

# 5 Female Intersexual Selection

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## 5.1 Female Intersexual Selection

In *The Descent of Man, and Selection in Relation to Sex*, Charles Darwin (1871) defined sexual selection as “the advantage which certain individuals have over other individuals of the same sex and species, in exclusive relation to reproduction” (p. 256). He identified two mechanisms by which sexual selection operates, stating that “it is the males that fight together and sedulously display their charms before the female” (p. 272). Today, we refer to these processes as intrasexual and intersexual selection. Whereas intrasexual selection surrounds competition amongst members of one sex for access to opposite-sex mates, or for resources relevant to obtaining mating opportunities such as territory (i.e., the “fight together” aspect), intersexual selection refers to mate choice (i.e., the “display their charms” aspect), which Darwin described as “A taste for the beautiful.” Darwin dedicated a relatively greater portion of *Descent of Man* to the latter topic, noting that “when we see many males pursuing the same female, we can hardly believe that the pairing is left to blind chance – that the female exerts no choice, and is not influenced by the gorgeous colours or other ornaments with which the male alone is decorated” (p. 421).

Intersexual selection, then, is the process by which animals use sensory and cognitive processes to evaluate secondary sexual traits in potential mates (Prum, 2012). During this process, a female chooses a mate based upon ornaments or other mate value characteristics. Given that males will vary in these preferred traits, some fortunate males will be at a mating advantage. These males will outreproduce their rivals and, in so doing, increase the frequency of the desirable trait(s) in the population. Darwin attributed these perceptual processes to an aesthetic appreciation that existed, to varying degrees, across many species. From his perspective the preferences were likely arbitrary, pleasing for their own sake, and unrelated to any underlying value or quality (Prum, 2012). This view later formed the basis for Fisherian selection and the Lande-Kirkpatrick (LK) null model, which predicts that arbitrary display traits can evolve due to a genetic correlation with a female preference, even though they do not signal any underlying quality or condition, either honestly or dishonestly, and which “lack any meaning or design other than their potential to correspond to mating preferences” (Prum, 2010, p. 3085; see also Jones & Ratterman, 2009).

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In contrast to Darwin, Alfred Russel Wallace argued that if mate choice and selection for secondary sexual characteristics did occur, then they must be "strictly correlated with health, vigor, and general fitness to survive" (Wallace, 1895, p. 379). This view was later expanded upon under the umbrella of "good genes" sexual selection and the handicap hypothesis; the idea that secondary sexual characteristics can be selected for because they are "costly" to develop or maintain, and as such serve as honest signals of an organism's underlying genetic quality (Zahavi, 1975). Traits that confer an immunological handicap are expected to be difficult to fake, given that only the healthiest individuals can presumably afford the cost associated with their development (Folstad & Karter, 1992). Females who selected males based upon these traits would have produced more phenotypically fit offspring, who themselves could better afford the immunological cost of producing the desired trait(s).

### 5.1.1 Why Intersexual Selection Matters for Women

Darwin recognized that in most species, it is the females who are choosier and the males who are more ornamented, although it is important to note that he also identified species whereby the opposite pattern had been observed. Yet neither he nor his contemporaries sufficiently addressed the question of why this was the case. In 1948, Bateman discovered that male fruit flies varied more widely in their reproductive success, relative to females, and were able to improve their fitness by mating with more females. Bateman's ideas were expanded upon by Trivers (1972), who attributed female selectivity and the evolution of male ornamentation and weaponry to differences in obligatory parental investment. In most mammals, females invest more in developing larger and more energetically expensive gametes, gestation, and postnatal care of offspring. This, coupled with age-related cessation in fertility, reduces the total number of offspring an individual female can produce relative to an individual male, whose reproductive success is limited only by their capacity to outcompete same-sex rivals for reproductive access to females. The more heavily investing sex is thus compelled to exhibit greater choosiness in their mates. Accordingly, males will tend to exhibit much more reproductive variance. Some competitively advantaged males will leave many offspring, whereas others will leave few or none. Female choosiness and divergence in male competitive efficacy, in turn, intensify selection on the male traits that lead to reproductive success (Trivers, 1972).

Although this sex difference is most clearly exemplified in tournament species (i.e., species within which males fiercely compete for mates), some mammals such as humans exhibit mating systems characterized by longer-term pair-bonding and biparental care, whereby males also invest heavily in their offspring (Fletcher, Simpson, Campbell, & Overall, 2015; Geary, 2000). It is believed that relative to earlier hominids, modern humans engage in more biparental care as evidenced by our lesser degree of sexual dimorphism

(Geary, 2000). Researchers have proposed various reasons why forms of monogamy and biparental care have been selected for in humans. First, offspring survival and quality are bolstered by paternal investment (Geary, 2000; Hill & Hurtado, 1996; Pleck, 1997). For example, in some hunter-gatherer or hunter-horticulturalist societies, father-present children are more likely to survive than father-absent children (e.g., Hill & Hurtado, 1996). Similarly, paternal investment has been linked to infant and child survival rates in pre-industrial Western societies (Geary, 2000).

Beyond mere survival, paternal investment also influences the quality (e.g., social standing) of those offspring. In modern society, paternal investment is linked with offspring social and academic skills, as well as higher income during adulthood (Geary, 2000). Given that some species exhibit social monogamy in the absence of paternal investment in offspring, researchers have further considered the benefits of attracting a more desirable partner (by conforming to her preferences for an investing male), gaining repeated sexual access to a female, and a greater ability to guard that partner from other males as other potential explanations for the evolution of monogamous pair-bonding in humans (see Arnocky, Woodruff, et al., 2016 for review).

Regardless of the underlying adaptive mechanism(s), it is important to recognize that greater paternal investment constrains male reproductive potential because energy and resources invested in maintaining a single partner and rearing their young cannot be invested in seeking new mating opportunities. Under such conditions, fewer males will be shut out of the mating competition and fewer males will produce many offspring with a variety of women (Geary, 2000). In species where males' total reproductive potential is constrained in this manner, researchers have argued that males would benefit from being more selective in their long-term mate choice (Arnocky & Vaillancourt, 2017; Campbell, 2004). Evidence suggests that men's mate preferences become more discerning within the context of a long-term versus shorter-term mating strategy (Buss & Schmidt, 1993). Moreover, because males will vary in their own desirability as a mate (i.e., their mate value), competition will ensue amongst females for the most attractive males, who because of their higher mate value may be particularly discerning in their mate choice (Arnocky, 2018; Arnocky & Vaillancourt, 2017; Kokko & Johnstone, 2002).

Women are less satisfied with being mated to lower status males (Byrne & Barling, 2017), and lower status men in the United States have lower fertility rates (i.e., are more likely to have no childbearing partners and have fathered fewer offspring) than higher status men (Hopcroft, 2018). This preference for higher status men remains even when the female herself gains considerable status. For instance, female academy award for best actress winners are significantly more likely to file for divorce from their partners after the win than are the unsuccessful nominees (Stuart, Moon, & Casciaro, 2011). This is unsurprising given that ultimately, the ability of a female to successfully

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attract and retain a high mate value partner can have meaningful consequences for her reproductive success. In some pre-industrial societies, women mated with higher status men produced more surviving offspring (e.g., Voland, 1990; Voland & Engel, 1990). Among the Tsimané (a Bolivian indigenous forager-horticulturalist group), higher status men (e.g., having greater community-wide influence) marry wives who first give birth at earlier ages and have greater in-pair offspring survivorship (von Rueden, Gurven, & Kaplan, 2011). Together, the fitness benefits of attracting a high mate value man who is willing and able to invest in offspring compel women to exert considerable effort toward attracting and retaining these partners.

### 5.1.2 Men's Mate Preferences

Humans mate discriminately to obtain direct and indirect reproductive benefits, and to avoid costs associated with poor mate choice (Clutton-Brock, 1991; Darwin, 1871; Gangestad & Scheyd, 2005). Individuals will vary in their ability to provide reproductive benefits, making some potential mates more desirable than others (Miller, 1998). Women's adaptive morphological (e.g., ornaments), psychological (e.g., parenting ability), or behavioral (e.g., sexual fidelity) traits that benefit men's reproductive fitness can form the bases of men's mate choice and women's epigamic display (i.e., self-promotion) within the realm of intersexual selection.

Buss and Barnes (1986) identified various factors that are implicated in men's mate choice, which ranked in order of importance across their studies as follows: kind and understanding, exciting personality, intelligent, physically attractive, healthy, easygoing, creative, wants children, college graduate, good earning capacity, good heredity, good housekeeper, and religious. A subsequent cross-cultural examination across thirty-seven cultures demonstrated that some mate preferences showed tremendous cultural variability. For instance, Buss et al. (1990) found that a desire for chastity in a partner, along with desire for home and children and good housekeeping skills varied widely across cultures, with Western cultures scoring lower in these preferences. Culture also related to personality preferences, with some cultures emphasizing an exciting, easygoing, or pleasing personality more than others. Nevertheless, there are also areas of tremendous cross-cultural ubiquity. Buss et al., also demonstrated a reliable sex difference across cultures whereby men held a stronger preference than women for a physically attractive partner, as well as good cook and good housekeeper traits. Given that potential mates vary along a multitude of mate value traits, researchers have examined the trade-offs individuals make in their mate preferences. Li et al. (2002) assigned participants varying "mating budgets" in building a hypothetical ideal long-term mate. They found that when given a restrictive mating budget, men prioritized physical attractiveness, kindness, and intelligence in a partner. They deemed these the "necessities" of mate choice, which must be satisfied before spending

on “luxury” traits. Moreover, attractiveness held across both short- and long-term mating contexts as an important mate value characteristic (Li, 2006). This raises the question: why do men prefer certain traits in their partners?

**Physical Attractiveness.** Evolutionary scholars argue that men have likely evolved to find particular morphological characteristics, such as a youthful appearance, facial symmetry, femininity, a healthy complexion, larger breasts, and a lower waist-to-hip ratio (WHR) attractive because of their associations with fertility, reproductive value (i.e., the probability of conceiving and producing a healthy child), health, and/or “good genes” (Arnocky et al., 2014; Cloud & Perilloux, 2014; Shackelford & Larsen, 1999). Over evolutionary history, men who mated with women lower in health, fertility, and reproductive capacity would likely have had poorer reproductive success than men selecting healthy, fertile, and reproductively capable partners. The attractiveness of several traits in women vary according to cultural and ecological parameters that influence the adaptive costs and benefits linked to physical characteristics. For example, in circumstances of resource scarcity and economic deprivation, men appear to find traits such as a larger body mass index (BMI) and bigger breasts in women attractive because these traits indicate that the individual has greater caloric reserves to help produce and nourish healthy offspring (Sorokowski, Kościński, Sorokowska, & Huanca, 2014; Valentova, Bártová, Štěrbová, & Varella, 2017). In contexts where resources are plentiful, however, larger BMI and breasts may signal the exact opposite condition to men: heightened morbidity and mortality risk, as well as poorer fertility (Arnocky et al., 2014).

**Parenting Ability.** Across species, parental care can benefit parents through enhancing the survival, growth, development, and quality of progeny, which contribute to an offspring’s reproductive success (Klug & Bonsall, 2014). As discussed previously, humans are somewhat unique among primates in that they form socially monogamous pair-bonds and engage in biparental care in the service of raising altricial young who require substantial postpartum care (Schacht & Kramer, 2019; Zeveloff & Boyce, 1982). Consequently, men place a significant amount of emphasis on traits that indicate good parenting ability (e.g., kindness, being a good housekeeper, and liking children), particularly because maternal investment is critical for the survival, health, and well-being of offspring (Amato et al., 1994; Buss, 1991; Campbell, 1999; Hsin & Felfe, 2014). Over evolutionary time, men selecting women with good parenting abilities would have likely had greater reproductive success than those who did not, indicating that women can emphasize this characteristic to appeal to men’s mating preferences.

**Kindness.** Kindness is a highly attractive quality in a mate because it signals the proclivity to be agreeable, cooperative, and altruistic, and communicates the potential to invest important material and social-emotional resources (e.g., support) in oneself, one’s offspring, and one’s friends and family (Buss, 1991; Buss & Schmitt, 1993; Cottrell, Neuberg, & Li, 2007; Li, Kenrick, Bailey, &

Linsenmeier, 2002; Lukaszewski & Roney, 2010). Therefore, kindness can be important for parenting, kin relations, and reciprocity, as well as commitment to one's partner and the pair-bond (Miller, 2008). For example, Simpson and Gangestad (1992) found a link between lower self-rated kindness and a desire for uncommitted sex with a variety of individuals (i.e., an unrestricted sociosexual orientation) in both women and men. And those higher in "dark" (i.e., malevolent) personality traits, such as psychopathy, who have low levels of kindness (Canter, Youngs, & Yaneva, 2017), express unrestricted sociosexuality (Fernández del Río, Ramos-Villagrasa, Castro, & Barrada 2019), and are more likely to commit infidelity (Jones & Weiser, 2014). Unsurprisingly, greater kindness can be critical in maintaining marital stability and longevity (Dew & Bradford Wilcox, 2013). Therefore, ancestral men selecting kind women more often benefited from having an invested, committed, and faithful partner, with better caretaking abilities for offspring and someone who would contribute to the reproductive success of kin.

**Intelligence.** Intelligence is a highly heritable trait that may signal good genes and so is argued to be preferentially sought after by women in a sexual partner (Miller, 2000). Kanazawa and Kovar (2004) proposed that because intelligent men tend to be higher in status and more likely to mate with beautiful women, and because both intelligence and physical attractiveness are heritable, intelligence and beauty can become genetically correlated over time. This runs contrary to the idea that attractive people are only perceived as intelligent because of a "beauty is good bias" or "halo effect" (discussed in Kanazawa & Kovar, 2004). Intelligence and physical beauty appear to be more strongly correlated in men in comparison to women (Kanazawa, 2011). Nonetheless, when "designing the ideal marriage partner," both women and men report finding intelligent mates highly desirable (Li et al., 2002). Assortative mating patterns (i.e., individuals seeking out self-similar mates) also indicate that mated partners tend to be similar in their intelligence and physical attractiveness across societies (Conroy-Beam et al., 2019). Moreover, Jonason et al. (2019) found that both women and men desired mates who had an equal or greater level of intelligence to themselves in the context of long-term partnerships. Li et al. (2002) stated that intelligence signals the capacity to engage in activities that impact survival and reproduction, such as parenting ability, adapting to novel social and environmental circumstances, and navigating mate competition (see also Barkow, 1989). Therefore, ancestral men selecting intelligent women as partners may have benefited by having a more apt and responsible caregiver. As expressed by Buss and Shackelford (2008), intelligence can signal both good genes as well as good investment potential. Therefore, ancestral men selecting intelligent women as partners may have profited by producing offspring of greater phenotypic quality and having a more apt and responsible caregiver.

These sex differences have been reported across diverse cultures suggesting they reflect adaptive preferences that evolved because they augmented

ancestral males' and females' reproductive fitness. Nevertheless, some researchers have criticized the evolutionary understanding of sex differences in standards of mate choice. For example, Eagly (1997) suggested these observed sex differences are a cultural creation, within the context of social roles theory. She argued that the societies studied purportedly exhibited male social dominance; had females been the dominant sex we might expect a reversal in such mate preferences. In reanalyzing cross-cultural data on sex differences in mate preferences (Buss et al., 1990), Eagly and Wood (1999) suggested that greater female preferences for good earning capacity and greater male preferences for domestic skills (but not physical attractiveness) were an artifact of gender inequality. However, a recent study of thirty-six nations found negligible evidence that sex differences in mate preferences were any smaller in countries with greater gender equality, as evidenced using United Nations' Gender Inequality Index (GII) and Gender Development Index (GDI) metrics (Zhang, Lee, DeBruine, & Jones, 2019).

### 5.1.3 Has Intersexual Selection Shaped Women's Phenotypic Traits?

Darwin viewed female ornaments as by-products of selection acting upon males (i.e., correlated inheritance). Because much of the male and female genome is shared, genetic correlation likely explains some female trait exaggeration (Tobias, Montgomerie, & Lyon, 2012). Yet others have argued that we should expect selection to operate independently on female phenotypes, either through competition for reproductively relevant resources (Clutton-Brock, 2009; Rosvall, 2011) and/or through benefits to nonmating social interactions (Tobias et al., 2012). Researchers have also examined female phenotypes from the lens of intersexual selection. For example, studies have shown that females gain a fitness advantage through investment in traits that aid in attracting mates. Based on a review of the literature, Kraaijeveld et al. (2007) argued that whereas few studies have examined the potential influence of genetic correlation upon female ornamentation, "there is good evidence that mutual ornaments can have a signal function in both sexes, especially in terms of mate choice" (p. 657). This is supported by the simple fact that even in species with conventional sex roles, females can display ornaments that are not exhibited by males. Many such examples exist in nonhuman species. In the Lake Eyre dragon lizard, female orange coloration appears to signal sexual receptivity to males (Stuart-Fox & Goode, 2014, cf. Chan, Stuart-Fox, & Jessop, 2009). Extending this position, researchers have argued that many ornaments observed in both sexes (i.e., mutual ornaments) might also serve adaptive functions for both males and females (Kraaijeveld, Kraaijeveld-Smit, & Komdeur, 2007). In the great tit (a monogamous passerine bird), female breast stripe and cheek coloration appear to signal underlying immunocompetence, such that brighter females produce larger offspring who are more resistant to a novel antigen (Remeš & Matysioková, 2013). Because female reproductive

fitness often relies more heavily upon remaining alive to rear offspring, natural selection might then account for the often-blunted expression of these traits amongst females, and given the trade-off between female ornament production and fecundity (e.g., egg production), males may be selected to prefer a more balanced display of such ornaments in females (Kraaijeveld et al., 2007).

Recently, researchers have begun to explore how intersexual selection may have shaped phenotypes in women. One such trait considered from this perspective is the breast, which is one of our species' most conspicuous secondary sexual characteristics. The female breast is larger and more permanent than necessary for feeding offspring; breast size is also linked to greater risk of various health problems ranging from infection to cancer (see Locke & Arnocky, 2021). Some researchers have suggested that larger breast size is an intersexually selected trait that is ubiquitously attractive to men because it signals fertility (Jasienska, Ziolkiewicz, Ellison, Lipson, & Thune, 2004). Similarly, Locke and Arnocky (2021) have shown that symmetrical breasts may be attractive to men because they signal underlying immunocompetence, as evidenced by both self-reported health and higher levels of a mucosal immune marker, salivary immunoglobulin-A.

Other phenotypic traits have also been linked to markers of immunocompetence and fertility. For instance, men find feminized voices more attractive (see Arnocky, Bird, & Perilloux, 2014 for review). Vocal femininity appears to increase around ovulation (Bryant & Haselton, 2009), suggesting it may have been selected for as a cue of fertility. Vukovic et al. (2010) found that women's vocal femininity predicted indices of body size and fat content, which are known health risk factors. However, other researchers have highlighted that selection seems to have operated much more strongly on male voices (Arnocky, Albert, Carrég, & Ortiz, 2018). Men also prefer feminized faces characterized by prominent cheekbones, a narrow jaw, and short chin (Shackelford & Larsen, 2001). Facial femininity appears to be estrogen-dependent. For example, women's late follicular oestrogen has been linked to men's ratings of those women's facial femininity and attractiveness (Law Smith et al., 2006). Other researchers have shown a negative relationship between progesterone (which is relatively low during the follicular and elevated during the luteal phase) and women's facial attractiveness as rated by men across the ovulatory cycle (Puts et al., 2013). Together these findings suggest that facial femininity and attractiveness may be shaped by selection for fertile mates.

There is also evidence linking female facial traits with immunocompetence. Although some researchers have failed to find links between facial femininity and health (e.g., Rhodes, Chan, Zebrowitz, & Simmons, 2003; Shackelford & Larsen, 2001), other studies have found that women with feminized facial features have fewer respiratory illnesses (Thornhill & Gangestad, 2006). A recent study showed that adolescent indices of immune function predicted later adult facial sexual dimorphism in both sexes (Foo, Simmons, Perrett, Holt, Eastwood, & Rhodes, 2020). Links to immunocompetence may be



fundamentally intertwined with fertility; men have been shown to rate the faces of women who are higher on late follicular oestrogen as being healthier (Law Smith et al., 2006). From the perspective of the immunocompetence handicap hypothesis (Folstad & Karter, 1992), the immunological cost of producing some estrogen-dependent sexually dimorphic traits (e.g., via suppressed cell-mediated immune function; Foo, Nakagawa, Rhodes, & Simmons, 2017) may serve as an honest signal of a woman's immunocompetence and fertility. Conversely, other researchers have found that preferences for sexually dimorphic facial features are only present in novel, highly developed environments (Scott et al., 2014). This raises the possibility that these features have not been selected for as cues to heritable mate value traits. Further research on the operation of intersexual selection upon females in smaller-scale traditional societies, as well as on the extent to which female sexually dimorphic traits do or do not indicate underlying phenotypic quality is necessary.

#### 5.1.4 How Women Attract Mates

In a heterosexual context, the mate preferences of one sex become the focus of mating effort amongst the opposite sex (see Arnocky, 2016 for review). As evidence of this, Li (2006) found that in designing an "ideal self" for short- and long-term mating, women matched male preferences in their designs for such mates; that is, women prioritized physical attractiveness in themselves for both short- and long-term mating. Below we highlight the ways in which women have been shown to alter their desirability as a mate.

**Appearance Enhancement.** When asked to describe the most common and effective tactics that they employ for attracting mates, women often report using cosmetics products (e.g., makeup and skin creams), adorning jewelry, exercising and dieting to improve their physique, wearing more stylish, form-fitting, and revealing clothing that accentuate certain areas of the body, hairstyling and depilation, tanning, and opting for cosmetic surgeries (Buss, 1988a; see Davis & Arnocky, 2020 for review). Compared to men, women are two times more likely to spend more than one hour each day working on their physical appearance (Meston & Buss, 2009), underscoring the importance of women's epigamic display. Various kinds of appearance-related self-promotion tactics, such as cosmetic surgery, can facilitate women's ability to attract mates, compete with same-sex others, and/or retain desired romantic partners by helping to augment their mate value (Arnocky & Piché, 2014; DelPriore, Prokosch, & Hill, 2017; Dubbs, Kelly, & Barlow, 2017; Singh & Randall, 2007). For instance, women can use cosmetic products to enhance their attractiveness and as ornamental armament for intrasexual rivalry by dishonestly manipulating features of the face that men have evolved to find attractive, such as a youthful appearance, healthy complexion, facial symmetry and femininity, full lips, white teeth, and white sclera (Arnocky, Perilloux, et al., 2016; Davis & Arnocky, 2020).

Women's appearance enhancement practices have been demonstrated to vary in accordance with evolutionarily relevant contexts and individual differences. Hill and Durante (2011) showed that women experimentally primed with mating goals increased their interest in engaging in several different appearance enhancement behaviors, including potentially harmful activities such as taking a diet pill and skin tanning. Moreover, these links were mediated by a reduction in the perceived dangerousness of these activities, suggesting that mating motivation might alter one's psychological risk assessment surrounding actions taken to attract mates. Bradshaw et al. (2019) found that women higher in short-term mating effort were more accepting of risky appearance enhancement (e.g., cosmetic surgery), but not low-cost tactics (e.g., makeup). People also viewed women who had cosmetic surgery as investing more in short-term mating (Bradshaw, Leyva, Nicolas, & Hill, 2019). High heels may be a costly signal that enhance the attractiveness of women by accentuating aspects of their body that appeal to men (e.g., lumbar curvature; Lewis et al., 2017). Heels appear to be preferentially worn by younger women higher in self-perceived mate value who desire having sex (Watkins & Leitch, 2020). When attending a hypothetical party with an attractive same-sex acquaintance and an opposite sex "crush," Olson et al. (2020) showed that women were more likely to choose sexier and more revealing outfits. Previous work also highlights how men are attracted to women wearing red clothing (e.g., Roberts, Owen, & Havlicek, 2010). Women anticipating meeting and conversing with an attractive man were more likely to choose wearing a red, versus a green, shirt (Elliot, Greitemeyer, & Pazda, 2013). Men perceived greater sexual intent in a woman wearing a red T-shirt in comparison to when she was wearing a blue, green, or white shirt (Guéguen, 2012). However, there appears to be mixed evidence that women wear pink or red clothing more often around peak fertility (Hone & McCullough, 2020). Some forms of appearance enhancement among women, such as adorning sexy lingerie, are more private and are used to enhance mate value, communicate and elicit sexual desire, and increase self-perceived attractiveness and femininity (Craig & Gray, 2020). Women of higher mate value appear more likely to wear lingerie to feel sexy and desired, as well as in preparation for sex with their partners.

Beautification practices, such as makeup, jewelry, clothing, hairstyles, tattoos, and piercing, vary across culture and time in unique ways (Frederick, Forbes, Jenkins, Reynolds, & Walters, 2015). For example, painful forms of body modification that are tied to cultural standards of beauty have emerged across different societies. Among the Mursi, a hunter-horticulturalist society from Ethiopia, women wear lip plates to signal entry into adulthood, femininity, and reproductive potential (Turton, 2004). Women from the Padaung tribe in Burma wear brass rings around their necks that compress their collarbones to create the perception of having a longer neck, which is connected to cultural identity and beauty (Theurer, 2014). Foot-binding was a Chinese custom whereby girls and women had their feet tightly bound to limit

their growth, because small feet were considered attractive and connoted status (Ko, 2007). Amid the compelling cultural diversity of appearance enhancement practices, across the world beauty matters, some people are regarded as more attractive than others, and there is competition to embody what is desired by potential mates (Davis & Arnocky, 2020, 2021; Frederick et al., 2015).

### 5.1.5 Sexual Access and Timing

Women also report manipulating cues to sexual access as a mate attraction technique, and these tactics can vary based upon female's short-term versus long-term mating goals. Buss (1988a) noted that sexually provocative behavior is a highly effective mating tactic that is simultaneously not widely utilized by females; ostensibly because it is most effective for short-term mating, and long-term mating is the preferred strategy of most women (Schmitt & Buss, 1996). Women more than men endorse acting flirtatious and seductive, proposing and having sex, and sexualizing their appearance as effective mate attraction mechanisms, particularly in the context of short-term mating (Schmitt & Buss, 1996). Researchers found that early sexual initiation within relationships was negatively associated with marital quality, but only among women. The authors determined that this link was largely explained by cohabitation, which was more likely to happen rapidly when sexual activity initiated early (Sassler, Addo, & Lichter, 2012). Given men's preferences for chaste partners, women (and their kin) sometimes engage in behavior meant to reinforce men's paternity certainty and perpetuate a reputation of female sexual restrictiveness. Women more than men report displaying sexual exclusivity as an effective mating tactic within the context of long-term mating (Schmitt & Buss, 1996). Moreover, many women report deceiving others about the number of sex partners they have had (Horan, 2016). This has also been borne out experimentally, whereby women more than men who were exposed to a bogus lie detector paradigm reported having engaged in more sexual activity and having more lifetime sex partners than women in a control condition (Fisher, 2013). This reputation management also extends to information provided after the birth of a child offered by the female partner and her kin. Hospital room videotapes indicated that mothers and their relatives allege paternal resemblance of the newborn more often than maternal resemblance (Daly & Wilson, 1982). Follow-up research has shown that mothers ascribe resemblance to the fathers more than to themselves shortly after birth, and that this effect increases when the father is present, even though objective third-party ratings of resemblance more often favor the mother (McLain, Setters, Moulton, & Pratt, 2000). Together, evidence suggests that women attempt to present their sexual reputations in alignment with men's mate preferences. Future research would benefit from exploring intra-individual differences among heterosexual women in shifting their sexual initiation depending upon their desired mating outcome with a particular male.

### 5.1.6 Personality

Although most research on tactics of mate attraction tend to focus on those displaying a sex difference, it is also important to identify tactics that both sexes simultaneously desire in a mate and might display as a mating tactic. In Buss' (1988a) act nomination study of tactics used in mate attraction, respondents identified acts such as displaying humor and sophistication along with "acting nice" as common tactics. In terms of trait effectiveness, displaying humor, sympathy, good manners, and assistance (help) were all among the most effective. Because both sexes desire partners with these traits, both sexes report displaying them with similar frequencies (Buss, 1988a), although men appear to deceive mates more about their levels of kindness, sincerity, and trust (Tooke & Camire, 1991). Recent evidence suggests that women (and men) who are altruistic (incurring a cost to themselves to help unrelated others) have more mating success. Arnocky et al. (2017) demonstrated that self-reported altruism predicted women's perceived desirability to men and their in-pair sex frequency; moreover, women who were willing to donate winnings from the study had more past year sex partners and more casual sex partners.

### 5.1.7 Mate Poaching

Intersexual selection is not limited to the initial attraction of unmated individuals. Mate poaching involves attempting to attract someone who is already in a romantic relationship (Schmitt & Buss, 2001). Schmitt and Buss (1996) highlighted two pathways by which mate poaching could succeed. Whereas one involved denigrating a romantic rival for the favor of their mate (i.e., intrasexual selection), the other involved making oneself a more desirable alternative to that mate (i.e., intersexual selection). Successful poaching may rely on both forms of selection: Arnocky (2020) found that intrasexual competitiveness predicted successful mate poaching, but only for those who scored at or above average (but not below average) in their mate value. Schmitt and Buss (2001) found that participants rated the act of enhancing one's physical attractiveness effective for women's short- and long-term mate poaching efforts; such efforts were rated as more effective than denigrating a rival's attractiveness. Moreover, Schmitt and Shackelford (2003) found that women more than men rated enhancing their physical attractiveness as effective for enticing men to try to poach them. Building on this, Sunderani et al. (2013) found that women who were physically attractive were more successful at mate poaching and were most likely to be targeted by members of the opposite sex for poaching attempts (see also: Schmitt & Buss, 2001). Schmitt and Buss (2001) also found that boosting the target's ego was deemed more effective for women than for men. This tactic is also rated among the top three by women for its perceived efficacy (along with displaying one's sexual availability) in

enticing men to attempt to poach them from their relationship (Schmitt & Shackelford, 2003). Other researchers have highlighted the perceived efficacy of befriending a target for a poach; raters view those who become friends with a target as more likely to succeed in their poaching attempts and decreased the threat of some associated risks (Mogilski & Wade, 2013).

### 5.1.8 Mate Retention

Successful intersexual competition does not hinge solely on the ability to initially attract a mate, but also upon the retention of that mate. Unsurprisingly, many of the same factors underlying mate attraction also underlie mate retention efforts, especially within the realm of benefit provisioning tactics (see Albert & Arnocky, 2016 for review). For instance, women more than men report enhancing their appearance (e.g., dressing nicely to maintain partner interest) and verbal signals of possession (e.g., telling friends how much they are in love; Buss & Shackelford, 1997), along with threatening infidelity (e.g., flirting with another man in front of their partner; Buss, 1988b). The latter may be an effective intersexual negative inducement because women's infidelity is particularly costly to men's reproductive success; therefore, such a threat being made salient might induce sexual jealousy and greater male commitment or mate retention effort (Buss, 1988b). Some sex differences, such as in appearance enhancement mate retention effort, have been found to exist longitudinally within long-term relationships (Kaighobadi et al., 2010). Although researchers have failed to observe sex differences in sexual inducements as a mate retention strategy, other scholars have shown that men and women utilize sexual favors in this manner. For example, Sela et al. (2015) found that women who engaged in more benefit-provisioning mate retention behavior also performed oral sex more often. Because mate retention involves a cost to the actor, these actions should not be performed indiscriminately. Rather, women who are mated to men who are higher in status striving and income, as putative indices of their mate value, have been found to engage in more mate retention effort (Buss & Shackelford, 1997).

### 5.1.9 The Blurred Line between Intersexual and Intrasexual Competition

Although Darwin considered these mechanisms of selection as distinct, it is important to understand that intersexual and intrasexual selection are fundamentally intertwined. Further complicating the issue, some behaviors can be considered using either lens. For instance, male musculature serves the intrasexually competitive function of facilitating success in combat with other males, ostensibly for obtaining status or direct mating access. Yet this phenotype simultaneously enhances a male's intersexual competitiveness, because a muscular mesomorphic male body is attractive to females, perhaps because it

signals information about his health, condition, or ability to protect and provide resources which can also be passed on to subsequent sons derived from the mating relationship. Researchers have argued that for men, the intrasexual signaling properties of sexually dimorphic traits likely had far more selective impact than did female choice (e.g., Puts, 2010). However, for many sexually dimorphic female physical traits, "male mate choice was probably central in women's mating competition because ancestral females could not constrain the choices of larger and more aggressive males through force, and attractive women could obtain greater male investment" (Puts, 2010, p. 157). Accordingly, future work should attempt to disentangle whether specific traits evolved due to intersexual selection, intrasexual selection, or both (Puts, 2010).

## 5.2 Understanding Variability in Men's Preferences and Women's Mating Effort

### 5.2.1 Individual Difference Factors

Not all men are equal in their desire for certain mate value traits. Rather, men's mate preferences vary according to both environmental and individual difference variables. Similarly, women's mating effort also varies across many of the same individual difference and ecological factors.

**Mate Value.** One individual difference that is related to men's mate preferences is their own mate value. Arnocky (2018) found that men who perceived themselves as being higher in mate value were more likely than lower mate value men to prefer to have a spouse who was younger than them, and to have a partner who was sociable, ambitious, high in social status, health, good looks, and mutual attraction with good financial prospects and a desire for children. Male facial attractiveness, as an objective marker of attractiveness rated by women, was unrelated to men's mate preferences, suggesting one's own perception of their mate value may be more important in driving mate preferences. Nevertheless, what this study tells us is that high mate value men (or those who think they are high mate value) prefer traits in women which together serve as cues to fertility and condition (younger age, good looks, health), parenting ability (desire for children) and status (good financial prospects, ambition, sociability). Accordingly, women who wish to attract a high mate value male are compelled to embody the traits that high mate value men prefer.

There is mounting evidence that women who perceive themselves as being deficient on important mate value traits such as physical attractiveness, relative to same-sex rivals, are more likely to experience emotions and behaviors aligned with attempts at increasing their standing on these traits. Arnocky, Perilloux et al. (2016) found that women who perceived themselves as being less physically attractive than other women reported more trait envy and were

more intent on tanning their skin, desired losing more weight (controlling for current weight), and spent more on appearance-enhancing goods and services. In the same set of studies, an experimental replication found that women who were primed to make upward appearance comparisons to magazine models experienced more state envy and more interest in using a risky diet pill, intended using more facial cosmetics, and held more positive attitudes toward cosmetic surgery. Similarly, Arnocky and Piché (2014) found that women (and men) who were high in upward physical appearance comparisons (comparing oneself negatively to others who are more attractive) were more likely to intend on having cosmetic surgery in the future and spending more money over the lifetime on cosmetic surgical procedures. Beyond attempts at augmenting their mate value, less physically attractive women might also employ different mating strategies relative to more attractive women.

Recent evidence suggests that women who perceive themselves as being less physically attractive than other women experience more jealousy and engage in more cost-inflicting mate retention effort (Arnocky & Locke, 2020). It also appears that women adjust their mate preferences, and perhaps their mating strategies, depending upon their own mate value. Buss and Shackelford (2008) found that women who were rated as being less physically attractive were lower in their reported preferences for indices of parental ability, resource provisioning, good genes, and being a good partner. More recent research has also linked lower scores on these mate preferences to lower self-perceived mate value (Birkás, Láng, & Meskó, 2018). Buss and Shackelford (2008) argued that due to assortative mating, high mate value women can obtain all the necessary male traits from a single highly valuable man, whereas lower mate value women may be more prone to pluralistic mating – for example by obtaining resources and commitment from one man and good genes from another. As they noted, "... it is obvious that women of lower mate value, in principle, have more to gain by genetic cuckoldry than do women of higher mate value" (p. 143). Some researchers have shown that less attractive women are more likely to commit infidelity (McNulty, Meltzer, Makhanova, & Maner, 2018). Campbell et al., (2009) found that women whose faces were rated as less feminine were viewed as less desirable as long-term mates by men. These women were also more likely to report a less restricted sociosexual orientation, suggesting that less physically attractive women might augment their mating to conform to a more male-preferential strategy. However, other researchers have demonstrated small positive links between women's objective physical attractiveness and their unrestricted sociosexual orientation (Fisher, Hahn, DeBruine, & Jones, 2016); a pattern that has been replicated in a recent meta-analysis examining women's self-reported mate value (Arnocky et al., 2021). Perhaps women who are (or perceive themselves to be) more attractive can adopt a riskier pluralistic strategy, which can confer reproductive benefits to females, because they are more assured in their ability to attract future mates. It has long been established that attractive women are more likely to be asked out on dates by men

(Walster et al., 1966), whereas women low in physical attractiveness markers tend to be mated with less desirable men and are more dissatisfied with their partners (see Arnocky et al., 2014 for review). Future researchers should consider whether current relationship status or perceived ease of attracting desirable mates might moderate potential links between women's attractiveness or mate value and their sociosexual orientation.

**Hormones.** Both men's mate preferences and women's mating effort are also influenced by sex hormones. Researchers have shown that endogenous testosterone predicts men's preferences for feminine facial features (see Bird et al., 2016 for review). Building on this finding, Bird et al. (2016) administered exogenous testosterone to men and measured their preferences for facial femininity versus a placebo control group. Results of two experiments converged to show that men given testosterone preferred more feminized faces within short-term mating contexts relative to men in the placebo group. Although most research on men's testosterone and mate preferences has focused on attractiveness of female phenotypic traits, testosterone might also be linked to men's desire for partner fidelity and prevention of loss of their partner. Arnocky et al. (2018) found that men who were higher in testosterone engaged in more mate retention effort, and that this relationship was mediated by intrasexual competitiveness. Future research would benefit from a more comprehensive examination of men's hormones and a broader range of short-term and long-term mate preferences, either through examination of exogenous or endogenous hormones and, potentially, their interactions with glucocorticoids.

Women's successful reproduction, to a great extent, relies upon discriminate mate choice and effective mate pursuit. A growing body of research suggests that female sex hormones may influence women's mate pursuit and copulatory behavior. Zhuang and Wang (2014) found that women paid more attention to ornamental objects (e.g., jewelry and high heel shoes) near ovulation relative to the luteal phase of their cycles. In a second experiment where they primed women with either attractive (or unattractive) same-sex or opposite sex images, they found that women exposed to attractive men during the luteal phase, and attractive women during the ovulatory phase, paid more attention to ornamental items, suggesting that intersexual courtship motives may drive ornamentation when conception risk is low. The authors posited that because women may be less attractive during this phase, ornamentation may serve a purpose similar to concealed ovulation or extended sexuality; that is, to maintain a mate's investment in them in spite of a lack of direct reproductive benefits.

Researchers have recently examined how women's mating-relevant behavior may fluctuate in line with conception risk. For instance, Blake et al. (2017) measured ovarian hormone concentrations at fertile and nonfertile menstrual phases in a sample of naturally cycling women, along with assertiveness, sexual motivation, and interest in clothing purchases. Their results showed that women were more assertive and were more interested in purchasing "sexy" clothing when they were high in estradiol and low in progesterone.



During periods of fertility, women reported greater sexual availability. The authors interpreted the findings as supporting the hypothesis that when conception risk is high, assertiveness guards against indiscriminate mate choice. An equally plausible and complementary position would be that assertiveness also motivates the pursuit of desired mates, which would help to explain women's greater sexual motivation and desire to purchase sexy clothing around fertility, and why assertiveness positively predicted these variables. Other researchers have recently shown that experimental beautification, by way of asking female participants to change their clothing, shoes, jewelry and makeup to feel "very attractive," compared to when women were assigned to a control condition, increased their sexual motivation and assertiveness (Blake, Brooks, Arthur, & Denson, 2020). Moreover, sexual motivation mediated the link between beautification and assertiveness, suggesting that beautifying increased sexual motivation which in turn accounted for the increase in assertiveness. This finding corresponds with previous literature demonstrating links between women's sociosexual orientation and preferences for assertive mating tactics such as preference for men competing with other men who are interested in her, the use of teasing or "negging" (e.g., "picks on her appearance or behavior"), and isolation of the female "target" (e.g., "try to get her alone"; Hall & Canterberry, 2011). Taken together, this suggests that women may increase assertiveness to pursue desired mating opportunities.

Subtle physiological changes also appear to occur in relation with conception likelihood which would ostensibly benefit female mating success. Breasts (Manning, Scutt, Whitehouse, Leinster, & Walton, 1996), ears, and digits (Scutt & Manning, 1996) become more symmetrical near ovulation. Other research has found that during the ovulatory phase women's faces are rated as being more attractive, healthy, sexy, sociable, trustworthy, young, and likeable than during the luteal phase, which may be accounted for by observed changes in face shape; during the luteal phase the nose was broader, and brows were more pronounced, whereas in the ovulatory phase lips were fuller and the face was more slender (Oberzaucher, Katine, Schmehl, Holzleitner, & Grammar, 2012). Puts et al. (2013) found that progesterone (and its interaction with estrogen) negatively predicted men's ratings of women's overall facial and vocal attractiveness across menstrual timepoints, suggesting that women become more desirable around peak fertility and that these changes are driven by changes in sex hormones. Because these fluctuations are subtle, researchers have argued that women conceal their ovulation to pursue a mating strategy that allows for long-term pair-bonding and opportunistic mating with high-quality (but possibly low investing) men, and that men's ability to detect subtle cues to ovulation represent distinct adaptations to detect currently fertile mates. However, other researchers have argued that men's preferences for subtle cues to ovulation and women's preferences for masculinized traits during ovulation do not represent distinct adaptations, but rather are spandrels resulting from adaptations related to interindividual

differences in reproductive potential. In other words, the relatively weak ability to detect intra-female changes in fertility across the cycle is a perhaps a by-product of the broader and ostensibly highly correlated ability to detect individual differences in fertility between women (Havlíček, Cobey, Barrett, Klapilová, & Roberts, 2015).

### 5.2.2 Environmental Factors

**Female-Biased Operational Sex Ratio.** The Operational Sex Ratio (OSR) refers to the ratio of reproductively viable males to females in the local population (Colwell & Oring, 1988). In many nonhuman species, biases in the OSR have been linked to greater selectivity and the expression of preferential mating strategies among the scarcer sex (see Arnocky et al., 2014, 2016 for review). A female-biased OSR makes males a scarcer commodity, essentially increasing their mate value. For instance, Abramitzky et al. (2011) examined sexual demographics among French men post-World War I. They found that in regions with higher mortality rates, men were less likely to marry women of lower social classes, and out-of-wedlock births increased yet divorce rates decreased. Similarly, in China, in regions with relatively few females available, women are more likely to marry before age twenty-five (Trent & South, 2011), ostensibly because their scarcity allows for the expression of their preferred mating strategies (female infidelity also increases). More recently in the United States, Kandrik et al. (2015) found that regional scarcity of females predicted a more restricted sociosexual orientation in a large sample of over 4,000 respondents. Schmitt (2005) studied the link between OSR and sociosexual orientation in over 14,000 people from forty-eight nations. Data on sex ratio levels were obtained from the United Nations. As predicted, sex ratios were significantly correlated with national sociosexuality in the expected direction. Beyond cross-sectional studies of demographics, this hypothesis has also been supported by experimental evidence. Men who were primed to believe that women are abundant increased their unrestricted sociosexual orientation and intentions to commit infidelity relative to men primed with perceived mate scarcity (Arnocky, Woodruff et al., 2016). Together these findings suggest that men's relative scarcity allowed them to better express a male-beneficial mating strategy characterized by unrestricted pluralistic mating.

A relative abundance of females may also influence men's mate preferences and assessment of their own mate value. Taylor (2013) primed men with videos of two men vying for the same female (mate scarcity) or two women vying for one male (mate abundance), and subsequently assessed their mate selectivity (a minimum level of attractiveness in a partner for various mating encounters) and own mate value. Results showed that the abundance condition predicted greater selectivity and self-perceived own attractiveness, but only among men who were simultaneously high in traditional masculinity. Similarly, Jonason et al. (2020) found that men and women are willing to

lower their standards when mates are hard to come by, albeit they tend to first prefer alternate strategies (e.g., travelling farther to find a mate). Moreover, those who believed themselves to be low in mate value or who had attachment anxiety were more willing to lower their standards. More directly, Stone et al. (2007) examined men's mate preferences in a large sample of men and women from thirty-six cultures. Results showed that from a list of eighteen different mate preferences (e.g., attractiveness, desire for children, good cook/housekeeper, chastity, etc.), sixteen of those preferences were stronger in regions with more female-biased sex ratios. Together, these studies suggest that availability of mates can influence men's preferences for mate value characteristics in women. Conversely, the Stone et al. study also demonstrated that women increased their mate preferences when men were scarce. In accordance with the alternative sex ratio mate preference shifts hypothesis, the authors argued that perhaps women increase their standards in such circumstances to avoid being taken advantage of by the greater proportion of men seeking short-term pluralistic mating. In support of this, Lichter et al. (1995) documented that women in the United States are more likely to marry a high-status man (in terms of education and occupation) when men are abundant, but that women do not appear to marry men of lower mate value in contexts of relative male scarcity. In other words, despite their scarcity, women maintain preferences for good-quality long-term mates.

Just as men adjust their mate preferences and exhibit a more pluralistic reproductive strategy when they are (or view themselves as) a scarcer resource relative to more abundant females, so too will females alter their behavior to increase their chances at mating successfully when desirable men are more difficult to come by. Women have been found to increase their mating motivation when mates are a scarcer commodity. For example, Hahn et al. (2014) exposed men and women to a motivational salience task using attractive and unattractive facial stimuli. Participants had to press a combination of buttons to view a particular face for a longer duration. These faces were paired with either same-sex (unfavorable sex ratio), opposite-sex (favorable sex ratio), or neutral distribution of other photos. Results showed that for men and women, the motivational salience of attractive opposite-sex faces was greatest in the own-sex-biased condition. These findings suggest that women and men may augment their mating effort, as evidenced by the motivational salience of attractive (but not unattractive) members of the opposite sex, under conditions of relative mate scarcity.

If women increase their mating motivation under conditions of mate scarcity, we should also see an increase in behavioral effort aimed at successfully attracting men in these circumstances. In support of this, Wang et al. (2021) recently showed that a female-biased sex ratio as well as stratified distribution of economic resources (GINI) independently predicted women's interest in cosmetic surgery as evidenced by Google search queries for cosmetic surgery terms as well as the density of certificated plastic surgeons in those regions, even

after controlling for female education, age, urbanization, female employment rate, and female income. Moreover, female college students from faculties with female-biased OSRs demonstrated greater appearance focus (i.e., habitually monitoring one's own appearance) than women from male-biased faculties. Other researchers have shown that in circumstances of female-biased sex ratios, women wear more revealing clothing (Barber, 1999). Although the goal of such appearance enhancement seems to be meant to make oneself more attractive to men in a competitive mating environment, it is important to note that such an endeavor also involves outcompeting same-sex rivals. Other research has shown that in women and men primed with perceptions of mate scarcity, trait intrasexual competitiveness increases relative to those primed with perceived mate abundance (Arnocky et al., 2014).

Beyond attempts at increasing their physical desirability through appearance enhancement practices, women also appear to relax their standards for engaging in sexual activity in a way that conforms to a more male-preferred shorter-term mating strategy. As previously mentioned, men and women report more sexual promiscuity when men are scarce relative to women. Moreover, South and Trent (1988) found across sixty-five nations that the rate of out-of-wedlock births correlated with a more female-biased (i.e., male scarcity) sex ratio. Locke et al. (2020) found that unmarried women who were primed with perceived mate scarcity reported desiring a smaller and less expensive engagement ring (an ostensible cue to a man's commitment and resource provisioning) compared to women primed with perceived mate abundance. However, use of this same priming procedure did not induce expressed differences in overt sociosexual attitudes and desires in women (Arnocky, Woodruff, et al., 2016). Together this suggests that women may flexibly attune their mating strategies and expectations for male commitment to attract a mate depending, in part, upon the ease with which those mates can be obtained; however, more research in this area is required.

**Pathogen Threat.** Mating with a healthy partner has implications for reproductive success. Choosing an unhealthy mate invokes risk of infection to oneself and offspring, loss of partner resources and parenting assistance, and genes for low immunocompetence being passed on to children (Tybur & Gangestad, 2011). Sexual selection is persistently influenced by organisms' resistance to rapidly evolving parasites (e.g., Hamilton & Zuk, 1982), such that those who are most resistant to infection are best able to invest in immunologically costly sexual signals (Folstad & Karter, 1992). Accordingly, research has shown that in regions with greater pathogen threat, individuals' weighting of the importance of an attractive partner, as a putative cue to good genes and disease resistance (see Arnocky et al., 2014), increases among both men and women (Gangestad & Buss, 1993). Men (and women) rate unattractive targets as being less attractive when they are higher in pathogen disgust. Together, this body of research suggests that less healthy individuals are at a mating disadvantage and should thus be more vigilant

toward potential reproductive threats and exert more effort at retaining a desired mate. Young adults who had experienced poorer health over the past year believed that their partners were more likely to cheat on them (Arnocky, Pearson, & Vaillancourt, 2015), and engaged in more cost-inflicting mate retention effort (Davis, Belanger, Mattsson, & Arnocky, 2019). Future research would benefit from exploring whether women primed with pathogen threat or information about their own poor health might be more prone to exerting effort at enhancing their physical appearance.

**Resource Scarcity.** Women's mating effort has also been linked to resource availability. Blake et al. (2018) examined the relationship between gender inequality and income inequality (assessed at city, country, and international levels), and self-sexualization via self-portrait photographs ("sexy selfies") shared publicly on social media. Areas with relatively more sexy selfies were more economically unequal but not more gender oppressive. They also found that in the United States, purchasing of beauty-enhancing goods and services such as women's clothing was greater in regions that were economically unequal but not gender oppressive, suggesting that women's appearance enhancement effort is driven, in part, by economic inequity. Blake and Brooks (2019) also showed that income inequality increased women's intentions to wear more sexualized clothing for a hypothetical night out. This finding mirrors earlier work on the "lipstick effect" – the finding that in times of economic uncertainty and hardship, women increase their spending on appearance enhancement products, while decreasing their spending on other goods (Hill, Rodeheffer, Griskevicius, Durante, & White, 2012). Some research suggests that various individual and ecological conditions might interact to influence women's mating effort. For instance, Wang et al. (2019) reported that whereas women with a high socioeconomic childhood were stable in their preferences for men with resources, women with a low socioeconomic childhood increased their preferences for men with resources when primed with a female-biased sex ratio. This suggests that under increased intrasexual competition, females with a life history reflecting resource scarcity may become more attuned to attracting men with resources.

### 5.3 Conclusion

Across diverse cultural circumstances over time, heterosexual women have been shown to engage in mate competition through self-promoting qualities that are preferentially desired by opposite-sex mates, such as cues to good parenting ability (e.g., kindness) and physical appearance (Arnocky et al., 2014; Buss, 1988a, 1991). Across the world, beauty matters and women engage in appearance enhancement for the purpose of augmenting their attractiveness to secure and retain desirable mates, as well as to compete with same-sex rivals and for valued economic resources (Davis & Arnocky, 2020).

2021; Frederick et al., 2015). Several individual difference (e.g., mate value; Arnocky, 2018) and contextual factors (e.g., operational sex ratios; Schmitt, 2005) have been shown to influence women's mating effort and appearance enhancement tactics. An evolutionary perspective can help to shed insight into how sexual selection has shaped women's mating psychology, such as their epigamic displays which largely correspond to men's evolved mating preferences.

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