forming beneficial long-term alliances with one's partner's kin (Henrich et al. 2012).

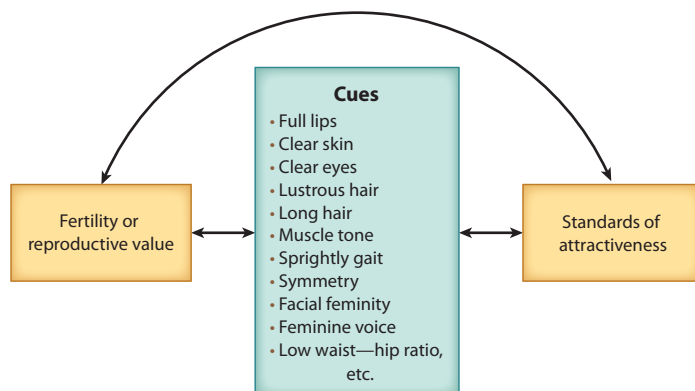
The original formulation of SST (Buss & Schmitt 1993) outlined several additional benefits and selective forces that would favor a long-term mating strategy in men, a list subsequently expanded by Buss (2015): (a) increasing the odds of attracting a mate, especially if women require commitment before consenting to sex; (b) increasing the ability to attract a high-value mate, including one of high genetic quality, if women higher in mate value require higher levels of commitment; (c) increasing the paternity certainty in ensuing offspring; (d) increasing the survival of children through protecting, provisioning, and paternal socialization; (e) increasing the reproductive success of children through paternal investment or paternal arrangements of mating opportunities; (f) increasing social status, since marriage in most cultures confers elevated prestige; and (g) acquiring coalitional allies through a partner's kin and other social networks.

Juxtaposed against these potential benefits is a key cost of long-term mating—the opportunity cost of foregone sexual opportunities. Time and resources allocated solely to a single mate preclude allocating efforts to securing short-term or even medium-term mateships. Selection likely favored, in men, adaptations to minimize these opportunity costs. One minimization strategy would be to seek opportunistic copulations when the costs and risks were low. A second would be to pursue a polygynous mating strategy, committing long term to two or more women. In this context, it is noteworthy that studies reveal that polygynous men, in contrast to lower-status married men with only one wife, often minimize direct paternal investment in children (e.g., Hewlett 1991).

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**Figure 1**

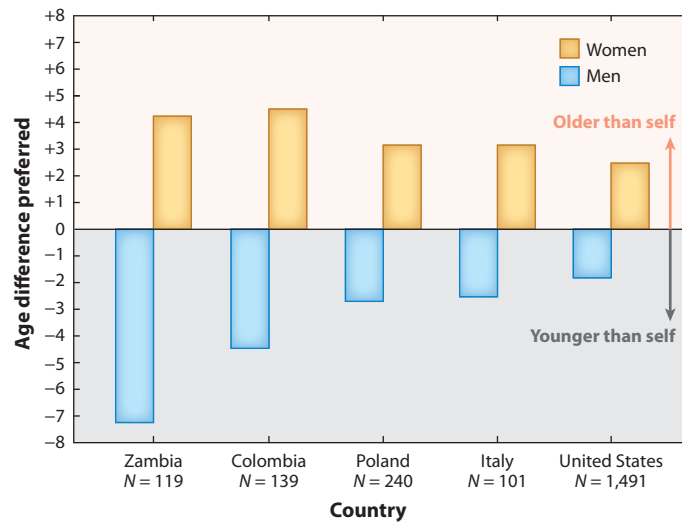
Evolutionary theory of female attractiveness. Ancestrally observable cues that are probabilistically linked with reproductive value are hypothesized to shape men's evolved long-term mate preferences and, more generally, standards of female attractiveness. Arrows depict hypothesized correlations.

Successful long-term mating requires that men solve two adaptive problems that are sex specific and at least one that is similar for men and women. The first challenge is identifying potential mates of high reproductive value (Williams 1975). This problem is made difficult by the fact that ovulation is concealed or relatively cryptic in women, in sharp contrast to chimpanzees, humans' closest primate cousin. Indeed, some hypothesize that the evolution of concealed ovulation was one of the driving forces in the evolution of human long-term committed mating (Alexander & Noonan 1979). The second challenge is solving the problem of paternity uncertainty. Selection would strongly oppose heavy male parental investment in offspring who are unlikely to be their own. A third key challenge is establishing a mutually cooperative and mutually beneficial long-term relationship marked by some degree of division of labor—an adaptive problem that is similar for both sexes.

### Identifying Women of High Reproductive Value

Reproductive value, like fertility, is not a quality that can be directly ascertained in humans. Our ancestors had two primary sets of observable cues that were probabilistically correlated with reproductive value—features of physical appearance and manifest behavior. One set of cues is made up of those correlated with relative youth. A young female of age 17, for example, has higher reproductive value than a woman of 27, 37, or 47, since she has many more years of future reproduction. This logic leads to an evolution-based theory of female beauty and a cogent array of specific empirical predictions. The theory of beauty, first articulated by Symons (1979) and subsequently elaborated by Buss (1987), Buss & Schmitt (1993), and many others, is graphically depicted in **Figure 1**.

This theory of female beauty has been confirmed by independent investigators (for a review, see Sugiyama 2005). Empirically verified cues linking reproductive value and beauty include the length and quality of women's hair; skin clarity and suppleness; feminine facial features caused in part by estrogen production, such as facial adiposity, full lips, small chin, thin jaws, and high cheekbones; a slender waist; a low waist-to-hip ratio; firm breasts; and a relatively low body mass index. One study found that even men who are congenitally blind from birth prefer a lower waist-to-hip ratio (Karremens et al. 2010). Another found that a latent variable capturing reproductive value correlated almost perfectly with a latent variable capturing female body attractiveness (Andrews



**Figure 2**

Scale numbers refer to the number of years younger or older, relative to the self, that are preferred in a long-term mate. Men prefer younger potential spouses in all cultures. The age difference preferred by men is especially strong in polygynous cultures such as that of Zambia, in which men are typically older before they have enough status and resources to marry. *N* refers to the sample size obtained from each country. All gender differences in age preferences are statistically significant beyond the 0.001 level. Figure adapted from Buss & Schmitt (1993), © American Psychological Association.

et al. 2017). Eye tracking laboratory studies also corroborate men's attraction to bodily cues to reproductive value (Garza et al. 2016). Cues to relative youth, in short, are powerful predictors of judgments of female attractiveness.

Another prediction is that men will prefer and seek relatively young women as long-term mates. This prediction has been confirmed in dozens of cultures (e.g., Buss 1989b, Conroy-Beam & Buss 2018, Kenrick & Keefe 1992). A study of 37 cultures found that men, on average, preferred as potential spouses women who were roughly 3 years younger than they were (see **Figure 2**).

### Do Age Preferences Get Translated Into Actual Mating Behavior?

Although some have questioned whether mate preferences influence actual mating behavior (e.g., Eastwick et al. 2014), the empirical data indicate quite strongly that they do. Brides are younger than grooms across cultures, averaging roughly 3 years younger at first marriage (Buss 1989b). As men get older, and if they divorce and remarry, the women that they marry become increasingly younger than themselves. In the United States, the age gap is roughly 3 years at first marriage, 5 years at second marriage, and 8 years at third marriage (Guttentag & Secord 1983). These findings are robust over time, as well, appearing, for example, in marriage statistics on the island of Poro a century ago (Kenrick & Keefe 1992). In Sweden in the 1800s, church documents reveal that men who remarried following divorce married brides, on average, 10.6 years younger than they were (Low 1991). Data from Norway from 1851 through 2002 reveal similar findings (Conroy-Beam & Buss 2018). The actual marriage data across cultures and over time support the hypothesis that men's age preferences translate into actual marriage decisions.

An unprecedented data set bearing on this issue came from a study of marriages in South Korea (Sohn 2017). A subset of these marriages occur through an unusual mechanism—some men

purchase brides from developing countries. Although the sample of Korean men who married Korean women ( $N = 1,088,457$ ) showed the usual age gap of several years, Korean men who purchased foreign brides ( $N = 45,528$ ) married dramatically younger women, reaching 2 decades younger for the older cohorts of men. In a mating market where men can act on their preferences, they actually select and marry women substantially younger than themselves.

Other behavioral data converge on this conclusion (Conroy-Beam & Buss 2018). In studies of online dating, men actively seek younger partners. Younger women in online dating receive a larger number of responses from men than do older women. The age of potential brides influences the amount of money spent on premarriage customs in cultures such as the Kipsigis in Kenya (Borgerhoff Mulder 1990). The amount of money spent on engagement rings is higher for younger compared to older fiancées (Cronk & Dunham 2007). Younger wives are more intensely mate guarded than older wives (Buss & Shackelford 1997). In sum, converging lines of evidence from multiple data sources using different methods, from independent investigators, from dozens of different cultures, and over time periods spanning centuries robustly confirm the prediction that age preferences translate into actual mating behavior.

### The Problem of Paternity Uncertainty

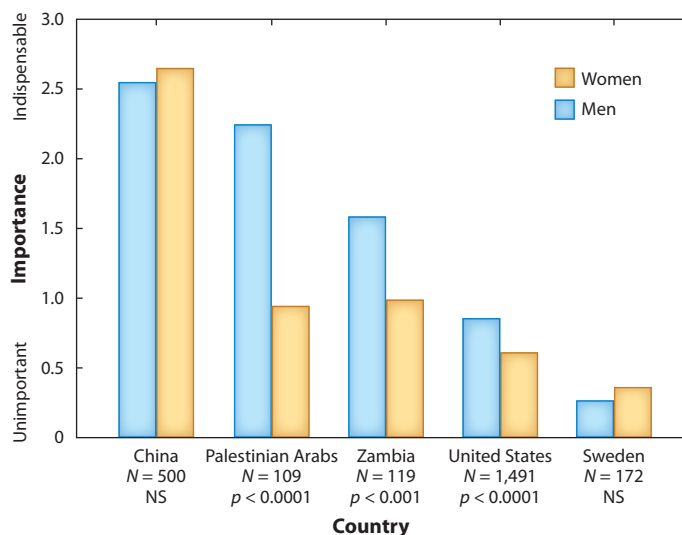
Because fertilization occurs internally within women, maternity is 100% certain. Men can never be sure; paternity certainty has almost always been less than 100%, at least prior to recently developed molecular methods of DNA testing. Estimates of actual nonpaternity vary across culture and from study to study, but meta-analyses put the figures between roughly 1% and 3.7% (Anderson 2006, Voracek et al. 2008). The reproductive costs to ancestral men investing heavily in long-term mating and parenting would have been catastrophic unless they evolved adaptations that increased the probability of paternity certainty. Several such adaptations have been proposed.

Three hypothesized adaptations from SST have centered on (a) a mate preference for virginity, or no prior experience in sexual intercourse; (b) preference cues to that auger well for postmating sexual fidelity and loyalty; and (c) the emotion of sexual jealousy and its mate-guarding behavioral outputs.

**Virginity.** The first hypothesis, that of a mate preference for virginity, was poorly formulated. For a mate preference to have evolved, it must involve a quality that our human ancestors could have actually observed or assessed in some direct or indirect way. Unlike qualities like age (roughly reliably assessed via appearance factors such as smooth versus wrinkled skin and behavior factors such as a sprightly versus a stooped slow gait) and physical attractiveness—qualities that can be evaluated with at least some accuracy, albeit imperfectly—virginity is not a quality that our ancestors could have observed or assessed reliably. There are no observable physical or behavioral cues to virginity. Even tests such as palpating the hymen are inherently unreliable; women vary tremendously in whether they have an intact hymen, and many causes other than sexual intercourse can rupture an otherwise intact hymen (e.g., horseback riding) (O'Connor 2008). What is most relevant to men for solving the problem of paternity uncertainty may not be whether a potential mate is a virgin, but rather whether she is not pregnant by another man at the time of commitment and will remain sexually faithful after commitment or marriage. Sexual conduct prior to marriage, determined either through observation or reputation, might predict sexual fidelity.

Perhaps because the virginity hypothesis was conceptually problematic, empirical tests failed to produce universal support for it. As shown in **Figure 3**, cultures differ tremendously both in the absolute magnitude of value placed on virginity and in the presence (62% of the cultures) or absence (38% of the cultures) of a sex difference in evaluations of virginity. At best, the original hypothesis





**Figure 3**

Importance placed on virginity (no prior sexual intercourse) in a potential spouse. The countries depicted reveal the dramatic range of variation across cultures, both in the importance placed on virginity and in the presence or absence of gender differences.  $N$  refers to the sample size obtained from each country;  $p$  refers to the level of statistical significance. Abbreviation: NS, not statistically significant. Figure adapted from Buss & Schmitt (1993), © American Psychological Association.

about virginity can be regarded as only weakly and inconsistently supported. These findings belie the oft-repeated, yet factually incorrect, claim that evolutionary psychological hypotheses are inherently unfalsifiable (for a fuller discussion of falsifiability, see Confer et al. 2010).

**Sexual fidelity.** In contrast, there exists considerably more support for the value that men place on sexual fidelity in a long-term mate. Men place sexual fidelity at or near the top of the list of desired qualities in a potential spouse (Buss & Schmitt 1993, Gil-Burmann et al. 2002, Waynforth & Dunbar 1995). On a rating scale of  $-3$  (extremely undesirable) to  $+3$  (extremely desirable), men rated the quality “faithful”  $+2.88$  and “sexually loyal”  $+2.85$ ; these were the two most highly valued qualities in a long-term mate out of 67 qualities evaluated (Buss & Schmitt 1993). On the other end of the scale, men rated “unfaithful”  $-2.93$  and “sleeps around a lot”  $-2.79$ ; these were the two most undesirable qualities in a prospective long-term mate. Men apparently assess and evaluate levels of sexual activity by a woman prior to long-term commitment—behavior that would have been observable or known through social reputation in the small-group lifestyles of our ancestors. Past behavior is a good predictor of future behavior, and having a large number of sex partners prior to marriage is a statistical predictor of infidelity after marriage (Buss 2016).

**Sexual jealousy.** The emotion of sexual jealousy has been hypothesized as an adaptation to solve the problem of paternity uncertainty in men (Buss et al. 1992, Symons 1979). Empirical tests have largely confirmed this hypothesis using multiple methods, including force-choice dilemmas, continuous self-report measures, experiments with memorial recall and speed of processing, laboratory experiments using cognitive load, reports after experiencing actual infidelities, and functional magnetic resonance imaging techniques (for reviews, see Buss 2015, Edlund & Sagarin 2017).



These findings have not gone unchallenged. Some have argued that the findings are methodological artifacts. Others have argued that the findings are better explained by alternative theories, such as attachment theory or domain-general social-cognitive theories. These challenges have been successfully refuted. The findings are consistent across many methods and not restricted to a single method. An experiment that claimed to show that the findings disappeared under cognitive load (deSteno et al. 2002) actually found that they did not (Barrett et al. 2006). And the alternative theories cannot explain the many design features of male sexual jealousy that have been empirically documented (e.g., Buss & Haselton 2005).

Mate guarding and mate retention tactics, from vigilance to violence, have been the hypothesized behavioral output of sexual jealousy adaptations (Buss & Shackelford 1997). Hypothesized design features include increased mate guarding (*a*) as a function of perceived infidelity probability, (*b*) as a function of the youth and thus reproductive value of the female partner, and (*c*) as a function of mate-value discrepancies between the male and female partners.

Although this section has focused on sex-differentiated adaptive problems that men have faced in long-term mating, several adaptive problems are critical for women and men alike. These include choosing a partner who will be a good cooperater and a dependable and healthy long-term partner, as well as a good prospective parent (Buss 1991). The high levels of sexual similarities revealed in the 37-culture study—in value placed on kindness, dependability, and good health—support these hypothesized similarities in mate selection.

## WOMEN'S LONG-TERM MATING STRATEGIES

Given men's evolved desires for sexual variety, most women have available to them a wide range of potential short-term mates, including many of high mate value. As most women can secure a man with higher mate value in the context of short-term mating than in long-term mating, why would women ever seek a long-term mate? SST identifies three potential benefits that ancestral women could have accrued: (*a*) status and economic resources for herself and her children, (*b*) physical protection for herself and her children, and (*c*) enhanced mating success of her children as a consequence of social and material benefits. The primary costs to women from committed long-term mating, like the primary costs to men, are the opportunity costs of relinquishing some or all short-term matings and the potential benefits that they might entail.

The evolution of mate preferences for qualities relating to resource accumulation would have required at least two recurrent conditions. First, men would have to vary in their ability to provide such resources and in reliable cues to that ability. SST identified three such cues in potential mates—ambition, industriousness, and social status. Second, men would have to be willing to invest those resources in a particular woman. Although the original formulation of SST (Buss & Schmitt 1993) did not identify potential cues to a man's willingness to commit, other research has identified the emotion of love as a powerful signal of such commitment (Buss 1988b, 2018).

### Economic Resources

Women's preference for men with economic resources has been abundantly supported by dozens of studies. The 37-culture study found that women valued long-term mates who had good financial prospects more than did men (Buss 1989a). The universality of this mate preference spans across cultures with different mating systems (presumptive monogamy versus polygyny), different levels of gender economic equality (e.g., Sweden versus Iran), and different religious orientations (e.g., Muslim, Jewish, Christian, atheist).



The findings have been replicated with multiple methods across dozens of cultures. In studies of the minimum percentile that people would accept in a long-term mate, women put earning capacity in the 70th percentile, whereas men put it in the 40th (Kenrick et al. 1990). More recently, in a large national sample of US individuals, Fales et al. (2016) found that the percentage of people indicating that it was desirable or essential for a potential partner to have had a steady income was larger for women (97%) than for men (74%) ( $d = -1.17$ ). Wang et al. (2018) asked men and women from China, the United States, and Europe to rate the attractiveness of opposite-sex individuals, experimentally manipulating the physical and economic (i.e., salary) information about the targets. Across all cultures, women were roughly 1,000 times more sensitive to salary when rating men than men were when rating women. An in-depth study of the Hadza, a traditional hunter-gatherer group residing in Tanzania, found that women placed great importance on a man's foraging abilities, especially his ability to hunt and provide meat (Marlowe 2004).

### Ambition, Industriousness, and Social Status

Sex differences in mate preferences for key predictors of economic resources are not quite as universal across cultures. The combined item "ambition and industriousness" showed significant sex differences in 29 of the 37 cultures sampled (Buss 1989a). Women in all cultures, however, placed a relatively high absolute value on this quality, typically giving it above a 2 on a 0–3 scale, where a 3 indicates a quality being indispensable. For example, Nigerian women gave it 2.61, Chinese women 2.63, Iranian women 2.81, Estonian women 2.46, Italian women 2.07, and Swedish women 2.04. In a cross-generational analysis of US individuals from 1939 to 1996, the sex difference in preferring favorable social status persisted over time, and although men and women decreased in valuing ambition and industriousness, the degree of sex difference largely persisted in strength across more than 50 years (Buss et al. 2001).

### Love and Kindness as Indicators of Willingness to Commit

The emotion of love has been hypothesized to be an evolved mate commitment device (Buss 1988b, 2018; Frank 1988). Love turns out to be a human universal (Jankowiak 1997). Across cultures, people sing love songs, elope with a loved one against the wishes of their parents in societies with arranged marriages, and report personal anguish and longing when separated from a loved one. Acts of commitment of reproductively relevant resources top the list of most prototypical love acts (Buss 1988b). These include giving up romantic relations with others, talking of marriage, and expressing a desire to have children. Reports of experiencing love powerfully predict feelings of subjective commitment, far more than do feelings of sexual desire (Gonzaga et al. 2008).

Women also prioritize kindness in a long-term mate. The 37-culture study found that the variable "kind and understanding" was placed at or near the top of mate preferences by women in all cultures (Buss et al. 1990). Subsequent studies have provided an important scientific advance in documenting that women prefer mates who are kind and trustworthy specifically with respect to themselves and their families, but they are much less likely to prefer kindness that is directed toward other, unrelated types of individuals (Lukaszewski & Roney 2010). Like love, these target-specific mate preferences suggest that a willingness to commit to a particular woman and her genetic kin, rather than a domain-general trait of undifferentiated kindness, is preferred.

### Protection

Women and their children have historically faced dangers from predators and, perhaps more profoundly, from aggressive conspecifics, especially men. Hazards include physical harm and

sexual assault. A long-term mate could effectively function as a bodyguard, both deterring potential assaulters and, when needed, directly repelling immediate threats and dangers. Qualities rendering a potential mate an effective bodyguard include physical formidability, size, athletic prowess, and bravery in the face of danger.

Women's preferences in a mate appear to embody these cues. Women judge short men to be undesirable for either a short-term or a long-term mate (Buss & Schmitt 1993). In contrast, women find it very desirable for a potential marriage partner to be tall, physically strong, and athletic. A study of women from Britain and Sri Lanka found strong preferences for male physiques that were muscular and lean. Women prefer and find attractive men with a V-shaped torso, that is, broad shoulders relative to hips (Hughes & Gallup 2003). Women who are especially fearful of crime show even stronger preferences for long-term mates who are physically formidable.

Tall men are consistently seen as more desirable as dates and mates than are short or average men (Courtiol et al. 2010). Two studies of personal ads revealed that, among women who mentioned height, 80% wanted a man to be 6 feet tall or taller (Pierce 1996). Personal ads placed by taller men received more responses from women than those placed by shorter men. A study of the hits received by 1,168 personal advertisements in Poland found that a man's height was one of the four strongest predictors of the number of women who responded to the male ads (the others being education level, age, and resources) (Pawlowski & Koziol 2002). Tall men are perceived as more dominant, are more likely to date, and are more likely to have attractive partners than are shorter men (for a review, see Brewer & Riley 2009). Women solve the problem of protection at least in part by preferring a mate who has the size, strength, and physical formidability to protect them. These physical qualities also contribute to solutions to other adaptive problems such as resource acquisition and genes for good health, since tallness is also linked with status, income, symmetrical features, and good health (Brewer & Riley 2009).

### **Do Women's Preferences Translate Into Actual Mating Behavior?**

In one study of speed dating, women were more likely to actually select men who indicated that they had grown up in an affluent neighborhood (Hitsch et al. 2010). Another study of 382 speed daters found that women were more likely than men to select dates who had higher levels of income and education (Asendorpf et al. 2011; see also Li & Meltzer 2015). A study of mail-order brides from Colombia, the Philippines, and Russia found that women actively sought men with higher levels of status and ambition (Minervini & McAndrew 2006). A study of 2,956 Israelis using a computer dating service found that women, far more than men, sought mates who owned their own cars, had good economic standing, and placed a high level of importance on their careers (Bokek-Cohen et al. 2008). In the Kipisigis of Kenya, women and their parents preferentially select men who have large plots of land (Borgerhoff Mulder 1990). The men whom women choose to marry, compared to same-aged men who do not marry, have consistently higher incomes (Buss 2016).

Would women who acted on these long-term mate preferences, actually selecting men of high status and resources, have experienced greater reproductive success? There is evidence that women married to older, higher-status men have more, and more surviving, children (Nettle & Pollet 2008). For instance, in a study of 1700s preindustrial Finland, women married to wealthier men had more children and better child survival rates than women married to poorer men (Pettay et al. 2007). Fieder & Huber (2007) found that marrying a man 4 years older than oneself was associated with maximum levels of fertility among women, which matches closely what women say is their ideal long-term mate (Buss 1989b, Kenrick & Keefe 1992).

There is some debate over whether mating with ambitious and high-status men should always lead women to feel more love and satisfaction (Eastwick et al. 2014, Schmitt 2014), but men



not providing resources does have real-world consequences. A cross-cultural study of the causes of divorce found that inadequate economic support, including inadequate food, housing, and clothing, was a sex-linked cause of marital dissolution (Betzig 1989). In no society did a woman's failure to provide economic resources constitute grounds for divorce. Women's mate preferences for economic resources and social status in a long-term mate translate into actual mating behavior, from selective decisions in speed dating, to real-life fertility outcomes, to the causes of divorce. As with men's preferences, women's mate preferences matter in real-world mating markets.

## CONTEXT-SPECIFIC INFLUENCES ON SEXUAL STRATEGIES

Sexual strategies are predicted to be highly sensitive to context. One aspect of this sensitivity centers on strategic shifts according to personal qualities such as mate value and life history strategy, social conditions such as operational sex ratio, ecological conditions such as parasite prevalence, and cultural conditions such as prevailing norms surrounding sexual conduct. We highlight a few of these important contextual shifts.

### Women's Mate Value and Long-Term Mating

Women who are young and physically attractive have more mating options and can become choosier in their selections. Does a woman's mate value influence her own mate preferences? Little and colleagues (2002) had 71 women rate themselves on their perceptions of their own physical attractiveness and subsequently showed them photos of men's faces that varied along the masculinity–femininity dimension. Women's self-rated attractiveness was significantly linked to attraction to masculine faces. Women who view themselves as physically attractive also show a more pronounced preference for men who display vocal masculinity, marked by a low-pitched voice (Pisanski & Feinberg 2013).

Studies of personal ads in Canada, the United States, Croatia, and Poland find that women higher in mate value specified a longer list of traits that they sought or required in a potential mate than did women lower in mate value (Pawlowski & Dunbar 1999). Similar results have been found in Brazil and Japan. Furthermore, women who perceive themselves as higher in mate value tended to impose higher minimum standards in what they would require of a long-term mate on a wide variety of characteristics, notably social status, intelligence, and family orientation (Regan 1998). A Croatian study of 885 women found that women who rated themselves higher on physical attractiveness preferred higher levels of education, intelligence, good health, good financial prospects, good looks, and favorable social status in a potential mate (Tadinac & Hromatko 2007).

A US study had interviewers evaluate 107 women for face, body, and overall attractiveness (Buss & Shackelford 2008). Attractive women expressed a desire for higher levels of hypothesized good genes indicators such as masculinity, physical attractiveness, sex appeal, and physical fitness. They also expressed a greater desire for higher potential income of a mate, good parenting qualities such as fondness for children, and good partner indicators such as being a loving partner. A speed dating study conducted in Germany examined actual mate choices made by women (Todd et al. 2007). Women high on self-perceived physical attractiveness actually chose men high on overall desirability, an aggregate score that included wealth and status, family orientation, physical appearance, attractiveness, and healthiness. Attractive women apparently want it all.

### Men's Mate Value and Long-Term Mating

Although most men place a premium on youth and beauty in a mate, not all men succeed in achieving their desires. Men lacking the status and resources that women want have the most

difficulty attracting such women and may have to settle for less than their ideal. Evidence for this comes from historical data about the differences between men of high and low status. In the 1700s and 1800s, for example, wealthier men from the Krummerhörn of Germany married younger brides than did men lacking wealth (Voland & Engel 1990). High-status men, from the Norwegian farmers of the 1700s to 1900s to the Kipsigis in Kenya, consistently married younger brides than did their lower-status counterparts (Borgerhoff Mulder 1988, Røskaft et al. 1992).

Kings and despots routinely stocked their harems with young, attractive, nubile women and had sex with them frequently (Betzig 1992). The Moroccan emperor Moulay Ismail the Bloodthirsty, for example, sired 888 children. His harem included 500 women. When a woman reached the age of 30, she was removed from the emperor's harem, sent to a lower-level leader's harem, and replaced by a younger woman. Roman, Babylonian, Egyptian, Incan, Indian, and Chinese emperors all shared the tastes of Emperor Ismail and enjoined their trustees to scour the land for young, pretty women.

Marriage patterns in the United States today confirm the prediction from SST that men with resources are most able to actualize their preferences. High-status older males, such as business CEOs, rock stars, and famous actors, frequently select spouses 1 or 2 decades younger than themselves, whereas similarly high-status women do not (Conroy-Beam & Buss 2018, Kenrick & Keefe 1992). Several sociological studies have examined the impact of a man's occupational status on the physical attractiveness of the woman that he marries (for a review, see Buss 2016). All of these studies reach the same conclusion: Men high in status tend to marry younger and more physically attractive women than do men low in status (Von Rueden et al. 2010).

Men who have high status and income are aware of their ability to attract more desirable women. In a study of a computer dating service involving 1,048 German men and 1,590 German women, Grammer (1992) found that, as men's income goes up, they seek younger partners (for a review, see Buss 2016). Each increment in income is accompanied by a decrease in the age of the woman sought. Men high in mate value express a stronger preference for facially feminine women—a strong correlate of attractiveness (Burriss et al. 2011). Finally, an experiment showed that men who won a video game competition expressed stronger preferences for women's facial femininity than did men who lost the competition, suggesting that even temporary increases in status may cause men to elevate their mating standards.

### Men's Mate Value and Short-Term Mating Strategy

One factor that may affect short-term mating is mate value. The self-perceived mating success scale (Landolt et al. 1995) assesses mate value. Sample items from this scale are: "members of the opposite sex notice me"; "I receive many compliments from members of the opposite sex"; "members of the opposite sex are attracted to me"; and "relative to my peer group, I can get dates with great ease."

Scores on the mate value scale were correlated with the reported sexual history of the participants. High-mate-value men, relative to lower-mate-value men, tended to have sexual intercourse at an earlier age, a greater number of sex partners since puberty, more partners during the past year, more sexual invitations within the past 3 years, sexual intercourse more frequently, and a stronger feeling that there was no need to be attached to a person before having sex. High-mate-value men tend to score toward the high end of the sociosexual orientation inventory (Clark 2006), suggesting that they are pursuing a short-term mating strategy. Men who are higher in status and resources tend to have a larger number of sex partners, indicating success at short-term mating (Perusse 1993).

Men with a higher shoulder-to-hip ratio have sex at an earlier age, have more sex partners and more extrapair copulations, and are more likely to have sex with other people's mates (Hughes



& Gallup 2003). Men with attractive faces and masculine bodies have more short-term sex partners (Rhodes et al. 2005) and express an especially strong preference for women with high facial femininity (Burriss et al. 2011). Men high in handgrip strength (Gallup et al. 2007) and who have high circulating testosterone (van Anders et al. 2007) tend to pursue a short-term mating strategy. Men with a mesomorphic (muscular) body build tend to have higher reproductive success, as gauged by offspring count (Genovese 2008), which may reflect a short-term mating strategy.

### Women's Mate Value and Short-Term Mating Strategy

The findings for a link between women's mate values and sexual strategies are more mixed than those for men. On the one hand, some studies find no association between women's self-perceived mate value and the pursuit of a short-term mating strategy (e.g., Landolt et al. 1995, Mikach & Bailey 1999). On the other hand, women with a low (attractive) waist-to-hip ratio tend to follow a more unrestricted (short-term) mating strategy and are perceived by others to be more promiscuous and less trustworthy (Brewer & Archer 2007). One speculation is that bodily attractiveness, rather than facial or overall attractiveness, may be linked with a short-term mating strategy in women, although future research is needed to test for this links.

### Temporal Context Shifts

Women's mate preferences shift as a function of temporal context. Buss & Schmitt (1993) asked women to rate 67 characteristics on their desirability in short-term and long-term mates. The rating scale ranged from  $-3$  (extremely undesirable) to  $+3$  (extremely desirable). Women found the following qualities to be more desirable in long-term marriage contexts than in short-term sexual contexts: "ambitious and career-oriented" (average rating of 2.45 in the long term versus 1.04 in the short term), "college graduate" (2.38 versus 1.05), "creative" (1.90 versus 1.29), "devoted to you" (2.80 versus 0.90), "fond of children" (2.93 versus 1.21), "kind" (2.88 versus 2.50), "understanding" (2.93 versus 2.10), "responsible" (2.75 versus 1.75), and "cooperative" (2.41 versus 1.47). These findings suggest that temporal context matters a great deal for women, causing shifts in their preferences depending on whether a marriage partner or a casual sex partner is sought (Schmitt & Buss 1996).

### Sex Ratio Shifts

The ratio of eligible men to eligible women is another critical context that can influence sexual strategies (Moss & Maner 2016). Many factors affect this sex ratio, including wars, which kill larger numbers of men than women; risk-taking activities such as physical fights, which more frequently affect men; intentional homicides, in which roughly seven times more men than women die; different remarriage rates by age, whereby, with increasing age, women remarry less often than men; sex-differentiated migration patterns, as occur in some frontier settings; and differential attendance of certain colleges and universities (women currently outnumber men on many college campuses throughout North America and Western Europe). Men tend to shift to brief encounters when many women are sexually available because the sex ratio is in their favor, and they are therefore better able to satisfy their desire for variety (Pedersen 1991). Ache men of Paraguay, for example, appear to be highly promiscuous because there are 50% more women than men (Hill & Hurtado 2017). In the most comprehensive cross-cultural study of sex ratio and sexual strategies, involving 14,059 individuals in 48 nations, people in cultures with a surplus of women

were more likely to endorse attitudes and behaviors associated with a short-term mating strategy (Schmitt 2005). When there is a surplus of men, in contrast, both sexes appear to shift toward a long-term mating strategy marked by stable marriages and fewer divorces (Pedersen 1991). A surplus of males also predicts polyandry—a form of mating in which one woman marries more than one man, often brothers (Starkweather & Hames 2012).

### Personality and Mating Strategy

One's own personality characteristics also appear to influence the pursuit of differing sexual strategies. A study of 13,243 individuals from 46 nations found that the traits of extraversion, low levels of agreeableness, and low levels of conscientiousness predicted an interest in short-term mating, attempts at poaching the mates of others, and succumbing to the lure of mate poaching by others (Schmitt & Shackelford 2008). The Dark Triad of personality—the traits of narcissism, psychopathy, and Machiavellianism—also predict exploitative short-term mating strategies, including willingness to engage in sex with others while in a relationship (e.g., Schmitt et al. 2017). Narcissism, for example, predicts a preference for one-night stands (Jonason et al. 2012).

### Ecological Parasite Prevalence

Because parasites are known to degrade physical appearance, people living in ecologies with a high prevalence of parasites should place a greater value on physical attractiveness in a mate than people living in ecologies with a low prevalence of parasites (Gangestad & Buss 1993). To test this hypothesis, the prevalence of parasites in 29 cultures was correlated with the importance that the people in those cultures attached to physical attractiveness in a marriage partner. The results confirmed the hypothesis: The greater the parasite prevalence, the more important was physical attractiveness (see also Gangestad et al. 2006).

### Cultural Norms and Rituals Influence Mating Strategies

Cultures differ tremendously in prevailing cultural norms surrounding mating and the rituals that they enact (Broude & Greene 1976, Frayser 1985). In some, matings are arranged; in others, individuals have great latitude for choice. Some, such as the culture of the Trobriand Islanders, encourage premarital sexual experimentation and place great emphasis on the female orgasm. Others forbid premarital sex and pay little attention to female sexual pleasure. Although all cultures appear to have marriage rituals, these vary in form. Some require men to pay a bride price in which resources are transferred to the woman's kin. Others expect the woman's family to provide a dowry in which resources get transferred to the man or his family. Some cultures legally permit polygamy; others forbid it. A few cultures practice polyandry (Marlowe 2003).

Although the origins of these differing cultural norms are largely unknown, it would be astonishing if they failed to influence human mating behavior. Humans have psychological adaptations to conform, prioritize the opinions of others, and monitor the status effects of their own behavior on their reputation within the group (Buss 2015). Cultural variation in the importance placed on virginity is correlated with the prevalence of premarital sex. Cultures with ritual practices of clitoridectomy and other forms of genital mutilation place a low priority on female sexual pleasure. Cultures even invent novel forms of mate guarding, such as infibulation, which physically prevents sexual intercourse unless or until the threads closing the vulvar lips are cut. A key direction for future theoretical and empirical work is a fuller integration of cultural evolution with SST.



## CHALLENGES TO SEXUAL STRATEGIES THEORY: CAN ALTERNATIVE THEORIES PROVIDE COGENT EXPLANATIONS?

Prior to SST, no theory of mating in the social sciences was anchored in fundamentals of evolutionary biology, specified the origins of mating strategies, predicted that the temporal dimension of mating would prove crucial, or outlined context-specific shifts in mating. Importantly, no prior theory predicted sex differences in the underlying psychology of mating.

Buss & Barnes (1986, p. 569), prior to Buss's cross-cultural study, proposed the first competing explanation for sex differences in mate preferences, a form of social role theory explanation that they called "structural powerlessness and sex role socialization." According to this view, because women are typically excluded from power and access to resources, which are largely controlled by men, women seek mates who have power, status, and earning capacity. Women try to marry upward in socioeconomic status because this provides their primary channel for gaining access to resources. Men do not value economic resources in a mate as much as women do because they already have control over these resources and because women have fewer resources anyway.

Subsequently, Eagly & Wood (1999) also proposed a social role explanation for the sex differences in mate preferences, albeit after the robust cross-cultural sex differences had been discovered (Buss 1989b). They suggested that the reason that some sex differences are universal is because gender roles stem, in part, from evolved physical differences between men and women (e.g., physical strength, ability to bear children). These physical sex differences, they argued, lead to the development of certain social structures (e.g., divisions of labor, political institutions, marital traditions) that guide gendered socialization practices and influence relationship dynamics in ways that generate psychological sex differences, including culturally universal sex differences in mate preferences (Eagly & Wood 1999). "As societies become more egalitarian, men and women become more similarly positioned in the social structure and, therefore, more similar psychologically in many ways" (Eagly et al. 2004, pp. 283–84). Thus, social role theory predicts that, as girls and boys are socialized more equally, experience more similar economic and undivided labor roles, experience lower levels of sociopolitical power differentials, and experience less patriarchy and sexism, psychological sex differences should become smaller.

The Bakweri from Cameroon in West Africa provide one test of social role theory by illustrating what happens when women have real power (Ardener et al. 1960). Bakweri women hold greater personal and economic power because they have more resources and are in scarcer supply than men. Women secure resources not only through their own labors on plantations but also from casual sex, which is a lucrative source of income. There are roughly 236 men for every 100 women, an imbalance that results from the continual influx of men from other areas of the country to work on the plantations. Because of the extreme imbalance in numbers of the sexes, women have considerable latitude to exercise their choice in a mate. Women have more money than men and more potential mates to choose from. Yet Bakweri women persist in preferring mates with resources. Wives often complain about receiving insufficient support from their husbands. A lack of sufficient economic provisioning is the reason most frequently cited by women for divorce. Bakweri women change husbands if they find a man who can offer them more money and pay a larger bride price. When women are in a position to fulfil their evolved preference for a man with resources, they do so. Having personal control of economic resources apparently does not negate this mate preference (see also Fales et al. 2016).

Buss (1989b) provided a more systematic set of tests of the social role theory explanation. In one test, he identified women who were financially successful, as measured by their salary and income, and contrasted their preferences in a mate with those of women with lower salaries and income. The financially successful women were well educated, tended to hold professional degrees,



and had high self-esteem. Successful women turned out to place an even greater value than less professionally successful women on mates who have professional degrees, high social status, and greater intelligence and who are tall, independent, and self-confident. Women's personal income was positively correlated with the income that they wanted in an ideal mate (Pearson product-moment correlation of  $r = +.31$ ), the desire for a mate who is a college graduate ( $r = +.29$ ), and the desire for a mate with a professional degree ( $r = +.35$ ). Contrary to the social role and structural powerlessness hypothesis, these women expressed an even stronger preference for high-earning men than did women who were less financially successful.

In a second test, Buss (1989b) correlated two culture-wide indicators of gender economic inequality with the magnitude of sex differences on preferences for mates with good earning capacity across 30 cultures. Neither indicator of gender economic or educational inequality correlated significantly with the magnitude of gender difference in this mate preference.

Eagly & Wood (1999) subsequently conducted secondary analyses on Buss's (1989b) data set. They constructed somewhat different indicators of the magnitude of culture-level gender equality or inequality in a subset of the cultures that Buss had studied. Only one of the four tests yielded a significant correlation with the magnitude of sex differences in the mate preference for good financial resources. None of the four tests of gender equality predicted significant cultural variation in sex differences in the importance attached to physical attractiveness. Of the critical tests across these two key variables, only one of the eight proved to be statistically significant, suggesting rather weak support for social role theory in the domain of mate preferences on these core variables.

Subsequent studies have continued to fail to find support for the social role theory of sex differences in mating strategies. Cross-cultural studies consistently find small but positive relationships between women's personal access to economic resources and preferences for mates with resources. A study of 1,670 Spanish women seeking mates through personal advertisements found that women with more resources and status were more likely to seek men with resources and status (Gil-Burmann et al. 2002). A study of 288 Jordanians found that both women and men with high socioeconomic status place more, not less, value on the mate characteristics of having a college graduate degree and being ambitious and industrious (Khallad 2005). A study of 127 individuals from Serbia concluded: "The high status of women correlated positively with their concern with a potential mate's potential socio-economic status, contrary to the prediction of the socio-structural model" (Todosijević et al. 2003, p. 116). Other large-scale cross-cultural studies fail to find support for the structural powerlessness hypothesis or social role theory (Lippa 2009, Schmitt 2012, Schmitt et al. 2017; but see also Zentner & Eagly 2015). More generally, a common finding across many studies is that sex differences tend to be larger in more gender egalitarian cultures (e.g., Schmitt 2014, Stoet & Geary 2018), in direct contradiction to predictions from the social role theory.

## CONCLUSIONS

To our knowledge, neither social role theory nor any other competing theories have yet provided content-rich predictions concerning (a) sex differences in short-term mating psychology, such as desires for sexual variety, quickness to agree to sex, and consenting to sex with complete strangers; (b) sex differences in patterns of and emotional reactions to sexual deception; (c) context-dependent male attraction to cues of female sexual exploitability; (d) sex differences in the causes of sexual regret; (e) universal standards of female facial beauty that embody cues to youth and fertility; (f) standards of female body attractiveness, such as a low waist-to-hip ratio, that embody cues to youth and fertility; (g) standards of male attractiveness that embody cues to status and resource



acquisition; (b) standards of male attractiveness, such as height and physical formidability, that embody cues to protection; (i) sex differences in and predictors of tactics of mate attraction, competitor derogation, and mate retention that correspond precisely to evolved mate preferences; and (j) context-dependent shifts in sexual strategies as a function of variables such as sex ratio, parasite prevalence, and mate value. SST predicts and successfully explains this diverse array of empirical findings. Any truly competing theory of human mating strategies, to be taken seriously, should provide a compelling alternative account for this large cumulative collection of empirical findings.

In this concluding section, we highlight advances in SST since its 1993 formulation and suggest directions for future theoretical development.

### Men's Short-Term Mating

Whereas Buss & Schmitt (1993) generated hypotheses about four design features of men's short-term mating strategies (e.g., time elapsed before seeking intercourse, number of sex partners desired, lowering of standards for short-term mates), subsequent theorizing and research has documented at least five additional design features. These include sexual regret over missed sexual opportunities; sexual attraction to women displaying cues to sexual exploitability; tactics of deception, i.e., feigning long-term interest to obtain short-term sex; emotional upset about being led on sexually without subsequent follow-through; and psychological tactics for avoiding entangling mating commitments (e.g., Jonason & Buss 2012).

### Women's Short-Term Mating

Although SST originally outlined several competing hypotheses about the function of women's short-term mating, evidence bearing on each was virtually nonexistent in 1993. Over the past 25 years, most research effort has been devoted to testing variants of the good genes hypothesis, including the dual mating hypothesis. After reviewing the evidence, our judgment is that the empirical evidence for the dual mating hypothesis is weak, although it cannot be ruled out for a subset of women.

Although the mate switching hypothesis is far less studied, we suggest that it is more promising than the dual mating hypothesis as an explanation of female short-term mating, particularly for female extra-pair mating (Buss et al. 2017). These hypotheses are not mutually exclusive. Short-term mating could serve different functions for different women in different circumstances. Some women might use short-term mating to assay potential long-term mates—a hypothesis that was originally proposed by Buss & Schmitt (1993) but that, to our knowledge, has remained untested empirically. Some women might use short-term mating to obtain resources, as proposed by Symons (1979) and Buss & Schmitt (1993) and more recently by Baumeister & Vohs (2012) under the rubric of sexual economics theory. Modern forms of sex-for-money exchanges include Internet pornography, sex-for-money Internet dating sites, and payment by men to watch women live on the Internet using sex cams. Do these forms of sex-for-money exchange simply reflect an exploitation of men's short-term mating psychology? Or are they modern manifestations of a proper evolved function of women's short-term mating strategy? More research is needed. For some women, short-term mating might serve no function at all and be merely a nonadaptive byproduct of activating sexual pleasure mechanisms in the modern environment. Consequently, future research should focus on testing hypotheses about which women under which circumstances obtain which benefits, if any, from short-term mating.

### Variations in Short-Term and Long-Term Mating

Short-term mating is not a singular phenomenon. Future research should distinguish low-commitment casual sex, such as college campus hookups, from low-investment affairs and distinguish the latter from long-term affairs that may, in essence, function little differently than formal long-term mating (Scelza & Prall 2018). The apparent surge in popularity of consensual nonmonogamy represents another interesting research avenue (Mogilski et al. 2017). Do these arrangements represent attempts to fulfill long-term and short-term mating strategies simultaneously? Do individuals who pursue consensual nonmonogamy differ in critical ways from those who do not, such as by possessing an unusually high sex drive or an unusually low activation threshold for sexual jealousy? There remains much to be discovered about important variations that cross-cut the temporal dimension of sexual strategies.

### Men's Long-Term Mating Strategy

Men's long-term mating has been central to SST from its first formulation. Many core elements of this strategy have been documented. These include mating priorities similar to those of women in long-term mating, such as prioritizing good partner and good parent qualities like dependability and emotional stability, as well as activation of the emotion of love, likely a key commitment device. Men's long-term mating also includes the priority that men place on cues to female reproductive value, such as youth and beauty; the priority that men place on sexual fidelity; the functional emotion of sexual jealousy; and the array of mate-retention tactics that men deploy to protect their reproductive assets, including benefit-bestowal of resources and tactics to repel threats from mate poachers (Buss & Shackelford 1997). Some scientific evidence highlights the value of SST in predicting men's mate switching or remarrying behaviors, such as divorcing an unfaithful or postmenopausal wife and remarrying women increasingly younger than they are (Conroy-Beam & Buss 2018). Much remains to be discovered, however, about the contexts that cause men to shift from a long-term to a short-term mating strategy (e.g., sudden rises in status) or from a short-term to a long-term mating strategy (e.g., successfully attracting women at the high end of their mate value ranges).

### Women's Long-Term Mating Strategy

Like men, women prioritize good partner and good parent qualities in a long-term mate—intelligence, dependability, emotional stability, adaptability, and good health. Women, more than men, prioritize economic resources; cues to resource acquisition, such as ambition and status; and cues to a man's willingness to channel those resources specifically to the woman and her children. There is little evidence from recent studies conducted across the globe, from India to China to Norway, that these priorities have changed, despite increased gender equality in some countries.

There is evidence, however, of cultural evolution in women's long-term mating. Modern men and women in mainland China, for example, no longer place as much value on virginity as they did 3 decades ago (Chang et al. 2011). Women in some cultures, such as Japan, appear to be foregoing long-term mating entirely, choosing to focus instead on their careers. As gender economic equality continues to increase, we can expect women to be increasingly exacting in their long-term mate preferences and to be less tolerant of existing mates who fail to fulfill their long-term desires.

### Evolved Mating Psychology in the Modern World

Humans evolved in small groups of hunter-gatherers numbering perhaps 50 to 150 individuals (Dunbar 1993). Contact with other groups occurred through fusion of smaller groups into a larger



group, trade between neighboring groups, efforts at exogamous mating, and small-group warfare. The entire pool of potential mates to which a typical ancestral human would have been exposed would have been perhaps a few dozen. Mating in the modern world, in sharp contrast, exposes people to hundreds of thousands of potential mates, as first made possible through population explosion and large urban cities. Internet dating has expanded the mating pool to millions. Cultural technologies have been invented to implement our evolved sexual strategies.

In a real sense, cultural evolution may be taking over where organic evolution left off. Humans create culturally novel technologies to more successfully pursue their evolved mating strategies. Specialized Internet dating sites are designed to exploit different facets of our evolved mating psychology. Simultaneously, however, these cultural innovations may change our mating psychology in many ways, some known and some unknown, including by deluding us about the possibility of finding a perfect mate who is maximally optimal on each of several dozen dazzling qualities. Our evolved standards of sexual morality may clash with cultural innovations, as when an individual must decide whether viewing pornography, purchasing increasingly realistic sex dolls, or using advanced virtual reality sex technology constitutes infidelity to a long-term mate.

It is an exciting time to study human mating. SST does not furnish the final word on human mating strategies, but it does provide a foundation on which the future science of human mating can be built.

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## LITERATURE CITED

- Alexander RD, Noonan KM. 1979. Concealment of ovulation, parental care, and human social evolution. In *Evolutionary Biology and Human Social Behaviour: An Anthropological Perspective*, ed. NA Chagnon, W Irons, pp. 436–53. North Scituate, MA: Duxbury Press
- Anderson K. 2006. How well does paternity confidence match actual paternity? Evidence from worldwide nonpaternity rates. *Curr. Anthropol.* 47(3):513–20
- Andersson MB. 1994. *Sexual Selection*. Princeton, NJ: Princeton Univ. Press
- Andrews TM, Lukaszewski AW, Simmons ZL, Bleske-Rechek A. 2017. Cue-based estimates of reproductive value explain women's body attractiveness. *Evol. Hum. Behav.* 38(4):461–67
- Ardener E, Ardener S, Warmington WA, Ruel MJ. 1960. *Plantation and Village in the Cameroons: Some Economic and Social Studies*. Oxford, UK: Oxford Univ. Press
- Arnqvist G, Rowe L. 2013. *Sexual Conflict*. Princeton, NJ: Princeton Univ. Press
- Arslan RC, Schilling KM, Gerlach TM, Penke L. 2017. Using 26 thousand diary entries to show ovulatory changes in sexual desire and behaviour. PsyArXiv. <http://doi.org/10.17605/OSF.IO/JP2YM>
- Asendorpf JB, Penke L, Back MD. 2011. From dating to mating and relating: predictors of initial and long-term outcomes of speed-dating in a community sample. *Eur. J. Personal.* 25(1):16–30
- Barrett HC, Frederick DA, Haselton MG, Kurzban R. 2006. Can manipulations of cognitive load be used to test evolutionary hypotheses? *J. Personal. Soc. Psychol.* 91(3):513–18
- Baumeister RF, Vohs KD. 2012. Sexual economics, culture, men, and modern sexual trends. *Society* 49(6):520–24

- Bendixen M, Asao K, Wyckoff J, Buss DM, Kennair LEO. 2017. Sexual regret in U.S. and Norway: effects of culture and individual differences in religiosity and mating strategy. *Personal. Individ. Differ.* 116:246–51
- Berscheid E, Walster E. 1974. Physical attractiveness. *Adv. Exp. Soc. Psychol.* 7:157–215
- Betzig L. 1989. Causes of conjugal dissolution: a cross-cultural study. *Curr. Anthropol.* 30(5):654–76
- Betzig L. 1992. Roman polygyny. *Ethol. Sociobiol.* 13(5–6):309–49
- Bokek-Cohen Y, Peres Y, Kanazawa S. 2008. Rational choice and evolutionary psychology as explanations for mate selectivity. *J. Soc. Evol. Cult. Psychol.* 2(2):42–55
- Borgerhoff Mulder M. 1988. Kipsigis bridewealth payments. In *Human Reproductive Behaviour: A Darwinian Perspective*, ed. L Betzig, M Borgerhoff Mulder, P Turke, pp. 65–82. Cambridge, UK: Cambridge Univ. Press
- Borgerhoff Mulder MB. 1990. Kipsigis women's preferences for wealthy men: evidence for female choice in mammals? *Behav. Ecol. Sociobiol.* 27(4):255–64
- Brewer G, Archer J. 2007. What do people infer from facial attractiveness? *J. Evol. Psychol.* 5(1):39–49
- Brewer G, Riley C. 2009. Height, relationship satisfaction, jealousy, and mate retention. *Evol. Psychol.* 7(3):447–89
- Broude GJ, Greene SJ. 1976. Cross-cultural codes on twenty sexual attitudes and practices. *Ethnology* 15:409–29
- Burriss RP, Welling LL, Puts DA. 2011. Mate-preference drives mate-choice: Men's self-rated masculinity predicts their female partner's preference for masculinity. *Personal. Individ. Differ.* 51(8):1023–27
- Buss DM. 1987. Sex differences in human mate selection criteria: an evolutionary perspective. In *Sociobiology and Psychology: Ideas, Issues, and Applications*, ed. C Crawford, M Smith, D Krebs, pp. 335–52. Mahwah, NJ: Lawrence Erlbaum
- Buss DM. 1988a. The evolution of human intrasexual competition: tactics of mate attraction. *J. Personal. Soc. Psychol.* 54(4):616–28
- Buss DM. 1988b. Love acts: the evolutionary biology of love. In *The Psychology of Love*, ed. R Sternberg, M Barnes, pp. 100–18. New Haven, CT: Yale Univ. Press
- Buss DM. 1989a. Conflict between the sexes: strategic interference and the evocation of anger and upset. *J. Personal. Soc. Psychol.* 56(5):735–47
- Buss DM. 1989b. Sex differences in human mate preferences: evolutionary hypotheses tested in 37 cultures. *Behav. Brain Sci.* 12(1):1–14
- Buss DM. 1991. Mate selection for good parenting skills. *Behav. Brain Sci.* 14(3):520–21
- Buss DM. 1995. Psychological sex differences: origins through sexual selection. *Am. Psychol.* 50:164–68
- Buss DM. 2015. *Evolutionary Psychology: The New Science of the Mind*. Abingdon, UK: Routledge
- Buss DM. 2016. *The Evolution of Desire: Strategies of Human Mating*. New York: Basic Books
- Buss DM. 2018. The evolution of love in humans. In *The New Psychology of Love*, ed. R Sternberg. Cambridge, MA: Cambridge Univ. Press. In press
- Buss DM, Abbott M, Angleitner A, Asherian A, Biaggio A, et al. 1990. International preferences in selecting mates: a study of 37 cultures. *J. Cross-Cult. Psychol.* 21:5–47
- Buss DM, Barnes M. 1986. Preferences in human mate selection. *J. Personal. Soc. Psychol.* 50(3):559–70
- Buss DM, Goetz C, Duntley JD, Asao K, Conroy-Beam D. 2017. The mate switching hypothesis. *Personal. Individ. Differ.* 104:143–49
- Buss DM, Haselton M. 2005. The evolution of jealousy. *Trends Cogn. Sci.* 9(11):506–7
- Buss DM, Larsen RJ, Westen D, Semmelroth J. 1992. Sex differences in jealousy: evolution, physiology, and psychology. *Psychol. Sci.* 3(4):251–56
- Buss DM, Schmitt DP. 1993. Sexual strategies theory: an evolutionary perspective on human mating. *Psychol. Rev.* 100(2):204–32
- Buss DM, Schmitt DP. 2011. Evolutionary psychology and feminism. *Sex Roles* 64(9–10):768–87
- Buss DM, Shackelford TK. 1997. From vigilance to violence: mate retention tactics in married couples. *J. Personal. Soc. Psychol.* 72(2):346–61
- Buss DM, Shackelford TK. 2008. Attractive women want it all: good genes, economic investment, parenting proclivities, and emotional commitment. *Evol. Psychol.* 6(1):134–46
- Buss DM, Shackelford TK, Kirkpatrick LA, Larsen RJ. 2001. A half century of mate preferences: the cultural evolution of values. *J. Marriage Fam.* 63:491–503



- Cattell RB, Nesselroade JR. 1967. Likeness and completeness theories examined by sixteen personality factor measures on stably and unstably married couples. *J. Personal. Soc. Psychol.* 7:351–61
- Chang L, Wang Y, Shackelford TK, Buss DM. 2011. Chinese mate preferences: cultural evolution and continuity across a quarter of a century. *Personal. Individ. Differ.* 50(5):678–83
- Clark AP. 2006. Are the correlates of sociosexuality different for men and women? *Personal. Individ. Differ.* 41(7):1321–27
- Clark MS, Reis HT. 1988. Interpersonal processes in close relationships. *Annu. Rev. Psychol.* 39:609–72
- Clark RD, Hatfield E. 1989. Gender differences in receptivity to sexual offers. *J. Psychol. Hum. Sex.* 2(1):39–55
- Confer JC, Easton JA, Fleischman DS, Goetz CD, Lewis DM, et al. 2010. Evolutionary psychology: controversies, questions, prospects, and limitations. *Am. Psychol.* 65(2):110–26
- Conroy-Beam D, Buss DM. 2018. The critical consequences of chronological age in human mating: evolved desires and their influence on actual mating behavior. *Evol. Behav. Sci.* In press
- Courtial A, Raymond M, Godelle B, Ferdy JB. 2010. Mate choice and human stature: homogamy as a unified framework for understanding mating preferences. *Evolution* 64(8):2189–203
- Cronk L, Dunham B. 2007. Amounts spent on engagement rings reflect aspects of male and female mate quality. *Hum. Nat.* 18(4):329–33
- Darwin C. 1859. *On the Origin of Species by Means of Natural Selection*. London: Murray
- Darwin C. 1871. *The Descent of Man and Selection in Relation to Sex*. London: Murray
- DeSteno D, Bartlett MY, Braverman J, Salovey P. 2002. Sex differences in jealousy: evolutionary mechanism or artifact of measurement? *J. Personal. Soc. Psychol.* 83(5):1103–16
- Dunbar RI. 1993. Coevolution of neocortical size, group size and language in humans. *Behav. Brain Sci.* 16(4):681–94
- Eagly AH, Wood W. 1999. The origins of sex differences in human behavior: evolved dispositions versus social roles. *Am. Psychol.* 54(6):408–23
- Eagly AH, Wood W, Johanssen-Schmidt MC. 2004. Social role theory of sex differences and similarities: implications for the partner preferences of women and men. In *The Psychology of Gender*, AH Eagly, AE Beal, RJ Sternberg, pp. 269–95. New York: Guilford Press. 2nd ed.
- Eastwick PW, Luchies LB, Finkel EJ, Hunt LL. 2014. The predictive validity of ideal partner preferences: a review and meta-analysis. *Psychol. Bull.* 140(3):623–65
- Edlund JE, Sagarin BJ. 2017. Sex differences in jealousy: a 25-year retrospective. *Adv. Exp. Soc. Psychol.* 55:259–302
- Fales MR, Frederick DA, Garcia JR, Gildersleeve KA, Haselton MG, Fisher HE. 2016. Mating markets and bargaining hands: mate preferences for attractiveness and resources in two national US studies. *Personal. Individ. Differ.* 88:78–87
- Fieder M, Huber S. 2007. Parental age difference and offspring count in humans. *Biol. Lett.* 3(6):689–91
- Frank RH. 1988. *Passions Within Reason: The Strategic Role of the Emotions*. New York: Norton
- Frayser S. 1985. *Varieties of Sexual Experience: An Anthropological Perspective*. New Haven, CT: HRAF Press
- Freud S, Strachey JE. 1964. *The Standard Edition of the Complete Psychological Works of Sigmund Freud*. London: Hogarth Press
- Gallup AC, White DD, Gallup GG. 2007. Handgrip strength predicts sexual behavior, body morphology, and aggression in male college students. *Evol. Hum. Behav.* 28(6):423–29
- Galperin A, Haselton MG, Frederick DA, Poore J, von Hippel W, et al. 2013. Sexual regret: evidence for evolved sex differences. *Arch. Sex. Behav.* 42(7):1145–61
- Gangestad SW, Buss DM. 1993. Pathogen prevalence and human mate preferences. *Evol. Hum. Behav.* 14(2):89–96
- Gangestad SW, Haselton MG, Buss DM. 2006. Evolutionary foundations of cultural variation: evoked culture and mate preferences. *Psychol. Inq.* 17(2):75–95
- Gangestad SW, Thornhill R. 2008. Human oestrus. *Proc. R. Soc. Lond. B* 275(1638):991–1000
- Gangestad SW, Thornhill R, Garver-Apgar CE. 2005. Women's sexual interests across the ovulatory cycle depend on primary partner developmental instability. *Proc. R. Soc. Lond. B* 272(1576):2023–27
- Garza R, Heredia RR, Cieslicka AB. 2016. Male and female perception of physical attractiveness: an eye movement study. *Evol. Psychol.* 14(1):1474704916631614

- Genovese JE. 2008. Physique correlates with reproductive success in an archival sample of delinquent youth. *Evol. Psychol.* 6(3):369–85
- Gil-Burmann C, Peláez F, Sánchez S. 2002. Mate choice differences according to sex and age. *Hum. Nat.* 13(4):493–508
- Gildersleeve K, Haselton MG, Fales MR. 2014. Do women's mate preferences change across the ovulatory cycle? A meta-analytic review. *Psychol. Bull.* 140(5):1205–59
- Glass SP, Wright TL. 1992. Justifications for extramarital relationships: the association between attitudes, behaviors, and gender. *J. Sex Res.* 29(3):361–87
- Goetz CD, Easton JA, Lewis DM, Buss DM. 2012. Sexual exploitability: observable cues and their link to sexual attraction. *Evol. Hum. Behav.* 33(4):417–26
- Gonzaga GC, Haselton MG, Smurda J, Sian Davies M, Poore JC. 2008. Love, desire, and the suppression of thoughts of romantic alternatives. *Evol. Hum. Behav.* 29(2):119–26
- Grammer K. 1992. Variations on a theme: age dependent mate selection in humans. *Behav. Brain Sci.* 15(1):100–2
- Gray PB. 2013. Evolution and human sexuality. *Am. J. Phys. Anthropol.* 152(S57):94–118
- Gray PB, Garcia JR, Gesselman AN. 2018. Age-related patterns in sexual behaviors and attitudes among single US adults: an evolutionary approach. *Evol. Behav. Sci.* In press
- Greiling H, Buss DM. 2000. Women's sexual strategies: the hidden dimension of extra-pair mating. *Personal. Individ. Differ.* 28(5):929–63
- Guttentag M, Secord PF. 1983. *Too Many Women? The Sex Ratio Question*. Thousand Oaks, CA: Sage
- Hald GM, Høgh-Olesen H. 2010. Receptivity to sexual invitations from strangers of the opposite gender. *Evol. Hum. Behav.* 31(6):453–58
- Haselton MG, Buss DM, Oubaid V, Angleitner A. 2005. Sex, lies, and strategic interference: the psychology of deception between the sexes. *Personal. Soc. Psychol. Bull.* 31(1):3–23
- Henrich J, Boyd R, Richerson PJ. 2012. The puzzle of monogamous marriage. *Phil. Trans. R. Soc. B* 367(1589):657–69
- Hewlett BS. 1991. Demography and childcare in preindustrial societies. *J. Anthropol. Res.* 47(1):1–37
- Hill K, Hurtado AM. 2017. *Acbe Life History: The Ecology and Demography of a Foraging People*. Abingdon, UK: Routledge
- Hitsch GJ, Hortaçsu A, Ariely D. 2010. What makes you click? Mate preferences in online dating. *Quant. Mark. Econ.* 8(4):393–427
- Hrdy SB. 1979. Infanticide among animals: a review, classification, and examination of the implications for the reproductive strategies of females. *Ethol. Sociobiol.* 1(1):13–40
- Hughes SM, Gallup GG. 2003. Sex differences in morphological predictors of sexual behavior: shoulder to hip and waist to hip ratios. *Evol. Hum. Behav.* 24(3):173–78
- Jankowiak W, ed. 1997. *Romantic Passion: A Universal Experience?* New York: Columbia Univ. Press
- Jonason PK, Buss DM. 2012. Avoiding entangling commitments: tactics for implementing a short-term mating strategy. *Personal. Individ. Differ.* 52(5):606–10
- Jonason PK, Luevano VX, Adams HM. 2012. How the Dark Triad traits predict relationship choices. *Personal. Individ. Differ.* 53(3):180–84
- Jones BC, Hahn AC, Fisher CL, Wang H, Kandrik M, et al. 2018. No compelling evidence that preferences for facial masculinity track changes in women's hormonal status. *Psychol. Sci.* In press
- Jünger J, Kordsmeyer TL, Gerlach TM, Penke L. 2018. Fertile women evaluate male bodies as more attractive, regardless of masculinity. *Evol. Hum. Behav.* In press
- Karremans JC, Frankenhuys WE, Arons S. 2010. Blind men prefer a low waist-to-hip ratio. *Evol. Hum. Behav.* 31(3):182–86
- Kennair LEO, Bendixen M, Buss DM. 2016. Sexual regret: tests of competing explanations of sex differences. *Evol. Psychol.* 14(4):1474704916682903
- Kennair LEO, Wyckoff J, Asao K, Buss DM, Bendixen M. 2018. Why do women regret casual sex more than men do? *Personal. Individ. Differ.* 127:61–67
- Kenrick DT, Groth GE, Trost MR, Sadalla EK. 1993. Integrating evolutionary and social exchange perspectives on relationships: effects of gender, self-appraisal, and involvement level on mate selection criteria. *J. Personal. Soc. Psychol.* 64:951–69



- Kenrick DT, Keefe RC. 1992. Age preferences in mates reflect sex differences in human reproductive strategies. *Behav. Brain Sci.* 15(1):75–91
- Kenrick DT, Sadalla EK, Groth G, Trost MR. 1990. Evolution, traits, and the stages of human courtship: qualifying the parental investment model. *J. Personal.* 58(1):97–116
- Khallad Y. 2005. Mate selection in Jordan: effects of sex, socio-economic status, and culture. *J. Soc. Personal. Relatsh.* 22(2):155–68
- Landolt MA, Lalumière ML, Quinsey VL. 1995. Sex differences in intra-sex variations in human mating tactics: an evolutionary approach. *Ethol. Sociobiol.* 16(1):3–23
- Lewis DM, Easton JA, Goetz CD, Buss DM. 2012. Exploitative male mating strategies: personality, mating orientation, and relationship status. *Personal. Individ. Differ.* 52(2):139–43
- Li NP. 2007. Mate preference necessities in long- and short-term mating: People prioritize in themselves what their mates prioritize in them. *Acta Psychol. Sin.* 39(3):528–35
- Li NP, Meltzer AL. 2015. The validity of sex-differentiated mate preferences: reconciling the seemingly conflicting evidence. *Evol. Behav. Sci.* 9(2):89–106
- Lippa RA. 2009. Sex differences in sex drive, sociosexuality, and height across 53 nations: testing evolutionary and social structural theories. *Arch. Sex. Behav.* 38(5):631–51
- Little AC, Jones BC, Penton-Voak IS, Burt DM, Perrett DI. 2002. Partnership status and the temporal context of relationships influence human female preferences for sexual dimorphism in male face shape. *Proc. R. Soc. Lond. B* 269(1496):1095–100
- Low BS. 1991. Reproductive life in nineteenth century Sweden: an evolutionary perspective on demographic phenomena. *Evol. Hum. Behav.* 12(6):411–48
- Lukaszewski AW, Roney JR. 2010. Kind toward whom? Mate preferences for personality traits are target specific. *Evol. Hum. Behav.* 31(1):29–38
- Marlowe FM. 2003. The mating system of foragers in the standard cross-cultural sample. *Cross-Cult. Res.* 37:282–306
- Marlowe FW. 2004. Mate preferences among Hadza hunter-gatherers. *Hum. Nat.* 15(4):365–76
- Mogilski JK, Memering SL, Welling LL, Shackelford TK. 2017. Monogamy versus consensual non-monogamy: alternative approaches to pursuing a strategically pluralistic mating strategy. *Arch. Sex. Behav.* 46(2):407–17
- Mikach SM, Bailey JM. 1999. What distinguishes women with unusually high numbers of sex partners? *Evol. Hum. Behav.* 20(3):141–50
- Miller G. 2000. Sexual selection for indicators of intelligence. *Novartis Found. Symp.* 233:260–70
- Minervini BP, McAndrew FT. 2006. The mating strategies and mate preferences of mail order brides. *Cross-Cult. Res.* 40(2):111–29
- Moss JH, Maner JK. 2016. Biased sex ratios influence fundamental aspects of human mating. *Personal. Soc. Psychol. Bull.* 42(1):72–80
- Muggleton NK, Fincher CL. 2017. Unrestricted sexuality promotes distinctive short- and long-term mate preferences in women. *Personal. Individ. Differ.* 111(1):169–73
- Nettle D, Pollet TV. 2008. Natural selection on male wealth in humans. *Am. Nat.* 172(5):658–66
- O'Connor M. 2008. Reconstructing the hymen: mutilation or restoration? *J. Law Med.* 16:161–75
- Pawlowski B, Dunbar RI. 1999. Withholding age as putative deception in mate search tactics. *Evol. Hum. Behav.* 20(1):53–69
- Pawlowski B, Koziol S. 2002. The impact of traits offered in personal advertisements on response rates. *Evol. Hum. Behav.* 23(2):139–49
- Pedersen FA. 1991. Secular trends in human sex ratios. *Hum. Nat.* 2(3):271–91
- Perusse D. 1993. Cultural and reproductive success in industrial societies: testing the relationship at the proximate and ultimate levels. *Behav. Brain Sci.* 16(2):267–83
- Petersen JL, Hyde JS. 2010. A meta-analytic review of research on gender differences in sexuality, 1993–2007. *Psychol. Bull.* 136(1):21–38
- Pettay JE, Helle S, Jokela J, Lummaa V. 2007. Natural selection on female life-history traits in relation to socio-economic class in pre-industrial human populations. *PLoS ONE* 2(7):e606
- Pierce CA. 1996. Body height and romantic attraction: a meta-analytic test of the male-taller norm. *Soc. Behav. Personal.* 24(2):143–49



- Pisanski K, Feinberg DR. 2013. Cross-cultural variation in mate preferences for averageness, symmetry, body size, and masculinity. *Cross-Cult. Res.* 47(2):162–97
- Puts D. 2016. Human sexual selection. *Curr. Opin. Psychol.* 7:28–32
- Regan PC. 1998. 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. *Personal. Soc. Psychol. Bull.* 24(12):1294–303
- Rhodes G, Simmons LW, Peters M. 2005. Attractiveness and sexual behavior: Does attractiveness enhance mating success? *Evol. Hum. Behav.* 26(2):186–201
- Røskaft E, Wara A, Viken Å, Betzig L. 1992. Reproductive success in relation to resource-access and parental age in a small Norwegian farming parish during the period 1700–1900. *Ethol. Sociobiol.* 13:443–61
- Scelza BA. 2011. Female choice and extra-pair paternity in a traditional human population. *Biol. Lett.* 7:889–91
- Scelza BA, Prall SP. 2018. Partner preferences in the context of concurrency: what Himba want in formal and informal partners. *Evol. Hum. Behav.* 39(2):212–19
- Scheib JE, Gangestad SW, Thornhill R. 1999. Facial attractiveness, symmetry and cues of good genes. *Proc. R. Soc. Lond. B* 266(1431):1913–17
- Schmitt DP. 2005. Sociosexuality from Argentina to Zimbabwe: a 48-nation study of sex, culture, and strategies of human mating. *Behav. Brain Sci.* 28(2):247–75
- Schmitt DP. 2012. When the difference is in the details: a critique of “Stepping out of the Caveman’s Shadow: Nations’ Gender Gap Predicts Degree of Sex Differentiation in Mate Preferences.” *Evol. Psychol.* 10(4):147470491201000406
- Schmitt DP. 2014. On the proper functions of human mate preference adaptations: comment on Eastwick, Luchies, Finkel, and Hunt (2014). *Psychol. Bull.* 140:666–72
- Schmitt DP. 2014. The evolution of culturally-variable sex differences: Men and women are not always different, but when they are . . . it appears not to result from patriarchy or sex role socialization. In *The Evolution of Sexuality*, ed. TK Shackelford, RD Hansen, pp. 221–56. Berlin: Springer
- Schmitt DP. 2017, June 28. Which people would agree to have sex with a total stranger? *Psychology Today*, June 28. <https://www.psychologytoday.com/blog/sexual-personalities/201706/who-would-agree-have-sex-total-stranger>
- Schmitt DP, Alcalay L, Allik J, Alves ICB, Anderson CA, et al. 2017. Narcissism and the strategic pursuit of short-term mating: universal links across 11 world regions of the International Sexuality Description Project-2. *Psychol. Top.* 26:89–137
- Schmitt DP, Buss DM. 1996. Strategic self-promotion and competitor derogation: sex and context effects on the perceived effectiveness of mate attraction tactics. *J. Personal. Soc. Psychol.* 70(6):1185–204
- Schmitt DP, Long AE, McPhearson A, O’Brien K, Remmert B, Shah SH. 2017. Personality and gender differences in global perspective. *Int. J. Psychol.* 52(S1):45–56
- Schmitt DP, Shackelford TK. 2008. Big Five traits related to short-term mating: from personality to promiscuity across 46 nations. *Evol. Psychol.* 6(2):246–82
- Schützwohl A, Fuchs A, McKibbin WF, Shackelford TK. 2009. How willing are you to accept sexual requests from slightly unattractive to exceptionally attractive imagined requestors? *Hum. Nat.* 20(3):282–93
- Simpson JA, Gangestad SW. 1992. Sociosexuality and romantic partner choice. *J. Personal.* 60(1):31–51
- Sohn K. 2017. Men’s revealed preference for their mates’ ages. *Evol. Hum. Behav.* 38(1):58–62
- Starkweather KE, Hames R. 2012. A survey of non-classical polyandry. *Hum. Nat.* 23(2):149–72
- Stoet G, Geary DC. 2018. The gender-equality paradox in science, technology, engineering, and mathematics education. *Psychol. Sci.* 29:581–93
- Sugiyama LS. 2005. Physical attractiveness: an adaptationist perspective. In *The Handbook of Evolutionary Psychology*, ed. DM Buss, pp. 292–342. New York: Wiley
- Symons D. 1979. *The Evolution of Human Sexuality*. Oxford, UK: Oxford Univ. Press
- Tadinac M, Hromatko I. 2007. Own mate value and relative importance of a potential mate’s qualities. *Stud. Psychol.* 49(3):251–64
- Todd PM, Penke L, Fasolo B, Lenton AP. 2007. Different cognitive processes underlie human mate choices and mate preferences. *PNAS* 104(38):15011–16
- Todosijević B, Ljubinković S, Arančić A. 2003. Mate selection criteria: a trait desirability assessment study of sex differences in Serbia. *Evol. Psychol.* 1(1):116–26



- Valentine KA, Li NP, Penke L, Perrett DI. 2014. Judging a man by the width of his face: the role of facial ratios and dominance in mate choice at speed-dating events. *Psychol. Sci.* 25(3):806–11
- van Anders SM, Hamilton LD, Watson NV. 2007. Multiple partners are associated with higher testosterone in North American men and women. *Horm. Behav.* 51(3):454–59
- Voland E, Engel C. 1990. Female choice in humans: a conditional mate selection strategy of the Krummhörn women (Germany, 1720–1874). *Ethology* 84(2):144–54
- Von Rueden C, Gurven M, Kaplan H. 2010. Why do men seek status? Fitness payoffs to dominance and prestige. *Proc. R. Soc. Lond. B* 278:2223–32
- Voracek M, Haubner T, Fisher ML. 2008. Recent decline in nonpaternity rates: a cross-temporal meta-analysis. *Psychol. Rep.* 103(3):799–811
- Wang G, Cao M, Sauciuvenaite J, Bissland R, Hacker M, et al. 2018. Different impacts of resources on opposite sex ratings of physical attractiveness by males and females. *Evol. Hum. Behav.* 39:220–25
- Waynforth D, Dunbar R. 1995. Conditional mate choice strategies in humans: evidence from “Lonely Hearts” advertisements. *Behaviour* 132(9/10):755–79
- Williams GC. 1975. *Sex and Evolution*. Princeton, NJ: Princeton Univ. Press
- Winch R. 1958. *Mate Selection*. New York: Harper & Row
- Wolf M, Musch J, Enczmann J, Fischer J. 2012. Estimating the prevalence of nonpaternity in Germany. *Hum. Nat.* 23(2):208–17
- Zentner M, Eagly AH. 2015. A sociocultural framework for understanding partner preferences of women and men: integration of concepts and evidence. *Eur. Rev. Soc. Psychol.* 26(1):328–73

