CHAPTER

C1

1

The Sexual Selection of Human Mating Strategies: Mate Preferences and Competition Tactics

David M. Buss

Abstract

Darwin's theory of sexual selection provided a cogent theoretical framework for understanding the major causal processes of the mating strategies of sexually reproducing species—intrasexual competition and preferential mate choice. This framework, along with important theoretical elaborations, has proven extraordinarily useful in scientific theories and empirical discoveries about human mating strategies. Darwin described intrasexual competition as the primary province of males and preferential mate choice as the primary province of females. Unlike many species, however, humans display mutual mate choice and both sexes compete intensely for desirable mates. Moreover, humans are at least somewhat unique in using complex language to deploy courtship tactics to attract mates and to impugn the qualities of mating rivals. This chapter reviews the impact of sexual selection theory on scientific discoveries about human mating strategies, focusing on mate selection criteria and tactics of intrasexual competition.

Key Words: sexual selection, mating strategies, mate preferences, intrasexual competition, sex differences

C1.P1   Darwin was rightly hailed for his discovery of *natural selection*, which is a form of selection that favors traits that lead to greater survival (Darwin, 1859). These traits subsumed those that helped organisms combat three classes of "hostile forces of nature." These include threats from the physical environment (e.g., extreme temperature, falls from cliffs, and drowning), other species (e.g., predators and parasites), and conspecifics (e.g., in *Homo sapiens*, homicide at the hands of other humans). Organisms with traits that favored surviving these hostile forces lived to reproductive age and produced more offspring than those felled by these forces.

C1.S1   ## Sexual Selection Theory

C1.P2   Some traits, Darwin observed, did not readily lend themselves to explanation via natural selection. The elaborate plumage of peacocks and loud songs sung by some birds are prime examples. Many of these traits seemed detrimental to survival, being both metabolically

costly and conspicuous to predators. So troubled was Darwin by these contrasurvival traits that he noted in one of his correspondences: "the sight of a feather in a peacock's tail, whenever I gaze at it, makes me sick!" (Darwin, 1860). Grappling with these explanatory puzzles ultimately led Darwin to formulate his theory of sexual selection. *Sexual selection* favors traits that lead to mating success and can be favored even if those traits carry some cost to an organism's survival (Darwin, 1871).

C1.P3   Darwin identified two distinct causal processes by which sexual selection for mating success could be achieved. The first was *intrasexual selection*, a process by which members of one sex compete with one another, the outcome of which is greater sexual access to members of the opposite sex. The greater size and strength of males of many species, as well as sexually dimorphic animal weapons of combat such as horns, antlers, and claws, presumably evolved via the process of intrasexual selection. These armaments gave their bearers an advantage in physical battles, or what has been termed "contest competition," and Darwin believed this process applied primarily to males of different species. As we will see, however, contest competition is only one form of intrasexual selection, and when it comes to humans, both sexes engage in vigorous same-sex competition.

C1.P4   The second causal process of sexual selection is *intersexual selection*, or preferential mate choice. The logic is that if members of one sex prefer certain qualities in potential mates, then potential mates who possess those qualities have a mating advantage. Heritable traits can evolve over time simply because they are consensually valued by those doing the choosing. Darwin believed that preferential mate choice was primarily the province of females, based in part on his observation that males were less discriminating and had lower thresholds for mating. When it comes to humans, however, both sexes exert strong preferential mate choice, so this causal process applies to both women and men. In short, mating success can be achieved by besting same-sex rivals or by displaying or possessing qualities desired by the other sex. Evolution occurs if these causal processes are iterated over time. Although the intrasexual component of Darwin's sexual selection theory was largely embraced by his contemporaries, the preferential mate choice component was not. And although the theory of natural selection in its survival selection form came to dominate the field of biology after Darwin, his theory of sexual selection was largely ignored for a century (with some notable exceptions, such as Fisher, 1958).

C1.P5   In 1972, an edited book celebrated Darwin's theory of mating success (Campbell, 1972). The most influential chapter was written by Robert Trivers (1972), who proposed a theory centering on which sex does the choosing and which sex does the competing—*the theory of parental investment and sexual selection*. The sex that invests more than the other, he argued, does the choosing, so the intersexual selection component applies mainly to that sex. The sex that invests less, in contrast, is more competitive with members of their own sex for mating access to the higher investing sex. Trivers's theory was based on the work of Bateman (1948), and the key principle is termed the "Bateman gradient," the steepness of the slope between mating success and reproductive success. Sexual access to

additional mates (one form of mating success), according to Bateman and Trivers, pays more reproductive dividends for the low-investing sex than for the high-investing sex.

C1.P6 Trivers's elaboration of sexual selection theory has largely been supported empirically (see Mogilski, 2020, for a recent review), including in "sex-role reversed" species such as the pipefish seahorse and the Mormon cricket. In species in which males invest more than females, it is the females who are more aggressively competitive with each other for access to the high-investing males. Although the Bateman gradient and Trivers's theory of parental investment on which it is based have been challenged by some (e.g., Gowaty et al., 2012; Tang-Martínez, 2016), meta-analyses across many species and mating systems have largely supported their derived predictions about sex differences (e.g., Janicke et al., 2016).

C1.S2 ## Sexual Strategies Theory Fundamentals

C1.P7 Sexual strategies theory (SST) is anchored in sexual selection theory, but in the human case there are additional complexities that require conceptual and empirical examination (Buss & Schmitt, 1993, 2019). SST suggests that humans have faced two fundamental classes of adaptive problems of mating: (a) exerting fitness-enhancing preferential mate choice, and (b) out-competing rivals for desirable mates. Although sometimes conceptualized as distinct, they can be causally linked in at least two ways (Buss, 1988a). First, if men compete with each other in physical contests such as wrestling or chest-pounding duals, the informative variance produced can create or amplify women's preferences for athletic prowess of physical formidability. Second, the mate preferences of one sex can dictate the domains of intrasexual competition in the other sex. If women value bravery in the face of danger, generosity in food sharing, or signs of social status, these mate preferences can create selection pressure on men to compete with other men to display honest indicators of bravery and generosity and to place a high motivational priority on achieving social rank. This conceptualization expands the domain of intrasexual competition beyond physical contest competition as conceptualized by Darwin—a topic covered in greater detail below in the section on Sexual Selection and Mate Competition.

C1.P8 When applied to humans, the role of sexual selection becomes even more complex due in part to the facultatively variable nature of male and female investment and the multiplicity of mating strategies of both sexes. Men's mating strategies vary from low investment (e.g., one-night stand and casual sex) to high investment (e.g., many years of provisioning and protecting offspring). Women's mating strategies also vary from low to high investment, although for offspring production per se, an undoubtedly important component of investment, human reproductive biology dictates that women have a higher level of *minimum obligatory* parental investment than men (nine months of pregancy vs. one act of sex). High-investment mating strategies include attachment, pair-bonding, and prolonged resource commitment. Low-investment strategies can be as minimal as a brief sexual encounter or casual hookup. As a shorthand, SST has labeled the ends of the

investment continuum as short-term and long-term mating strategies, with the recognition that the temporal dimension captures only one form of investment (Buss & Schmitt, 1993, 2019).

C1.P9   Important premises of SST include:

C1.P10   (a) *Humans have evolved distinct mating-specific adaptations*. Humans have evolved distinct adaptations for specific problems that must be solved to reap the fitness benefits and avoid the fitness costs of pursuing each sexual strategy.

C1.P11   (b) *Sex similarity in mating psychology*. In domains in which the sexes confront similar adaptive challenges, such as solving the commitment problem in long-term mating, they have evolved a similar sexual psychology.

C1.P12   (c) *Sex differences in mating psychology*. In domains in which the sexes have confronted somewhat different adaptive challenges, such as assessing the fertility or social status of a potential mate, they have evolved somewhat distinct features of their sexual psychology (see Buss, 1995, for the evolutionary meta-theory of sex differences).

C1.P13   (d) *Common long-term mating challenges faced by both sexes*. In long-term mating, common challenges faced by both sexes include identifying a partner able and willing to commit, assessing long-term mate attributes such as an altruistically skewed welfare trade-off ratio (i.e., one in which the partner makes decisions that reflect valuing your welfare more than their own) (Tooby et al., 2008), identifying mates with similar mate value trajectories over time, and identifying mates who are not overly encumbered with costly commitments such as children from prior mateships or in the modern environment great financial debt.

C1.P14   (e) *Male-specific long-term mating challenges*. Male-specific problems of long-term mating include identifying potential partners high in reproductive value and solving the paternity uncertainty problem.

C1.P15   (f) *Female-specific long-term mating challenges*. Female-specific challenges of long-term mating include identifying men who are able to acquire resources consistently over time, who are willing to invest those resources in her and her children without diverting them to other women and their children, and who are able and willing to protect her and her children from harm and exploitation by conspecifics.

C1.P16   (g) *Male-specific short-term mating challenges*. Because of asymmetries of obligatory parental investment, combined with differences in the fitness benefits reaped from short-term mating, the sexes have evolved somewhat distinct motivational priorities, mate preferences, and mate attraction strategies for short-term mating; in men, these include desiring a larger number of

sex partners, letting less time and commitment elapse before initiating sexual intercourse, and tactics for minimizing entangling commitments that would interfere with a short-term mating strategy (e.g., Jonason & Buss, 2012).

C1.P17   (h) *Female-specific short-term mating challenges.* In short-term mating, women have evolved to reap several potential fitness benefits, including immediate access to resources, obtaining high-quality genes, and mate switching to divest themselves of a cost-inflicting partner or to trade up to a superior partner (Buss et al., 2017).

C1.P18   (i) *Context-specificity of sexual strategies.* Humans have evolved mating adaptations to implement different sexual strategies depending on features of condition and context such as operational sex ratio, mate value, social norms surrounding sexuality, culture-specific mating system, and ecological variables such as parasite prevalence, sex-specific mortality, food scarcity or abundance, and individual resource demands driven by the number of dependent children (e.g., Gangestad & Buss, 1993; Prall & Scelza, 2020; Schmitt, this volume).

C1.P19   (j) *Sexual strategies are evolved psychological solutions and their behavioral manifestations.* Sexual strategies are evolved solutions to common and sex-differentiated mating problems. They include psychological design features sensitive to multiple features of context that activate or suppress them, information-processing procedures and decision rules, and manifest emotional, cognitive, and behavioral outputs that include attraction, sexual arousal, tactics of attraction, derogation of competitors, mate guarding, and many others.

C1.P20   (k) *Humans have little conscious awareness of their mating psychology.* No conscious awareness about origins, nature, or evolved functions of sexual strategies is implied by SST. Nonetheless, humans may possess partial insight into some aspects of sexual strategies either through observation of others or through introspection about the self, partially driven by the degree to which this awareness facilitates navigating the complex maze of mating challenges posed by the processes of sexual selection.

C1.P21   With these core premises in mind, we review the substantial bodies of empirical findings that have tested different aspects of SST.

C1.S3   ## Preferential Mate Choice

C1.P22   Evolved mate preferences create deviations from panmixia, or random mating. There exists no known species in which mating is truly panmictic. Although Darwin envisioned females to have evolved mate preferences, it is now clear that males of many species do as

well, and in humans both sexes have evolved clear and distinct mate preferences. These become especially important in long-term high-investment mating. Indeed, as predicted by Trivers's theory of parental investment and sexual selection, it is relative investment, not biological sex per se, that influences who does the choosing. Because both sexes invest heavily in long-term mating contexts, we expect both sexes to be extremely choosy. Although women have greater obligatory minimum investment than men, men typically invest much beyond the minimum, and in some cases a man's investment can exceed a woman's, as in cases in which upon divorce the man becomes the primary parent responsible for rearing the child.

C1.S4 *Consensually Desired Mate Preferences*

C1.P23   Cross-cultural studies bear out the prediction that men and women both have evolved specialized mate preferences. In studies of expressed preferences, both sexes place a priority on qualities such as *good health*, *dependability*, *kindness*, *intelligence*, and *honesty* (Buss, 1989; Lippa, 2007; Walter et al., 2020). Although these universal preferences were not predicted in advance of their discovery, a few evolutionarily informed speculations seem reasonable. Good health likely conveys a robust phenotype, a lack of debilitating diseases, and low parasite and virus loads. High parasite or virus loads could be transmitted to the mate choosers or their children. Moreover, to the degree that good health is heritable, genes for good health can be transmitted to offspring (Buss, 2016). Dependability as a personality trait may convey reliability through adversity and durability of commitment to the pair-bond over time. Kindness may signal a cooperative disposition and an altruistically skewed welfare trade-off ratio. An intelligent mate may aid in solving the many complicated problems a couple and their family face. And an honest mate may signal sexual and emotional fidelity to a partner and a nondeceptive or nonexploitative social strategy. Whether these speculations turn out to be supported or not, they lead to testable predictions that are amenable to empirical testing and potential falsification.

C1.S5 *Love as an Evolved Emotion Signaling Willingness to Commit*

C1.P24   The emotion of love has been hypothesized to be an evolved mate commitment device (Buss, 1988c, 2018; Frank, 1988). Love is a human universal (Jankowiak, 1997). Across cultures, people sing love songs, elope with a loved one against the wishes of their parents, and report personal anguish and longing when separated from a loved one. Committing reproductively relevant resources to a partner tops the list of most prototypical love acts (Buss, 1988c). This includes 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 feelings of sexual desire (Gonzaga et al., 2008). Despite widespread views in the social sciences over the past century that love is a European phenomenon of recent origin (e.g., Bloch, 2009), love is prioritized as a

key preference in long-term mating in countries ranging from Brazil to Zambia (Buss et al., 1990).

Male-Specific Long-Term Mate Preferences

Several evolution-based predictions were generated in advance of large cross-cultural tests of them. Two centered on men solving the problem of choosing fertile or reproductively valuable women—a preference for *youth* and a preference for *physical attractiveness*. Fertility (immediate chances of conception per act of sex) and reproductive value (age and sex specific future reproductive potential) show pronounced age gradients in women. Female reproductive value peaks in the late teens and fertility peaks in the mid-20s, and both show steep drops after those ages. For most women in most cultures, fertility is low by age 40 and close to zero by age 50 with the onset of menopause. In contrast, men's fertility is more gradually age-graded, and men in their 50s, 60s, and 70s can and sometimes do reproduce.

Empirical studies from well over 50 different cultures, from Brazil to Zambia, show that men strongly prefer youth in long-term mates (Buss, 1989; Conroy-Beam & Buss, 2019; Kenrick & Keefe, 1992). This universal sex difference in age preference holds in cultures that are presumptively monogamous such as Poland, as well as those that permit polygyny such as Zambia (Buss, 1989). The findings remain robust across cultures that vary in religion, ethnicity, political system, and distance from the equator.

As men get older, they prefer women who are increasingly younger than they are. Upon divorce and remarriage, men marry women who are increasingly younger than they are—three years younger at first marriage, five years younger at second marriage, and eight at third marriage (Guttentag & Secord, 1983). Moreover, men who are higher in mate value, such as those of higher status and resources, are more likely than men lacking these qualities to fulfill their mate preferences. A study of Swedes analyzing meticulous records from hundreds of years ago found that men with greater land holdings married women substantially younger than men lacking these resources (Low, 1991). And among the Kipsigis of Kenya, younger brides command a higher bride price than older brides in cows, sheep, and shillings, so only men with large resource holdings can afford to marry them (Borgerhoff Mulder, 1988). A study of men in Korea who purchased foreign brides ($n = 45,528$) found that men married younger brides, with the age gap reaching 20 years for the older sample of men (Sohn, 2017). In sum, men across cultures and over time have preferences for women who are young and hence fertile, and men who are in positions to implement their preferences do so.

Beauty Is in the Adaptations of the Beholder

According to Symons (1995), appearance conveys a wealth of information about age, developmental history, parasite load, disease history, and health. Because of its strong link to youth, evolutionists have long predicted that men have evolved a preference for

physical attractiveness in mates (Symons, 1979; Williams, 1975). Observable cues reliably linked to youth have become part of our evolved standards of female beauty.

C1.P29   A large body of empirical evidence supports this evolutionary theory of female attractiveness, although each discrete element can be empirically tested and new features continue to be discovered (see Stephen & Luoto, this volume). For example, there is substantial evidence that facial femininity, likely caused by high levels of circulating estrogen (a hormone linked to fertility that declines with female age), is a strong predictor of the attractiveness of female faces (Rhodes, 2006). A low waist-to-hip ratio (WHR), another characteristic of youth and fertility, is judged to be more attractiveness than a high WHR (Bovet, 2019; Singh et al., 2010). More recent discoveries include lumbar curvature and limbal ring thickness and darkness, which studies have linked to attractiveness and fertility (e.g., Lewis et al., 2015; Peshek et al., 2011). In short, the evolutionary theory of female attractiveness and its importance in men's mate preferences have received substantial empirical support.

C1.P30   All observable cues are only probabilistically linked to fertility and reproductive value. Most cues, such as symmetry, WHR, and facial femininity have been studied singly (though notable exceptions exist; see Jones, 2018; Mogilski & Welling, 2017, 2018; Perilloux & Cloud, 2019). Much empirical work remains to be conducted to obtain more precise probabilistic estimates about cue validity for each hypothesized attribute and cue combination. Future studies should examine multiple cues simultaneously to evaluate (a) cue validity, that is the strength of each cue's relationship to reproductive value; (b) predictive validity, that is the strength of each cue's correlation with judgments of attractiveness; and (c) whether particular combinations or configurations of cues prove more valid and predictive above and beyond those captured by the sum of individual cues.

C1.P31   Darwin's theory of mate choice sexual selection included both preferences based on functional attributes such as vigor and health that provide direct benefits to the mate chooser as well as aesthetic preferences that may be arbitrary, lacking any direct benefit to the mate chooser (e.g., Prum, 2012). In the case of human judgments of female beauty, the cumulative body of evidence points to the functional rather than arbitrarily aesthetic explanation—preferences are functional when attraction occurs toward cues to fertility and reproductive value.

C1.P32   In addition to choosing a fertile mate, men over evolutionary history repeatedly confronted another adaptive challenge—solving *the problem of paternity uncertainty*. Because fertilization occurs internally within women, men cannot be certain that they are the genetic father of a woman's child. Men who failed to solve this problem would have risked investing valuable resources in the offspring of intrasexual rivals. To compound these costs, the mates of those men would have also devoted their investments into offspring of their rivals. Unless ancestral men were able to solve this problem, it is unlikely that men would have evolved a long-term high-investment mating strategy. Perhaps the

difficulty of solving the problem of paternity uncertainty explains why long-term, high-investment mating strategies are so rare in the mammalian world, characterizing only 3–5% of mammals.

C1.P33   In principle, men could have evolved to solve this adaptive problem in a variety of ways. One is through mate guarding (e.g., Buss, 2002; Kaighobadi et al., 2010). Another is through adaptations that displace the sperm of rival males (Starrett & Shackelford, this volume). A third is by selecting a mate likely to remain sexually faithful. An early test of the mate preference solution posited a desire for *chastity* in a potential mate as a solution, defined as someone who has not had sexual intercourse. An empirical test of this hypothesis across 37 cultures failed to provide universal support for it (Buss, 1989). Indeed, a preference for virginity in potential spouses was the most culturally variable preference in the 37-culture study. In mainland China, virginity was viewed as "indispensable" in a mate by both sexes. In Sweden, in contrast, virginity was viewed as "irrelevant" in selecting a spouse. Across cultures, 62% indicated a sex difference, with men valuing virginity in mates more than women in each instance. In 38% of the cultures, no sex difference emerged. These findings were in sharp contrast to the universal sex differences found for youth and physical attractiveness.

C1.P34   Some researchers then hypothesized that virginity before marriage may be less important than likelihood of future fidelity postmarriage (Buss, 2016). Subsequent studies of limited scope found that *sexual fidelity* was indeed highly valued by men, in one study emerging as the top mate preference from among a list of several dozen (Buss & Schmitt, 1993). Other studies discovered that both men and women are attentive to the sexual history of potential spouses, attempting to obtain information about their sexual reputation and number of prior sex partners (Buss, 2016; Mogilski et al., 2014). Because a good predictor of future behavior is past behavior, and number of prior sex partners is a predictor of infidelity likelihood, it's possible that men's inquiries into this information is part of how they deal with the challenge of paternity uncertainty. Nonetheless, at the current time, there is no compelling evidence that men have evolved a universal solution to this problem in the form of a specific mate preference, although it is equally clear that the emotion of sexual jealousy and the intensity with which men guard their mates and prevent them from having sexual contact with rivals are robust phenomena (e.g., Buss, 2000; Buss et al., 1992; Daly et al., 1982; Edlund & Sagarin, 2017; Symons, 1979).

C1.P35   In summary, there is good evidence that men have evolved long-term mate preferences, some of which they have in common with women (e.g., good health and kindness) and some of which are more characteristic of men than women (e.g., prioritizing youth and physical attractiveness). Hypotheses about mate preferences as solutions to the paternity uncertainty problem have not been investigated with sufficient rigor cross-culturally to draw definitive conclusions.

C1.S8 *Female-Specific Long-Term Mate Preferences*

C1.P36 Due to the heavy demands of prolonged pregnancy and an extremely long childhood characteristic of humans, ancestral women faced the challenge of providing resources for herself and her offspring. Based on studies of traditional cultures, women do much of the provisioning work themselves, contributing as much as 60% of the calories to their families (Hill & Hurtado, 1996). Nonetheless, the later stages of pregnancy limit a woman's resource acquisition abilities, and may impede tasks such as foraging and small-game hunting. The metabolic demands of pregnancy and lactation create greater needs. And during harsh winters and droughts in which gatherable foods are scarce and humans risked starvation, as evidenced by periods of dramatic population shrinkage, having a mate able and willing to provide resources to a woman and her children would have been extremely valuable. Moreover, the key selective force would not have been whether a woman could, in principle, forage for all the resources she and her children need but rather whether having a mate who was willing and able to provide resources would have given her an advantage in survival and reproductive success compared to women who lacked a provisioning mate. Humans, moreover, evolved as omnivores, and meat was a key part of human diet as convergent evidence suggests, such as our massive small intestines and the importance of large-game hunting, which was almost exclusively a male resource acquisition endeavor (Wrangham, 2009).

C1.P37 For these reasons, evolutionists have long hypothesized that women have evolved a specialized mate preference for men who have both the *ability and the willingness to provide resources*. The first large-scale test of this hypothesis received support in the 37-culture study (Buss, 1989), and the findings have been replicated in dozens of other cultures (see Buss & Schmitt, 2019, for summaries). Women also value qualities that are linked to resource acquisition, such as ambition-industriousness and social status, although the sex differences in valuation of these qualities are not as strong or as universal as the preference for good financial prospects.

C1.P38 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 in Tanzania, found that women placed great importance on a man's foraging abilities, centrally his ability to hunt and provide meat (Marlowe, 2004).

C1.P39 Women face another adaptive challenge in long-term mating which entails solving *the problem of protection*—securing a "bodyguard" who can safeguard them and their children from aggression, including sexual aggression, at the hands of other men. Women's expressed mate preferences for men who are *taller than average, athletic, physically fit*, and *physically formidable* appear designed to help deal with this challenge (see Buss, 2016, for a summary of the evidence). Women also value the psychological quality of *bravery* in the

face of danger in long-term mates, which indicates a willingness to offer protection against aggressive conspecifics.

Condition-Dependent Shifts in Mating Strategies

C1.S9

C1.P40 Mate preferences and strategies shift according to personal, social, ecological, and cultural contexts. One context is *personal mate value*. Those who are high in desirability appear to increase their standards, particularly on sex-linked mate preferences. Women high in mate value, for example, become more exacting on many mate preferences (Buss & Shackelford, 2008). They impose higher minimum standards and provide a longer list of desired traits in studies conducted in Croatia, Poland, Canada, and the United States (Pawlowski & Dunbar, 1999; Regan, 1998).

C1.P41 *Sex ratio.* A key social context affecting mating is *operational sex ratio*—the ratio of men to women in the extant mating pool (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; homicides, in which roughly seven times more men than women die; and different remarriage rates by age, whereby with increasing age women remarry less often than men. Men shift to brief sexual 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, 1997). 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 to 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).

C1.P42 *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). A more recent study of 45 countries, however, failed to replicate this finding (Walter et al., 2020), while simultaneously successfully replicating the above sex differences in mate preferences, so the importance of this ecological variable is currently in question, awaiting further research.

C1.S10 **Short-Term Mate Preferences**

C1.P43 Because of the large sexual asymmetry in obligatory parental investment, a straightforward set of predictions follows from SST about sex differences in short-term mating. Buss and Schmitt (1993) originally specified four that directly pertain to sex differences in desires for *sexual variety*: (a) men will express greater desire for, or interest in, short-term mates than will women, (b) men will desire larger numbers of sex partners than will women, (c) men will be willing to engage in sexual intercourse after less time has elapsed than will women, and (d) men will relax their mate preference standards in short-term mating contexts more than 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, et al., 2017).

C1.P44 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 +.74. Men more than women desire a larger number of sex partners across time intervals ranging from a month to a lifetime. If 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 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 independent cross-cultural studies, with not a single cultural exception (Lippa, 2009; Schmitt, 2005). Men more than women relax their standards for low-cost short-term matings across an array of mate qualities, including personality, intelligence, and even attractiveness.

C1.P45 Not only are these sex differences robust across cultures, on some measures, the magnitude *increases* in more gender-egalitarian cultures. For example, sex differences in expressed comfort 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, 2005).

C1.P46 In short, voluminous empirical evidence supports key predictions from SST regarding predicted design features of men's short-term sexual psychology. SST, from its inception, 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 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 hooking up, friends with benefits, one-night stands, or extra-pair sexual encounters. And they do so strategically.

C1.P47   Because ancestral women typically could not have dramatically increased their reproductive output from 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 and 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.

C1.P48   Although these are qualitatively distinct 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 herself and her 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 her offspring—the hypothesis most vigorously advocated by many evolutionary scientists (e.g., Thornhill &Gangestad, 2008; Gildersleeve et al., 2014). And some women, finding themselves in a cost-inflicting 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 advocated by Buss and colleagues (Buss et al., 2017).

C1.P49   What do the empirical tests show? One of the first tests was conducted by Greiling and Buss (2000) who examined predictions from all 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, the contexts in which short-term mating occurred, and benefit perceptions by women who actively pursued short-term mating. They found some support consistent with the resource acquisition and mate-switching hypotheses, although these findings cannot be viewed as decisive or definitive.

C1.S11   *The Good Genes Hypothesis*

C1.P50   Most research on the possible functions of women's short-term mating has focused on the good genes hypothesis. The primary source of evidence has been shifts in women's mate preferences at ovulation (Gangestad et al., this volume). The logic of the hypothesis is that some women pursue a dual mating strategy—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 prioritize hypothesized "good genes" qualities (e.g., symmetry, masculine features, and physical attractiveness); that these preference shifts will center on short-term rather than long-term mating; and that sexual desire will peak for men other than women's regular partners.

C1.P51   The empirical evidence for these mate preference shifts is 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 were small (Gildersleeve et al., 2014).

A subsequent 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 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 women's preferences for masculine bodies increased at ovulation, as predicted by the good genes hypothesis (Junger et al., in press). Based on the studies conducted thus far, empirical support for the hypothesized good genes function of women's short-term mating is weak or mixed (Jones et al., 2019).

C1.P52   The good genes 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 finding 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 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., 2018).

C1.P53   Second, because all traits highly valued by women in long-term mating show moderate heritability, including intelligence, emotional stability, dependability, ambition, and industriousness, it is not clear conceptually why masculine and symmetrical features should be singled out as special cases of "good genes" indicators. To take one example, intelligence shows somewhat higher heritability than most other traits, has been hypothesized to be a cardinal good-genes indicator (e.g., Miller, 2001), yet there is no evidence that women elevate the importance they attach to intelligence at ovulation. In short, on both theoretical and empirical grounds, the good genes 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 function of women's short-term mating may be more promising—the mate-switching hypothesis.

C1.S12   *The Mate-Switching Hypothesis*

C1.P54   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, dying in a war, or in probabilistic anticipation of a potential breakup. This has been called the "mate insurance" function of short-term mating (Buss, 2016). Another variant involves having a short-term sexual encounter

to make it easier to divest herself 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 her current partner. A fourth variant involves using short-term mating as a means of assaying her mate value to evaluate whether there might be more desirable and accessible potential partners on the mating market.

C1.P55 Few empirical studies have tested the mate-switching hypothesis directly, but several independent findings converge on its plausibility. First, *relationship dissatisfaction* is one of the most powerful predictors of women's infidelity but not men's infidelity (Glass & Wright, 1992). Second, relationship dissatisfaction predicts women's sexual interest in other men both during the fertile *and* luteal phases of the ovulation cycle (Gangestad et al., 2005). This finding is consistent with infidelity functioning for mate switching, but it cannot be explained by the good genes hypothesis, which predicts interest in other men only during the ovulation phase. Third, *women's reported benefits* of extra-pair 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).

C1.P56 Fifth, 79% of women who have affairs report *falling in love* with their affair partner, in contrast to only a third of men who have affairs (Glass & Wright, 1992)—and love is an emotion hypothesized to come online in long-term mating contexts (Buss, 1988c, 2018). If the primary function of female infidelity were to secure superior genes from an affair partner, falling in love would be both superfluous and costly because it might interfere with securing continued investment from a woman's regular partner.

C1.P57 Sixth, the *qualities women want in an affair partner* are similar to those 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.

C1.P58 Moreover, one meta-analysis misattributed paternity reported a rate of only 1.7% (Anderson, 2006). A second meta-analysis reported a rate between 3.1% and 3.7% (Voracek et al., 2008). And 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 semi-nomadic Himba of Namibia, 23% of children from arranged marriages, but none from "love" marriages, were cases of misattributed paternity (Scelza, 2011). The 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 hypothesis.

C1.P59 The good genes and mate-switching hypotheses are not mutually exclusive. A small minority of women in some 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. I 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 its inputs, decision rules, and outputs, see Buss et al., 2017).

C1.S13 *Additional Functions of Short-Term Mating for Women*

C1.P60 The mate-switching and good genes hypotheses do not exclude other 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 is 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 securing good genes is the primary function.

C1.S14 **Sexual Selection Through Mate Competition**

C1.P61 Although human mating research guided by Darwin's sexual selection theory has focused on mate preferences, much research has also focused on the second causal process of sexual selection—intrasexual competition.

C1.S15 *Contest Competition*

C1.P62 Darwin's initial theory focused on contest competition (i.e., physical battles, typically among males, the outcomes of which led to mating success for the victors). As Darwin described, "the greater size, strength, courage, pugnacity, and energy of man, in comparison with woman, were acquired during primeval times, and have subsequently been augmented, chiefly through the contests of rival males for the possession of the females" (Darwin, 1871, p. 605). Some evolutionary scholars, in contrast, have suggested that contest competition has played little role in humans (e.g., Schacht & Kramer, 2019). They point to lower levels of sexual dimorphism in humans compared to many other primate species on attributes such as size, height, and weight. More recently, the study of contest

competition among humans has seen a resurgence that may overturn conventional wisdom among evolutionary scholars (Puts et al., this volume).

C1.P63   One source of evidence centers on sexual dimorphism—sex differences in features of body morphology. Sexual dimorphism can be caused by several evolutionary forces, including sex differences in mate preferences and division of labor between the sexes. If women prefer to mate with tall men, for example, and men do not impose an analogous selection pressure on women, the sexes will diverge in height over evolutionary time. If men specialize in large-game hunting and women in gathering and small-game hunting, then qualities that lead to success in these sex-differentiated endeavors can create sexual dimorphism as well. Contest competition also creates sexual dimorphism, and species in which contest competition is intense, from elephant seals to chimpanzees, show marked sexual dimorphism. Elephant seal males, for example, weigh four times as much as females—a species marked by harem polygyny and markedly higher reproductive variance among males than among females (Le Boeuf, 1974).

C1.P64   Puts and his colleagues argue that convergent findings from multiple sources support the hypothesis that humans have experienced a long and intense evolutionary history of sexual selection via contest competition (Puts, 2010; Puts et al., this volume). They examined more than a dozen traits using multiple criteria for evaluation: (a) Does the trait show sexual dimorphism? (b) Does the trait emerge at puberty when the sexes enter reproductive competition? (c) Is the trait linked with mating success?

C1.P65   It is true that humans show comparatively low levels of sexual dimorphism on overall body mass—males exceed females by only 15–20%. This global index, however, overlooks specific components of sexual dimorphism such as muscle mass. Men have 61% more muscle mass than women, and 75% more upper-body muscle mass (Puts et al., this volume). This translates into the average young man having more upper-body muscle mass than 99.9% of same-age young women. The male bias in upper-body muscle mass is especially pronounced in elements conducive to punching, such as forward arm thrusting, shoulder flexion, and power generated by elbow extension (Puts et al., this volume).

C1.P66   Other large sex differences include proclivity to physical aggression, same-sex homicides of which 95% are male-on-male, coalitional aggression (e.g., gangs and intergroup warfare), throwing velocity, craniofacial structure in which men's greater robustness appears to function as a defense against punches, displays of physical prowess, sports that involve direct one-on-one combat such as boxing or mixed martial arts, and many others. Men more than women appear to spontaneously assess whether they are more physically formidable compared to same-sex others. Although no single element of this sexually dimorphic evidence provides definitive confirmation of the importance of human contest competition as a force of sexual selection, Puts et al. (this volume) argue that a history of contest competition is the most parsimonious explanation of the entire array. Over the next decade, the field can anticipate more empirical research devoted to this neglected aspect of Darwin's theory of sexual selection.

C1.S16   *Tactics of Attraction and Derogation of Competitors*

C1.P67   The mate preferences of one sex should determine the dimensions along which members of the opposite sex compete. If men and women strongly prefer kind and dependable mates, both sexes are predicted to display acts of kindness and dependability in their attraction tactics. If there are sex-differentiated mate preferences, theory predicts sex-differentiated attraction tactics. These predictions have been supported. Studies of undergraduate and newlywed couples support the predictions that display of kindness, helping, and altruism figure heavily in the early stages of tactics of attraction (Buss, 1988a; Bleske-Rechek & Buss, 2006; Schmitt & Buss, 1996). For example, both sexes show sympathy for the potential partner's troubles and make offers to help. Both sexes derogate their mating competitors by implying that they are unkind, mean, selfish, and enjoy "using" members of the opposite sex (Buss & Dedden, 1990; Schmitt & Buss, 1996). Both sexes impugn their rival's intelligence, mentioning that the rival is stupid or an "airhead," or arranging to make the rival seem dumb. Both sexes prioritize "good health" in potential mates, so both display tactics of attraction such as showing good hygiene and derogate their rivals by mentioning that they have a sexually transmitted disease (Buss & Dedden, 1990). Sense of humor is highly valued by both sexes, and both sexes display humor roughly equally as tactics of attraction (Schmitt & Buss, 1996).

C1.P68   Predictions about sex-differentiated tactics of attraction are also strongly supported. Men more than women display resources, boast about their resources, and showcase their ambition as tactics of attraction (Schmitt & Buss, 1996). They also belittle their mating rivals on these dimensions, telling a prospective mate the rival has no money, lacks drive or ambition, or drives a cheap old car. Women more than men value signs that a prospective mate will offer protection, and men's tactics of attraction follow suit. While showing off their own strength, men also impugn a rival's strength, attempt to outshine him in athletic contests, physically dominate him in front of the prospective mate, and call him cowardly.

C1.P69   Men more than women prioritize physical attractiveness in mate preferences, and women's tactics of attraction and competitor derogation follow suit. Women more than men wear facial makeup, report spending more than an hour making their appearance attractive, diet to improve their figures, and groom and style their hair carefully (Buss, 1988a). More than men, women derogate their mating rivals by making fun of their appearance, laughing at their hair, mentioning that the rival is fat or ugly, making fun of the size or shape of the rival's body, and mentioning that the rival's thighs are unusually heavy (Buss & Dedden, 1990; Krems, 2021; Schmitt & Buss, 1996).

C1.P70   Men more than women prefer sexual fidelity in a long-term mate, and women's tactics of attraction and competitor derogation appear to embody these preferences. In long-term mating, women are especially likely to show signs of sexual exclusiveness and are more likely than men to call rivals a slut, promiscuous, or "loose" (i.e., having had many previous sex partners), and mention that their rival cannot remain loyal to one man (Buss & Dedden, 1990; Krems, 2021; Schmitt & Buss, 1996).

C1.P71   In summary, tactics of attraction and competitor derogation are well-predicted by mate preferences. Both sexes compete to embody the qualities consensually desired in mates, and show sex-differentiated competition tactics precisely in the domains in which there exist sex-differentiated mate preferences. Confirmation of the hypothesis that patterns of mate competition can be well predicted by expressed mate preferences supports the close causal connection between the two major components of Darwin's sexual selection theory.

C1.S17   *Mate Poaching and Mate Guarding*

C1.P72   The causal processes of sexual selection do not end once a mateship has formed. Intrasexual competition continues in the form of mate poachers who vie to lure a mate away, either for a temporary liaison or for a more permanent mateship (Schmitt & Buss, 2001). Existing partners engage in mate retention or mate guarding efforts to combat mate poachers and deter defection from their regular mate (Buss, 1988b; Buss & Shackelford, 1997; Kaighobadi et al., 2010). Mate poachers attempt to embody the mate preferences of their targets more fully than the target's existing partner. For both sexes, this includes displaying higher mate value on both consensually desired and sex-differentiated mate preferences. Mate guarders attempt to fend off mate poachers. For men, these involve tactics as diverse as vigilance, physically assaulting a mate poacher, displaying more extravagant kindnesses and resources toward their mate, or sequestering her. For women, these involve tactics such as escalating her vigilance, displaying renewed kindnesses, doubling her efforts to enhance her physical appearance, and performing sexual favors. The two causal processes of sexual selection, in short, begin with the initial stages of mate attraction and mate competition, continue after a mateship has been initiated in forms such as mate poaching, mate guarding, and mate switching, and even continue in the aftermath of a breakup in forms such as stalking and efforts to entice a former mate back for sexual encounters or a more permanent mateship (Buss, 2021).

C1.S18   **Sexual Coercion and Sexual Selection: Unresolved Issues**

C1.P73   The nonhuman animal scientific literature is replete with studies of sexual coercion—instances in which males use tactics that appear to bypass female choice (Arnqvist & Rowe, 2005). Examples of these tactics include both indirect and direct methods (Thompson & Alvarado, 2012). Two indirect tactics are *sequestration* (i.e., the male enforces a separation of the female from other males) and *punishment* of the female for interacting with other males. Three direct tactics are *intimidation* (i.e., aggression toward the female for resisting mating), *harassment* (i.e., repeated efforts to mate with a reluctant or resisting female, creating a war of attrition that is sometimes asymmetric), and *forced copulation* (i.e., the use of physical restraint or violence to obtain sexual intercourse).

C1.P74   Smuts and Smuts (1993) proposed that sexual coercion should be regarded as a third form of sexual selection, supplementing the two traditional Darwinian processes of preferential mate choice and intrasexual competition. Among evolutionary biologists, Thornhill

and Palmer (2000) endorsed this view. Some evolutionary theoreticians argued that all sexual selection ultimately stems from preferential mate choice creating mating biases, directly and sometimes indirectly (Cunningham & Birkhead, 1998). According to this view, females preferring to mate with some males while rejecting others could select for male tactics to overcome female resistance. So male sexual coercion, according this view, would be a tactic evolving due to female mate choice for resisting sex with a subset of males. Other evolutionary biologists argued that all forms of sexual selection ultimately stemmed from competition among members of one sex for matings with the opposite sex (e.g., Andersson & Iwasa, 1996). In this framing, sexual coercion would be one form of intrasexual competition, along with other forms such as contest competition, scramble competition, and sperm competition. Both views may be correct, and may be somewhat different framings of the same issues.

C1.P75   Watson-Capps (2009) suggested that the key issue is *mating bias*. In traditional female mate choice, mating bias occurs when females select one or a subset of mates possessing desirable traits, and in consequence, that subset of males experiences increased mating success. In sexual coercion, mating bias occurs when a subset of males increases their mating success by overcoming female resistance to their mating advances. If females experience harm from sexual coercion, either through bodily injury, reputational damage, or siring suboptimal offspring as a consequence of being inseminated by suboptimal males, then sexual coercion could be regarded as a form of male–male competition, but one that differs in kind from other forms of intrasexual competition such as contest competition, scramble competition, resource acquisition competition, or sperm competition.

C1.P76   In short, sexual coercion is often intimately intertwined with the Darwinian processes of preferential mate choice and intrasexual competition. The particular ways in which it is intertwined vary according to different contexts, such as whether the act of coercion harms the female (or even creates a fitness benefit in the form of successfully coercive sons).

C1.P77   A key issue is whether evolution by selection favored distinct male strategies of sexual coercion in humans, regardless of how it is framed vis-à-vis sexual selection theory. This issue is highly contentious. On one side, some hypothesize that human males have evolved specific adaptations to rape females (Thornhill & Palmer, 2000). On the other side, some hypothesize that human males have not evolved rape-specific adaptations but rather that rape is a nonadaptive or even maladaptive by-product of other male adaptations, such as a desire for sexual variety, a willingness to have impersonal sex, and the use of aggression to obtain a variety of ends (Symons, 1979; Thornhill & Palmer, 2000).

C1.P78   Unfortunately, little research has been devoted directly to adjudicating between these competing hypotheses. Extant studies refute one version of the rape adaptation view, the so-called *mate deprivation hypothesis* (Buss, 2021). According to this hypothesis, men who lack sexual opportunity as a consequence of being disfavored by women (or failing to embody women's mate preferences) use force as a last-ditch tactic to avoid total matelessness. Studies of convicted rapists show that they are disproportionately men of low

socioeconomic status, which would seem to favor the mate deprivation hypothesis. This support, however, is illusory (Buss, 2021). Convicted rapists are not representative of all rapists, and men with money and means are less likely to be accused when they have committed acts of sexual coercion, and when accused, often use their resources to hire high-priced lawyers to escape conviction. They silence victims with monetary settlements that require nondisclosure, so many instances of sexual coercion are never revealed. Moreover, several studies suggest that men who are high in status and successful in consensual mating contexts are more, not less, likely to also use sexual coercion (e.g., Lalumiere et al., 1996). Although some mate-deprived men undoubtedly sometimes rape, the weight of the evidence falsifies a strict version of the mate deprivation component of the rape-adaptation hypothesis.

C1.P79 The evidence for other versions of the rape adaptation hypothesis, such as marital rape in the context of sperm competition (e.g., Thornhill & Palmer, 2000), has received some empirical support, but the evidence is largely equivocal or inconclusive (Buss, 2021). Most predictions from the rape adaptation hypothesis have yet to be tested. Moreover, it is proving difficult to identify critical tests that can distinguish between the adaptation versus by-product hypotheses. Some have argued, for example, that the finding that rape victims are disproportionately concentrated among young, and hence fertile, women is evidence consistent with the rape adaptation hypothesis (Thornhill & Palmer, 2000). However, the fact that men are attracted to such women in regular consensual mating contexts means that this finding is equally consistent with the by-product hypothesis (Thornhill & Palmer, 2000). No specialized rape adaptation needs be invoked to explain the finding. Future empirical research may be better able to adjudicate between the competing hypotheses about sexual coercion.

C1.P80 Regardless of the origins of sexual coercion, there is consensus that sexual coercion has recurred throughout human history, and likely has been a harm inflicted on women over deep time. Biblical writings from thousands of years ago, ancient paintings depicting rape, ethnographies of traditional societies describing episodes of rape, and even circumstantial molecular evidence of genetic sweeps occurring in Mongolia, Ireland, and Norway all converge on the deep-time history of human rape (Buss, this volume). Consequently, it is reasonable to hypothesize that women have evolved defenses to prevent becoming a victim of male sexual coercion (e.g., Buss, this volume; Smuts & Smuts, 1993; Thornhill & Palmer, 2000; Wilson & Mesnick, 1997). If sexual coercion has inflicted fitness costs on women over deep time, as seems likely, it would be astonishing if women had not evolved defenses against it.

C1.P81 Hypotheses about women's evolved defenses are many in number and diverse in nature (Buss, 2021). They include adaptations to form social alliances with kin, female friends, male friends, or male mates who function as "bodyguards"; specialized rape fears that motivate avoidance of sexually vulnerable situations and sexually aggressive men; fighting, appeasing, fleeing, and refuging when confronted with an attacker; tonic immobility

when entrapped with no escape possible; and concealment in the aftermath to avoid reputational damage (Buss, this volume). Women's defenses presumably have evolved through the mate choice component of sexual selection, function to resist mating with nonpreferred men, and have the effect of creating a mating bias in the reproductive success of males.

C1.S19   **Sexual Selection is the Key to Human Mating Strategies**

C1.P82   Darwin's theory of sexual selection, with modern elaborations unknown in Darwin's day, is the most important overarching framework for understanding human mating strategies. There exist no alternative theoretical frameworks that better explain observed patterns of human mating. Although preferential mate choice was initially proposed to operate primarily within females and intrasexual competition primarily within males, both causal processes operate strongly within both sexes in the human case. In long-term mating, both sexes typically invest heavily in offspring, so both sexes are predicted to be choosy or discriminating. And both sexes compete with members of their own sex for desirable members of the other sex.

C1.P83   The forms of intrasexual competition are more variable and complex than Darwin envisioned. In addition to physical battles of *contest competition*, other forms include *scramble competition for locating mates*; *competition to satisfy the mate preferences of the opposite sex,* such as resources, social status, beauty, and dependability that are attractive to mates (Buss, 1988a); *endurance rivalry*, which involves the ability to sustain mating effort over long periods of time (Andersson & Iwasa, 1996); *sperm competition*, in which the sperm from two or more males compete within the female reproductive tract for access to the valuable egg (Parker, 1970; Shackelford & Goetz, 2007); and possibly *sexual coercion*, in which nonpreferred males displace preferred males, leading to sexually selected defenses in women to prevent males from bypassing their mate choice (Andersson & Iwasa, 1996; Arnqvist & Rowe, 2005; Parker, 1979).

C1.P84   Intrasexual competition also takes on a unique form in the human case as a consequence of the evolution of language. Both sexes use language to attract mates, including displays of humor, charm, or verbal prowess. Humans also use language to derogate their rivals, rendering them less attractive to target mates through slings and arrows of insults and character-impugning reputational damage (Buss & Dedden, 1990; Krems, 2021).

C1.P85   In a scientific era of replication crisis, sex differences in the components of human mating strategies are among the most robust and replicable of all findings in the social sciences. Sex differences in mate preferences, for example, remain replicable through multiple data sources that include self-reported preferences, studies of online dating searches, studies of sex differences in response rates to preferred qualities of online dates, attraction tactics used by the opposite sex, derogation tactics used to lower the desirability of mating competitors, patterns of dating deception, tactics of mate poaching, predictors of mate

guarding, causes of divorce, and many others (Buss & Schmitt, 2019). Research on the evolution of human mating is theoretically robust and empirically cumulative.

C1.P86   Sexual selection theory, initially advanced by Darwin more than 150 years ago, continues to bear scientific fruit in human mating research. It leads to novel discoveries, such as the use of language in intrasexual mate competition. It illuminates areas not envisioned by Darwin, such as sexual coercion and women's defenses against male attempts to bypass female mate choice. And it provides heuristic value, guiding scientists to important domains of hypothesis generation and empirical study. Sexual selection theory, so important in understanding the mating of all sexually reproducing species, is no less important in understanding the mating strategies of our own species.

C1.S20
References

Anderson, K. (2006). How well does paternity confidence match actual paternity? Evidence from worldwide nonpaternity rates. *Current Anthropology*, *47*(3), 513–520.

Andersson, M., & Iwasa, Y. (1996). Sexual selection. *Trends in Ecology & Evolution*, *11*(2), 53–58.

Arnqvist, G., & Rowe, L. (2005). *Sexual conflict*. Princeton University Press.

Bateman, A.J. (1948). Intrasexual selection in Drosophila. *Heredity*, *2*, 349–368.

Arslan, R. C., Schilling, K. M., Gerlach, T. M., & Penke, L. (2018). Using 26,000 diary entries to show ovulatory changes in sexual desire and behavior. *Journal of Personality and Social Psychology*.

Bleske-Rechek, A., & Buss, D. M. (2006). Sexual strategies pursued and mate attraction tactics deployed. *Personality and Individual Differences*, *40*(6), 1299–1311.

Bloch, R. H. (2009). *Medieval misogyny and the invention of western romantic love*. University of Chicago Press.

Borgerhoff Mulder, M., & Turke, P. (1988). Kipsigis bridewealth payments. *Human Reproductive Behaviour: A Darwinian Perspective*, *7*(3), 65–82.

Bovet, J. (2019). Evolutionary theories and men's preferences for women's waist-to-hip ratio: Which hypotheses remain? A systematic review. *Frontiers in Psychology*, *10*, Article 1221.

Buss, D. M. (1988a). The evolution of human intrasexual competition: Tactics of mate attraction. *Journal of Personality and Social Psychology*, *54*(4), 616–628.

Buss, D. M. (1988b). From vigilance to violence: Tactics of mate retention in American undergraduates. *Ethology and Sociobiology*, *9*(5), 291–317.

Buss, D. M. (1988c). Love acts. *The evolutionary biology of love*. In R. J. Sternberg & M. L. Barnes (Eds.), *Psychology of love* (pp. 100–118). Yale University Press.

Buss, D. M. (1989). Sex differences in human mate preferences: Evolutionary hypotheses tested in 37 cultures. *Behavioral and Brain Sciences*, *12*(1), 1–14.

Buss D. M. (1995). Psychological sex differences: Origins through sexual selection. *American Psychologist,* 50, 164–168.

Buss, D. M. (2002). Human mate guarding. *Neuroendocrinology Letters*, *23*(4), 23–29.

Buss, D. M. (2000. *The dangerous passion: Why jealousy is a necessary as love and sex*. Free Press.

Buss, D.M. (2016). *The evolution of desire: Strategies of human mating*. New York: Basic Books

Buss, D. M. (2018). The evolution of love in humans. In R. J. Sternberg & K. Sternberg (Eds.), *The new psychology of love (pp. 42-63)*. Cambridge University Press.

Buss, D. M. (2021). *When men behave badly: The hidden roots of sexual deception, harassment, and assault*. Little, Brown Sparks.

Buss, D. M., Abbott, M., Angleitner, A., Asherian, A., Biaggio, A., Blanco-Villasenor, A., Bruchon-Schweitzer, M., Ch'U, H-Y., Czapinski, J., Deraad, B., Ekehammar, B., El Lohamy, N., Fioravanti, M., Georgas, J., Gjerde, P., Guttman, R., Hazan, F., Iwawaki, S., Janakiramaiah, N. . . . Yang, K-S. (1990). International preferences in selecting mates: A study of 37 cultures. *Journal of Cross-Cultural Psychology, 21*, 5–47.

Buss, D. M., & Dedden, L. A. (1990). Derogation of competitors. *Journal of Social and Personal Relationships*, *7*(3), 395–422.

Buss, D. M., Goetz, C., Duntley, J. D., Asao, K., & Conroy-Beam, D. (2017). The mate switching hypothesis. *Personality and Individual Differences*, *104*, 143–149.

Buss, D. M., Larsen, R. J., Westen, D., & Semmelroth, J. (1992). Sex differences in jealousy: Evolution, physiology, and psychology. *Psychological Science*, *3*(4), 251–256.

Buss, D. M., & Schmitt, D. P. (1993). Sexual strategies theory: An evolutionary perspective on human mating. *Psychological Review*, *100*(2), 204–232.

Buss, D. M., & Schmitt, D. P. (2011). Evolutionary psychology and feminism. *Sex Roles*, *64*(9–10), 768–787.

Buss, D. M., & Schmitt, D. P. (2019). Mate preferences and their behavioral manifestations. *Annual Review of Psychology*, *70*, 77–110.

Buss, D. M., & Shackelford, T. K. (1997). From vigilance to violence: Mate retention tactics in married couples. *Journal of Personality and Social Psychology*, *72*(2), 346.

Buss, D. M., & Shackelford, T. K. (2008). Attractive women want it all: Good genes, economic investment, parenting proclivities, and emotional commitment. *Evolutionary Psychology*, *6*(1), 134–146.

Campbell, B. G. (Ed.). (1972). *Sexual selection and the descent of man, 1871-1971*. Aldine.

Conroy-Beam, D., & Buss, D. M. (2019). Why is age so important in human mating? Evolved age preferences and their influences on multiple mating behaviors. *Evolutionary Behavioral Sciences*, *13*(2), 127–157.

Cunningham, E. J. A., & Birkhead, T. R. (1998). Sex roles and sexual selection. *Animal Behaviour*, *56*(6), 1311–1321.

Daly, M., Wilson, M., & Weghorst, S. J. (1982). Male sexual jealousy. *Ethology and sociobiology*, *3*(1), 11–27.

Darwin, C. (1859). *On the origin of species by means of natural selection*. London: Murray.

Darwin, C. (1860). Letter 2743 of Darwin Correspondence Project. Cambridge University. http://www.darwinproject.ac.uk/entry 2743

Darwin, C. (1871). *The descent of man and selection in relation to sex*. Murray.

Darwin, C. (1872). *The expression of the emotions in man and animals*. Murray.

Edlund, J. E., & Sagarin, B. J. (2017). Sex differences in jealousy: A 25-year retrospective. In J. M. Olson (Ed.), *Advances in experimental social psychology* (Vol. 55, pp. 259–302). Academic Press.

Fisher, R. A. (1958). *The genetical theory of natural selection*. Clarendon Press. (Original work published 1930)

Frank, R. H. (1988). *Passions within reason: The strategic role of the emotions*. W.W. Norton.

Gangestad, S. W., & Buss, D. M. (1993). Pathogen prevalence and human mate preferences. *Ethology and Sociobiology*, *14*(2), 89–96.

Gangestad, S. W., Haselton, M. G., & Buss, D. M. (2006). Evolutionary foundations of cultural variation: Evoked culture and mate preferences. *Psychological Inquiry*, *17*(2), 75–95.

Gildersleeve, K., Haselton, M. G., & Fales, M. R. (2014). Do women's mate preferences change across the ovulatory cycle? A meta-analytic review. *Psychological Bulletin*, *140*(5), 1205.

Glass, S. P., & Wright, T. L. (1992). Justifications for extramarital relationships: The association between attitudes, behaviors, and gender. *Journal of Sex Research*, *29*(3), 361–387.

Gonzaga, G. C., Haselton, M. G., Smurda, J., Davies, M., & Poore, J. C. (2008). Love, desire, and the suppression of thoughts of romantic alternatives. *Evolution and Human Behavior*, *29*(2), 119–126.

Gowaty, P. A., Kim, Y.-K., & Anderson, W. W. (2012). No evidence of sexual selection in a repetition of Bateman's classic study of Drosophila melanogaster. *Proceedings of the National Academy of Sciences, 109*(29), 11740–11745.

Greiling, H., & Buss, D. M. (2000). Women's sexual strategies: The hidden dimension of extra-pair mating. *Personality and Individual Differences*, *28*(5), 929–963.

Guttentag, M., & Secord, P. F. (1983). *Too many women?: The sex ratio question*. SAGE Publications, Incorporated.

Hill, K., & Hurtado, A. M. (1996). *Ache life history: The ecology and demography of a foraging people*. Routledge.

Hrdy, S. B. (1979). Infanticide among animals: A review, classification, and examination of the implications for the reproductive strategies of females. *Ethology and Sociobiology*, *1*(1), 13–40.

Janicke, T., Häderer, I. K., Lajeunesse, M. J., & Anthes, N. (2016). Darwinian sex roles confirmed across the animal kingdom. *Science Advances*, *2*(2), Article e1500983.

Jankowiak, W. (Ed.). (1997). *Romantic passion: A universal experience?* Columbia University Press.

Jonason, P. K., & Buss, D. M. (2012). Avoiding entangling commitments: Tactics for implementing a short-term mating strategy. *Personality and Individual Differences*, *52*(5), 606–610.

Jones, A. L. (2018). The influence of shape and colour cue classes on facial health perception. *Evolution and Human Behavior*, *39*(1), 19–29.

Jones, B. C., Hahn, A. C., Fisher, C. I., Wang, H., Kandrik, M., Han, C., Fasolt, V., Morrison, D., Lee, A. J., Holzleitner, I. J., O'Shea, K. J., Roberts, S. C., Little, A. C., & DeBruine, L. M. (2018). No compelling evidence that preferences for facial masculinity track changes in women's hormonal status. *Psychological Science*, *29*(6), 996–1005.

Jones, B. C., Hahn, A. C., & DeBruine, L. M. (2019). Ovulation, sex hormones, and women's mating psychology. *Trends in Cognitive Sciences*, *23*(1), 51–62.

Kaighobadi, F., Shackelford, T. K., & Buss, D. M. (2010). Spousal mate retention in the newlywed year and three years later. *Personality and Individual Differences*, *48*(4), 414–418.

Kenrick, D. T., & Keefe, R. C. (1992). Age preferences in mates reflect sex differences in human reproductive strategies. *Behavioral and Brain Sciences*, *15*(1), 75–91.

Kenrick, D. T., Sadalla, E. K., Groth, G., & Trost, M. R. (1990). Evolution, traits, and the stages of human courtship: Qualifying the parental investment model. *Journal of Personality*, *58*(1), 97–116.

Krems, J. A. (2021). Verbal derogation among women. In T. K. Shackelford & V. A. Shackelford (Eds.), *Encyclopedia of evolutionary psychological science* (pp. 8358–8359) Cham Springer.

Lalumière, M. L., Chalmers, L. J., Quinsey, V. L., & Seto, M. C. (1996). A test of the mate deprivation hypothesis of sexual coercion. *Ethology and Sociobiology*, *17*(5), 299–318.

Le Boeuf, B. J. (1974). Male-male competition and reproductive success in elephant seals. *American Zoologist*, *14*(1), 163–176.

Lewis, D. M., Russell, E. M., Al-Shawaf, L., & Buss, D. M. (2015). Lumbar curvature: A previously undiscovered standard of attractiveness. *Evolution and Human Behavior*, *36*(5), 345–350.

Lippa, R. A. (2007). The preferred traits of mates in a cross-national study of heterosexual and homosexual men and women: An examination of biological and cultural influences. *Archives of Sexual Behavior*, *36*(2), 193–208.

Lippa, R. A. (2009). Sex differences in sex drive, sociosexuality, and height across 53 nations: Testing evolutionary and social structural theories. *Archives of Sexual Behavior*, *38*(5), 631–651.

Low, B. S. (1991). Reproductive life in nineteenth century Sweden: an evolutionary perspective on demographic phenomena. *Ethology and Sociobiology*, *12*(6), 411–448.

Marlowe, F. W. (2004). Mate preferences among Hadza hunter-gatherers. *Human Nature*, *15*(4), 365–376.

Miller, G. (2001). *The mating mind: How sexual choice shaped the evolution of human nature*. Anchor.

Mogilski, J. K. (2020). Parental investment theory. In T. K. Shackelford (Ed.), *The SAGE handbook of evolutionary psychology*. SAGE.

Mogilski, J. K., Wade, T. J., & Welling, L. L. (2014). Prioritization of potential mates' history of sexual fidelity during a conjoint ranking task. *Personality and Social Psychology Bulletin*, *40*(7), 884–897.

Mogilski, J. K., & Welling, L. L. (2017). The relative importance of sexual dimorphism, fluctuating asymmetry, and color cues to health during evaluation of potential partners' facial photographs. *Human Nature*, *28*(1), 53–75.

Mogilski, J. K., & Welling, L. L. (2018). The relative contribution of jawbone and cheekbone prominence, eyebrow thickness, eye size, and face length to evaluations of facial masculinity and attractiveness: A conjoint data-driven approach. *Frontiers in Psychology*, *9*, Article 2428.

Moss, J. H., & Maner, J. K. (2016). Biased sex ratios influence fundamental aspects of human mating. *Personality and Social Psychology Bulletin*, *42*(1), 72–80.

Parker, G. A. (1970). Sperm competition and its evolutionary consequences in the insects. *Biological Reviews*, *45*(4), 525–567.

Parker, G. A. (1979). Sexual selection and sexual conflict. *Sexual selection and reproductive competition in insects*, *123*, 166.

Pawłowski, B., & Dunbar, R. I. (1999). Impact of market value on human mate choice decisions. *Proceedings of the Royal Society of London. Series B: Biological Sciences*, *266*(1416), 281–285.

Pedersen, F. A. (1991). Secular trends in human sex ratios. *Human Nature*, *2*(3), 271–291.

Perilloux, C., & Cloud, J. M. (2019). Mate-by-numbers: Budget, mating context, and sex predict preferences for facial and bodily traits. *Evolutionary Psychological Science*, *5*(3), 294–299.

Petersen, J. L., & Hyde, J. S. (2010). A meta-analytic review of research on gender differences in sexuality, 1993–2007. *Psychological Bulletin*, *136*(1), 21–38.

Peshek, D., Semmaknejad, N., Hoffman, D., & Foley, P. (2011). Preliminary evidence that the limbal ring influences facial attractiveness. *Evolutionary Psychology*, *9*(2), 147470491100900201.

Prall, S. P., & Scelza, B. A. (2020). Resource demands reduce partner discrimination in Himba women. *Evolutionary Human Sciences*, *2*, Article E45. https://doi.org/10.1017/ehs.2020.43

Prum, R. O. (2012). Aesthetic evolution by mate choice: Darwin's really dangerous idea. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *367*(1600), 2253–2265.

Puts, D. A. (2010). Beauty and the beast: Mechanisms of sexual selection in humans. *Evolution and Human Behavior*, *31*(3), 157–175. https://doi.org/10.1016/j.evolhumbehav.2010.02.005

Scelza, B. A. (2011). Female choice and extra-pair paternity in a traditional human population. *Biology Letters*, *7*, 889–891. 788–991. https://doi.org/10.1098/rsbl.2011.0478

Scelza, B. A., & Prall, S. P. (2018). Partner preferences in the context of concurrency: what Himba want in formal and informal partners. *Evolution and Human Behavior*, *39*(2), 212–219.

Schacht, R., & Kramer, K. L. (2019). Are we monogamous? A review of the evolution of pair-bonding in humans and its contemporary variation cross-culturally. *Frontiers in Ecology and Evolution*, *7*(230). https://doi.org/10.3389/fevo.2019.00230

Schmitt, D. P. (2005). Sociosexuality from Argentina to Zimbabwe: A 48-nation study of sex, culture, and strategies of human mating. *Behavioral and Brain Sciences*, *28*(2), 247–275.

Schmitt, D. P., & Buss, D. M. (1996). Strategic self-promotion and competitor derogation: Sex and context effects on the perceived effectiveness of mate attraction tactics. *Journal of Personality and Social Psychology*, *70*(6), 1185–1204.

Schmitt, D. P., & Buss, D. M. (2001). Human mate poaching: Tactics and temptations for infiltrating existing mateships. *Journal of Personality and Social Psychology*, *80*(6), 894–917

Schmitt, D. P., Long, A. E., McPhearson, A., O'Brien, K., Remmert, B., & Shah, S. H. (2017). Personality and gender differences in global perspective. *International Journal of Psychology*, *52*, 45–56.

Shackelford, T. K., & Goetz, A. T. (2007). Adaptation to sperm competition in humans. *Current Directions in Psychological Science*, *16*(1), 47–50.

Singh, D., Dixson, B. J., Jessop, T. S., Morgan, B., & Dixson, A. F. (2010). Cross-cultural consensus for waist–hip ratio and women's attractiveness. *Evolution and Human Behavior*, *31*(3), 176–181.

Smuts, B. B., & Smuts, R. W. (1993). Male aggression and sexual coercion of females in nonhuman primates and other mammals: evidence and theoretical implications. *Advances in the Study of Behavior*, *22*(22), 1–63.

Sohn, K. (2017). Men's revealed preference for their mates' ages. *Evolution and Human Behavior*, *38*, 58–62. https://doi.org/10.1016/j.evolhumbehav.2016.06.007

Symons, D. (1979). *The evolution of human sexuality*. Oxford University Press.

Symons, D. (1995). Beauty is in the adaptations of the beholder: The evolutionary psychology of human female sexual attractiveness. In P. R. Abramson & S. D. Pinkerton (Eds.), *Sexual nature/sexual culture* (pp. 80–118). University of Chicago Press.

Regan, P. C. (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. *Personality and Social Psychology Bulletin*, *24*(12), 1294–1303.

Rhodes, G. (2006). The evolutionary psychology of facial beauty. *Annual Review of Psychology*, *57*, 199–226.

Starkweather, K. E., & Hames, R. (2012). A survey of non-classical polyandry. *Human Nature*, *23*(2), 149–172.

Tang-Martínez, Z. (2016). Rethinking Bateman's principles: Challenging persistent myths of sexually reluctant females and promiscuous males. *The Journal of Sex Research*, *53*(4–5), 532–559.

Thompson, M. E., & Alvarado, L. C. (2012). Sexual conflict and sexual coercion in comparative evolutionary perspective. In T.K. Shackelford & A.T. Goetz (Eds.), *The Oxford Handbook of Sexual Conflict in Humans*. NY: Oxford University Press.

Thornhill, R., & Gangestad, S. W. (2008). *The evolutionary biology of human female sexuality*. Oxford University Press.

Thornhill, R., & Palmer, C. T. (2000). Why men rape. *SCIENCES-NEW YORK-*, *40*(1), 30–36.

Tooby, J., Cosmides, L., Sell, A., Lieberman, D., & Sznycer, D. (2008). Internal regulatory variables and the design of human motivation: A computational and evolutionary approach. In A. J. Elliott (Ed.), Handbook of *approach and avoidance motivation* (pp. 251–271). Psychology Press.

Trivers, R. L. (1972). Parental investment and sexual selection. In B. Campbell (Ed.), *Sexual selection and the descent of man* (pp. 136–179). Aldine.

Voracek, M., Haubner, T., & Fisher, M. L. (2008). Recent decline in nonpaternity rates: A cross-temporal meta-analysis. *Psychological Reports*, *103*(3), 799–811.

Walter, K. V., Conroy-Beam, D., Buss, D. M., Asao, K., Sorokowska, A., Sorokowski, P., Aavik, T., Akello, G., Alhabahba, M. M., Alm, C., Amjad, N., Anjum, A., Atama, C. S., Duyar, D. A., Ayebare, R., Batres, C., Bendixen, M., Bensafia, A., Bizumic, B. . . . Zupančič, M. (2020). Sex differences in mate preferences across 45 countries: A large-scale replication. *Psychological Science*, *31*(4), 408–423.

Wang, G., Cao, M., Sauciuvenaite, J., Bissland, R., Hacker, M., Hambly, C., Vaanholt, L. M., Niu, C., Faries, M. D., & Speakman, J. R. (2018). Different impacts of resources on opposite sex ratings of physical attractiveness by males and females. *Evolution and Human Behavior*, 39, 220–225.

Watson-Capps, J. J. (2009). Evolution of sexual coercion with respect to sexual selection and sexual conflict theory. In M. N. Muller & R. W. Wrangham (Eds.), *Sexual coercion in primates and humans* (pp. 23–41). Harvard University Press.

Williams, G. C. (1975). *Sex and evolution*. Princeton University Press.

Wilson, M., & Mesnick, S. L. (1997). An empirical test of the bodyguard hypothesis. In P. A. Gowaty (Ed.), *Feminism and evolutionary biology: Boundaries, intersections, and frontiers (505-511)*. Chapman & Hall.

Wolf, M., Musch, J., Enczmann, J., & Fischer, J. (2012). Estimating the prevalence of nonpaternity in Germany. *Human Nature*, *23*(2), 208–217.

Wrangham, R. (2009). *Catching fire: How cooking made us human*. Basic Books.