

Mate preferences among the Shuar of Ecuador: trait rankings and peer evaluations[☆]

Elizabeth G. Pillsworth*

Center for Behavior, Evolution, and Culture, University of California, Los Angeles, CA, USA

Department of Anthropology, University of California, Los Angeles, CA, USA

Initial receipt 27 September 2007; final revision received 17 January 2008

Abstract

A large body of research has examined sex differences in mate preferences, but very little of such work has been conducted in small-scale societies. Study 1 explored women's and men's mate preferences within a modern hunter-horticulturalist population in Amazonian Ecuador. In contrast to patterns documented in much of the existing literature, women and men from three Shuar villages were nearly identical in their stated preferences for physical attractiveness and resource-related traits, and physical attractiveness was ranked at the bottom among 19 traits. Study 2 examined the relationship between unmarried Shuar participants' assessments of the personal characteristics of known peers and their assessments of those peers as desirable long-term partners. When assessed using this method, physical attractiveness appeared to weigh much more heavily into Shuar evaluations of partner desirability, and a sex difference emerged in the preference for resource-related traits. Overall, there were substantial differences between individuals' stated preferences and their preferences as revealed in peer ratings. Across both measurement techniques, however, Shuar women and men were very similar in their preferences for physical attractiveness. These results raise questions about the universality of sex differences in mate preferences documented in the existing literature.

© 2008 Elsevier Inc. All rights reserved.

Keywords: Mate choice; Sex differences; Shuar; Hunter-horticulturalists

1. Evolutionary psychology and mate choice

1.1. Evidence supports predictions derived from parental investment theory

Trivers' (1972) parental investment theory makes several predictions about mate choice that have been central to human evolutionary studies. First, because women's investment in offspring is more obligatory and direct than that of men (the physiological resources required for pregnancy and lactation versus the external resources of additional food, protection, and/or social resources), women will prefer characteristics

indicating a partner's ability to provide resources more than will men. Second, because women's reproductive value declines steeply over the life course, men will prefer cues indicating a woman's physical ability to reproduce—such as youth and beauty—more than will women (Symons, 1979). There is to date a great deal of evidence to support these predictions, including numerous studies documenting sex differences in preferences for these traits across many populations and using a variety of methods (Buss, 1989a, 1989b; Buss & Barnes, 1986; Buunk, Dijkstra, Fetchenhauer, & Kenrick, 2002; Hatfield & Sprecher, 1995; Khallad, 2005; Li, Bailey, Kenrick, & Linsenmeier, 2002; Lippa, 2007; Shackelford, Schmitt, & Buss, 2005; Stewart, Stinnett, & Rosenfeld, 2000; Zeh & Smith, 1985). In fact, so often has it been reported that men consider physical attractiveness more importantly in a long-term partner than do women and that women consider access to resources more importantly than do men that these sex differences are beginning to be treated as truisms (e.g., Greitemeyer, 2007; Koyama, McGain, & Hill, 2004; Wiederman & Allgeier, 1994).

[☆] Funding for this research was provided by the National Science Foundation (Award No. 0451287), with additional support from the UCLA (University of California, Los Angeles) Department of Anthropology and the UCLA Latin American Studies Program.

* Department of Anthropology, 341 Haines Hall, Box 951553, University of California, Los Angeles, Los Angeles, CA 90095-1553, USA. Tel.: +1 310 977 1578.

E-mail address: pillse@ucla.edu.

There are two important shortcomings of the literature on human mate preferences. First, although investigators have endeavored to collect data from many cultures, these data have been collected, by and large, from urban, middle-class, and often college-educated participants. Second, the data collected are almost entirely self-reports of preferences, hypothetical choices, or retrospective reports of the attractive qualities of a current partner, all of which are susceptible to self-report biases.

1.2. *Small-scale societies and mate choice*

The typical study participants in mate choice research live in cultural and ecological environments that are evolutionarily novel: They are engaged in wage labor, involved in local, national, and global markets, exposed to mass media, and reside in relatively large populations, all of which could contribute to the patterns of results that have been documented. In contrast, scholars have just begun to systematically examine mate preferences within small-scale societies with subsistence economies, despite the fact that such societies are thought to more closely approximate ancestral environments in which mate preference adaptations evolved.

Several factors likely to affect the expression of mate preferences may differ substantially between traditional and modernized societies. First, in environments in which contraception is rare and communities are small, the consequences of mating decisions are greater for both women and men than for those in larger societies in which sociosexual relationships need not lead to reproduction and people can cloak themselves in anonymity or move from one social group to another with relative ease (Boyd & Richerson, 1988; Panchanathan & Boyd, 2004). Women risk pregnancy, and poor mating choices may expose both women and men to severe societal stricture or negative reputational consequences impacting their future opportunities. Second, subsistence economies often rely on a strict sexual division of labor, resulting in interdependence of the sexes for the basic necessities of life (Bird, 1999; Brown, 1991). Third, in environments in which modern medical care is difficult to come by, pathogens are prevalent, and a person's ability to obtain resources is directly linked to his or her physical ability, natural immune functioning is of paramount importance to survival and the ability to successfully reproduce (Sugiyama, 2003).

One area of research that has highlighted the importance of testing evolutionary hypotheses of mate choice in small-scale societies is the preference for low female waist-to-hip ratio (WHR). Based on multiple studies conducted in industrialized nations (e.g., Furnham, Tan, & McManus, 1997; Henss, 1995; Singh, 1993), it was argued that the preference for a small WHR might be a human universal. However, studies among the Matsigenka of Peru (Yu & Shepard, 1998), the Hadza of Tanzania (Marlowe & Wetsman, 2001), the Shiwiari of Ecuador (Sugiyama, 2004), the Zulu of South Africa (Tovée, Swami, Furnham,

& Mangalparsad, 2006), and the Sámi of Scandinavia (Swami & Tovée, 2007) have all documented cultural differences suggesting that overall body mass may be more important than WHR in determining attractiveness among foraging peoples. The debate over the importance of WHR is unsettled (see, for example, Marlowe, Apicella, & Reed, 2005) but highlights the importance of local culture and ecology in shaping mate preferences.

In studies conducted in small-scale societies examining preferences among partner traits, the pattern of results is also quite different from that found in college or urban samples, particularly in relation to the importance placed on physical attractiveness. Among the Hadza of Tanzania, for example, Marlowe (2004) found that women cited foraging ability as an important quality in a partner more often than did men but that women and men named physical attractiveness as an important feature about equally. In a study using the Standard Cross-Cultural Sample, Moore and Cassidy (2007) found that whether women placed more importance on attractiveness or resources in a partner varied across populations and was predicted in part by the means by which women derived status within that culture; for example, when women derived status from their authority in the home, they placed relatively more emphasis on attractiveness and less on resources. Among the Aché of Paraguay, men reported that women place the greatest importance on a partner's hunting ability, but women themselves most commonly cited "handsome" and "kind" as the most important characteristics in a mate (Hill & Hurtado, 1996). In addition, although not investigated in small-scale societies, there is evidence that high pathogen prevalence—a common feature of small-scale societies—increases the importance of physical attractiveness in a potential mate (Gangestad, Hasleton, & Buss, 2006), particularly for women (Penton-Voak, Jacobson, & Trivers, 2004).

These studies of small-scale societies are tantalizing, but each of the studies to date is limited by the fact that preferences were assessed using only free response from participants. For example, Hill and Hurtado (1996) speculated that Aché women's shy and abbreviated statements about what is important to them in a partner are actually less accurate than men's thoughtful descriptions of what women find important. In Study 1, I attempted to address this shortcoming in the literature by conducting a systematic ranking task within a hunter-horticultural society in Amazonian Ecuador.

1.3. *Behavioral measures and mate choice*

The second shortcoming of the mate preference literature is heavy reliance on self-reports of hypothetical preferences or retrospective reports of initial attraction to a current partner (e.g., Campbell, Simpson, Kashy, & Fletcher, 2001; Shackelford et al., 2005). These studies tell us what people *say* is important in a partner, but there is little evidence to suggest that people's subjective preferences accurately reflect those traits that actually attract them to a potential

partner (Todd, Penke, Fasolo, & Lenton, 2007; see also Wilson & Nisbett, 1978). Indeed, there is evidence that people are not necessarily aware of the features to which they are attracted in a potential mate, making their conscious designation of preferred traits unreliable. For example, attraction to symmetrical faces is not dependent on the ability to detect symmetry (Little & Jones, 2006). Similarly, a person's recollection of the specific traits that attracted him or her to a current partner may be influenced by current perceptions of the partner or current preferences (see, for example, Figueredo, Sefcek, & Jones, 2006; Murray, 1995; Murray, Holmes, Dolderman, & Griffin, 2000).

Only recently have researchers captured behavioral measures of individuals' real-time assessments of others whom they are actually considering as potential partners via the modern phenomenon of "speed dating" (e.g., Eastwick, Finkel, Mochon, & Ariely, 2007; Kurzban & Weeden, 2005; Todd et al., 2007). In speed dating, people meet several potential partners in an evening and choose the ones they would like to see again. The data from these studies are causing scholars to rethink conclusions about mate preferences that have been drawn solely from self-reports. Kurzban and Weeden, for example, found that both women and men appear to rely almost exclusively on observable attributes, such as physical attractiveness, in selecting potential partners, with no evidence of women's selections being based on indications of status or resources. More explicitly, Todd et al. found that participants' stated preferences in partner traits diverged substantially from the preferences revealed in their choices of dating partners. These studies have added to our understanding of mating decisions, as opposed to hypothetical preferences, but the novelty of the speed-dating context makes it difficult to draw firm conclusions from these studies alone. In Study 2, I investigated the relationship between individuals' attraction to known peers and their perceptions of the personal characteristics of those peers.

2. Mating-relevant characteristics

2.1. Physical attractiveness

From an evolutionary perspective, the physical features contributing to attractiveness are those that are correlated with fitness-relevant characteristics (Gangestad, Thornhill, & Yeo, 1994; Thornhill & Gangestad, 1999). Among most sexually reproducing species, females discriminate more based on attractiveness than do males because of their greater obligatory investment in offspring (Daly & Wilson, 1983). In contrast to males in other species, however, human males invest heavily in offspring and may pair with a mate for many years. Parental care shifts the typical pattern of discrimination, as women trade off cues indicating genetic quality for those indicating the ability and willingness of a partner to invest in offspring (Gangestad & Simpson, 2000) and men have evolved to prefer attractiveness in women

because it indicates both genetic quality and a woman's future reproductive potential (Symons, 1995).

Because choosiness can be costly (e.g., Pomiankowski, 1988), the importance of a partner's physical attractiveness should vary depending on cues in the local culture and ecology indicating the benefit of physical attractiveness relative to other desired features in mates. For example, under conditions of high pathogen load and resource scarcity, both women and men should have greater preferences for features indicating health and potential reproductive success. Physical attractiveness and facial symmetry have been shown to be of greater importance, particularly among women, in high-pathogen regions (Gangestad et al., 2006; Little, Apicella, & Marlowe, 2007), and female height, usually expected to be neutral to male preferences, has been shown to have a significant effect on reproductive success in stressed environments (Allal, Sear, Prentice, & Mace, 2004; Pollet & Nettle, *in press*). Similarly, when women contribute substantially to subsistence or control their own wealth, the weighting placed on resources provided by male partners may be lower and the preference for physical attractiveness may be higher (Moore, Cassidy, Law Smith, & Perrett, 2006). Thus, in an environment in which there is high pathogen load and women contribute substantially to family subsistence, as is true among the Shuar (Hagen, Barrett, & Price, 2006), men's and women's preferences for physical attractiveness may converge as compared with patterns of preferences documented previously and both sexes may exhibit strong preferences for physical attractiveness in a partner.

2.2. Ability to obtain resources

Men's and women's preferences for a partner's ability to provide resources should also vary depending on the local ecology and culture and the extent to which individuals of either sex can provide the resources necessary for successfully raising offspring. Because of women's heavy obligatory investment in offspring, it is possible that women's preferences for resources will be invariant across societies and uniformly high. Men's preferences for resources, on the other hand, might be more sensitive to cues that the survival of a man and that of his offspring are heavily dependent on resources provided by women. Under such circumstances, men, like women, may face tradeoffs in choosing physically attractive partners or partners who are good resource providers. In addition, both women and men may face tradeoffs among partner characteristics related to the provision of specific resources (e.g., the ability to provide material necessities or the ability to provide nutritional necessities). Thus, in an environment like that of the Shuar in which people live at a subsistence level and in which women are responsible for providing many of the basic food staples (Hagen et al., 2006), men's preferences for cues to resource acquisition might be higher than those in other environments and the differences

between the sexes should therefore be small or nonexistent. However, men's and women's preferences for individual resource-related traits may be contingent on the specific roles and responsibilities of each sex.

3. Study 1: trait rankings

3.1. Study samples

Data were collected in three Shuar villages and at the University of California, Los Angeles (UCLA). The Shuar samples included two community samples—the first from an interior village with little interaction with the broader Ecuadorian culture or economy, and the other located close to a road and *colono* (nonindigenous Ecuadorian) towns. The third Shuar sample was drawn from a population of high school students who traveled from many villages to attend the regional Shuar high school, located in a Shuar village on the main road. All Shuar village and location names are pseudonyms.

Traditional Shuar subsistence includes cultivated resources (primarily manioc, taro, and plantain); hunted resources (including large game such as agouti, monkey, and tapir, and small game such as armadillo and small birds); and gathered resources (such as fruits and larvae). In general, women are responsible for all horticultural activities except for the initial clearing of the garden and men are responsible for all large-game hunting. Both women and men may hunt small game, fish, and collect fruits and larvae. In some communities the importance of hunted and cultivated food resources have been largely supplanted by a reliance on purchased foods.

3.1.1. Participants

3.1.1.1. Kampunin (“remote village”). Kampunin is the most remote of the villages in which this study was conducted, located approximately 12 mi from the nearest road over rough terrain. The village consists of 17 households—typically composed of a married couple and their unmarried children—with an adult population of 24 men and 20 women. Most marriages are monogamous, but there are 2 polygynously married men in the village. Kampunin is unusual for an interior village in that 5 men hold government-paid jobs as teachers in surrounding villages, 1 man is the local health aide, and 1 man works for a regional indigenous organization. Aside from this, wage labor is uncommon and, even among those who earn money, almost all food is procured through gardening, gathering, and hunting. Because there is no road, manufactured and trade goods, including food, are difficult to procure. There is no electricity, no running water, and no propane for cooking.

All adults in the village were invited to participate in the study, with no specific set of selection criteria. According to Shuar norms, individuals aged approximately 13 years or older are considered adults, and it is not uncommon for

women to marry at 12 or 13 years of age. The only reasons for not participating were that the individual was not in the village during my stay or stated that he or she did not have time to participate. Eleven men and 15 women from Kampunin completed the trait ranking task. All participants were recruited individually; thus, in some cases, both married partners participated in the study and in others only one partner participated. Male participants were on average 28.5 years old (range=15–46 years, S.D.=12.1), whereas women were on average 23.1 years old (range=13–38 years, S.D.=8.2). Six men (55%) and 10 women (67%) in this sample were married (1 man in this sample was married polygynously to 2 wives, both of whom are also included in the sample; no other woman in the sample was polygynously married). Of those participants who were single, none had children. Among married participants, only 1—a newly married woman—was childless. The average number of children among the married male participants was 5.17 (range=2–9, S.D.=2.64), and that among the married female participants was 2.6 (range=0–7, S.D.=2.12). In this sample, 5 men (45%) and 9 women (60%) lived in households in which at least 1 member regularly earned money.

3.1.1.2. Iruntramu (“integrated village”). Iruntramu is larger and more integrated into the broader economy and culture of Ecuador than is Kampunin, with 38 households and an adult population of 59 men and 51 women. As in Kampunin, most marriages are monogamous, with only 3 polygynously married men in the village. The village is located at the end of an unpaved road approximately 6 mi from a small *colono* city, with regular (weekly) bus and semiregular truck traffic. Many of the people in this village are employed either regularly (e.g., teachers) or sporadically (e.g., selling sugar cane or timber or engaged in contract labor). Most residents of Iruntramu have electricity and propane stoves in their homes, and although gardening and hunting continue to be important activities, villagers purchase many food and material goods from the nearby town.

Participants from Iruntramu included 17 men and 19 women, selected using the same recruitment criteria as in Kampunin. Male participants were on average 30.1 years old (range=15–52 years, S.D.=11.9), and women were on average 26.3 years old (range=13–40 years, S.D.=8.1). Twelve men (71%) and 12 women (63%) in this sample were married (none of the men in this sample was polygynously married, but 1 woman in the sample had a cowife who lived in another village). No unmarried man in this sample had children; 2 unmarried women had one child each. Among the married participants, 1 man and 1 woman (married to each other) were childless; the average number of children among the married male participants was 4.75 (range=0–12, S.D.=3.11), and that among the married female participants was 4.17 (range=0–10, S.D.=3.07). Twelve men (71%) and 17 women (90%) lived in households in which there was at least 1 wage earner.

3.1.1.3. Unuinmaitai (“high school”). Unuinmaitai is a regional Shuar high school located in a mid-sized village directly on the main road that crosses Eastern Ecuador. Shuar students come to the high school from villages that range from very remote to very integrated, with some students commuting daily from their villages and others boarding with relatives or acquaintances in the high school village. At the time of this study, there were 109 students enrolled in Grades 7–12, of whom 63 were aged 13 years or older and thus eligible to participate.

Participants included 24 male and 24 female students, recruited solely based on age and time availability. Male participants were on average 17.4 years old (range=13–24 years, S.D.=2.5), and female participants were on average 16.0 years old (range=13–20 years, S.D.=1.4). Most individuals in this sample were single, with only 2 married men and no married women. None of the women in this sample had children, but 4 men (including the 2 married men) had either one or two children. The men with children represented the higher end of the age spectrum, the youngest being 19 years old. Reflecting the variety of home environments, the proportion of individuals from wage-earning households [16 men (67%) and 18 women (75%)] falls between those of the remote village and the integrated village.

3.1.1.4. Comparison sample (UCLA). Participants were recruited via word-of-mouth through undergraduate research assistants, and included 25 men and 23 women. Male participants were on average 22.2 years old (range=18–36 years, S.D.=3.4), and female participants were on average 25.2 years old (range=18–49 years, S.D.=8.9). Most participants were single, with only 2 married men and 2 married women. Most were childless, with only 1 married man having one child, 1 single woman with three children, and 2 married women with two children each. As with the Shuar high school sample, the individuals with children also represent the oldest participants in this sample, with the youngest being 36 years old.

3.2. Methods

3.2.1. Data collection

The same method was used across all four study populations, with only the language differing between samples. In the Shuar villages, Spanish was primarily used, but in both the remote village and integrated village, the traits being ranked were also named in the native Shuar language. Only Spanish was used among the Shuar high school students. I conducted all interviews with the Shuar participants myself. For the UCLA sample, interviews were conducted by either myself or by trained research assistants and in English. All interviews were conducted in private. No individual received direct compensation for participation in this study. Within the Shuar communities, compensation was provided in the form of public goods (e.g., donations to the medical center or school) and was not

contingent on any individual’s participation. No compensation was provided to participants in the UCLA sample.

The interview was conducted verbally with the aid of 19 index cards. Each card was labeled with a specific mating-relevant trait (e.g., “physically attractive,” “intelligent,” or “able to provide food resources”; the complete list of 19 traits is available in Supplemental Materials). Participants were shown 2 cards at a time, selected randomly, and asked to choose the trait they felt was more important to them in a long-term romantic partner or spouse. The winning trait was compared one at a time with others in the deck until it was paired with a trait that was deemed more important. The new winning trait then became the point of comparison. For example, a participant’s choices might go as follows (with the asterisk denoting the preferred card): A*–B; A*–C; B*–C; A–D*; D*–E; E–A*; D–F*. This would result in the following order: F, D, A, E, B, C. Preferences were assumed to be transitive, so it was not necessary to compare all possible pairs. In this example, D was not compared with B as D was preferred over A, which was preferred over B. Once all 19 traits had been put in order, participants had the opportunity to make any changes desired. On average, four to five changes were made to the overall order following the pairwise comparisons.

3.2.2. Data analysis

Within each sample, rank scores for specific traits were compared between the sexes using the nonparametric Mann–Whitney test in Intercooled Stata 10. Comparisons were made across samples using the same method. All reported *p* values are two tailed.

3.3. Results

3.3.1. Preference for physical attractiveness

The preference for physical attractiveness was assessed with a single item, “physically attractive,” following the methods used in previous studies (e.g., Buss, 1989a; Li et al., 2002). Among the UCLA participants, as expected, men ranked physical attractiveness as significantly more important in a long-term partner compared with women ($z=2.18$,

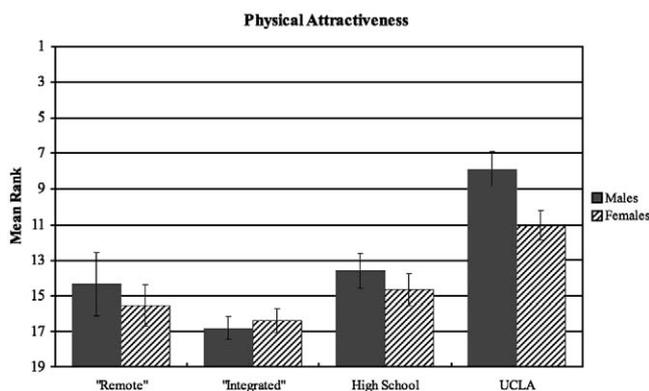


Fig. 1. Importance of physical attractiveness in a long-term romantic partner to women and men. Ranking: 1=most important, 19=least important.

$p=.03$). Among the Shuar participants, preferences for this trait converged and no sex difference was found in any of the samples (remote village: $z=0.32$, $p=.75$; integrated village: $z=-0.50$, $p=.79$; high school: $z=0.98$, $p=.33$). The mean ranks for physical attractiveness by sex and village are shown in Fig. 1. UCLA participants ranked physical attractiveness as significantly more important in a partner compared with participants in any of the Shuar samples, whether examined separately by sex or with the sexes combined (sexes combined: UCLA vs. remote village, $z=4.24$, $p<.0001$; UCLA vs. integrated village, $z=6.27$, $p<.0001$; UCLA vs. high school, $z=4.53$, $p<.0001$; between-sample comparisons by sex are available upon request). Comparing the three Shuar samples, both male ($z=2.74$, $p<.01$) and female ($z=2.08$, $p<.05$) participants from the high school ranked physical attractiveness as more important compared with males and females from the integrated village. No other between-village difference in the preference for physical attractiveness was found.

3.3.2. Preference for access to resources

Six of the 19 trait characteristics were designed to measure ability to acquire resources. These were “ability to obtain basic food needs,” “ability to obtain basic material needs,” “has (cash) money,” “educated,” “hardworking,” and “high status.” When these measures of resource acquisition abilities are averaged into a single composite item, UCLA women ranked access to resources as significantly more important in a long-term partner compared with UCLA men ($z=-2.11$, $p=.04$). Among the Shuar participants in all three villages, men’s and women’s preferences for resource-related traits converged and there was no between-sex difference found (remote village: $z=-0.15$, $p=.89$; integrated village: $z=-0.89$, $p=.37$; high school: $z=-1.18$, $p=.24$). The mean ranks for access to resources (average mean across the 6 individual items) can be seen in Fig. 2. Shuar participants in all of the samples ranked access to resources as significantly more important in a long-term partner compared with participants in the UCLA sample, whether the sexes were examined separately or together (sexes com-

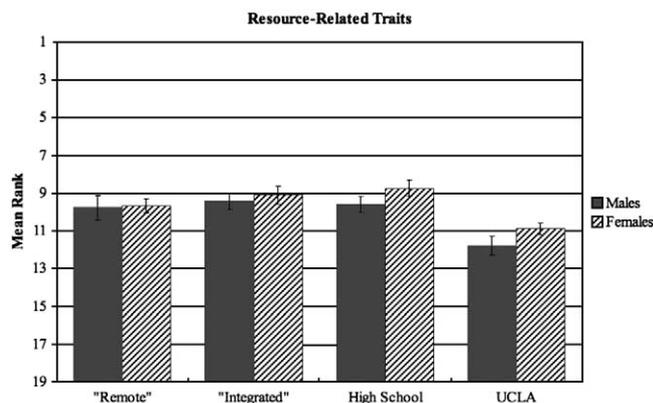


Fig. 2. Importance of resource-related traits in a long-term romantic partner to women and men. Ranking: 1=most important, 19=least important.

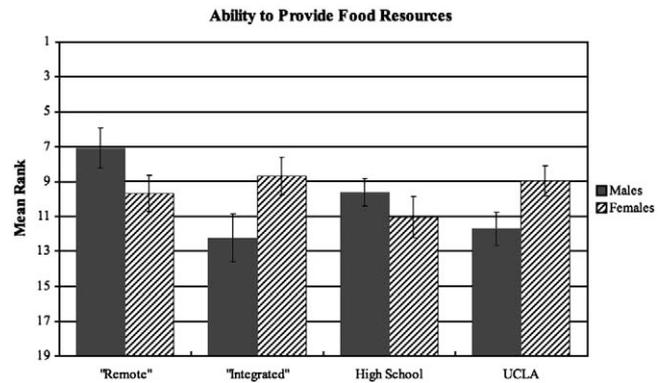


Fig. 3. Importance of the ability of a long-term romantic partner to provide basic food needs to women and men. Ranking: 1=most important, 19=least important.

pared: UCLA vs. remote village, $z=-3.26$, $p<.01$; UCLA vs. integrated village, $z=-4.54$, $p<.0001$; UCLA vs. high school, $z=-4.71$, $p<.0001$). There was no difference between any of the Shuar villages, either within or across sex, in the ranked importance of a partner’s ability to acquire resources.

Of the six individual traits included in the measure of resource acquisition ability, only the ability to obtain basic food needs resulted in any significant difference between women and men or between the study samples. Among both UCLA participants and participants from the integrated village, where food is primarily purchased, women ranked the ability of a partner to obtain basic food needs as significantly more important compared with men (UCLA: $z=-2.13$, $p=.03$; integrated village: $z=-2.01$, $p=.04$). Among participants in the remote village and those in the high school, there was no statistically significant sex difference in the importance of providing basic food needs, but there was a nonsignificant trend in both populations for men to rank this trait as more important compared with women (remote village: $z=1.59$, $p=.11$; high school: $z=1.27$, $p=.20$). Women in all four samples ranked this trait equally important, but men differed significantly across samples in the importance they placed on a partner’s food acquisition abilities. Men in the remote village ranked a partner’s ability to obtain food resources as significantly more important compared with men from either UCLA ($z=2.58$, $p<.01$) or the integrated village ($z=2.45$, $p<.05$) and as marginally more important compared with male participants from the high school ($z=1.75$, $p=.08$); male participants from the high school also ranked this trait as significantly more important compared with men in the integrated village ($z=-0.96$, $p<.05$) and as marginally more important compared with men from UCLA ($z=1.76$, $p=.08$). The mean ranks of “ability to obtain basic food needs” by sex and village are illustrated in Fig. 3.

3.4. Discussion

The results from Study 1 differ in two important ways from those of previous studies of long-term mate preferences. First, as predicted, among the Shuar participants, the

sexes were similar in their preference for physical attractiveness in a partner, whereas among the UCLA participants, the typical sex difference was observed, with men preferring physical attractiveness more than women. Second, also as predicted, Shuar women and men were similar in their preferences for resource-related traits, whereas the typical pattern was again observed at UCLA, with women ranking these traits as more important compared with men.

Contrary to expectations, however, both Shuar women and men appeared to agree that physical attractiveness was of little importance in selecting a long-term partner. Among both women and men, physical attractiveness was consistently ranked the lowest of all 19 traits in each of the three Shuar samples. One possibility is that the face-to-face nature of the task caused participants to be inhibited in their responses with respect to attractiveness. However, the same method was used among the UCLA participants, and, although all Shuar participants had had several personal conversations with the researcher and many had participated in other research tasks conducted in a similar manner, the UCLA participants were likely more accustomed to anonymous surveys than one-on-one interviews. Furthermore, in other tasks and in casual conversations, many of the same Shuar participants openly discussed the physical attributes of others and showed no reticence in making evaluations based on physical attractiveness, suggesting that their low ranking of this trait did not reflect cultural proscriptions of the topic.

It is possible that a sex difference in preference for attractiveness was obscured by the fact that women and men ranked physical attractiveness lowest on the scale of importance, causing a floor effect. However, participants in this study ranked 19 traits, including all 13 traits included in the study by Buss (1989a), in which sex differences were reliably found regardless of overall importance of physical attractiveness. Therefore, the fact that Shuar men and women did not differ in ranking physical attractiveness below all other traits is noteworthy. As a male participant commented, and several others expressed, when doing the task, “If a

woman cannot make manioc beer [the principal beverage] or care for the children or grow manioc [the staple food], what good is being attractive?”

The convergence of preferences for resource-related traits, on the other hand, appears to reflect the fact that both women and men highly value those qualities in a partner. Although other traits (e.g., reliability and kindness) were ranked more important, men and women in all Shuar samples ranked resource-related traits as significantly more important compared with men and women in the UCLA sample. In addition, because the preference for resource-related traits was based on a composite of six traits that, due to the nature of a ranking task, could not all be ranked equally highly, it is possible that the overall importance of resource-related traits is underestimated. Future studies using ratings in place of rankings may clarify the overall importance of resource-related traits to Shuar women and men.

As illustrated in Table 1, the different pattern of preferences between the UCLA sample and the three Shuar samples cannot be readily explained by sample differences in age, marital status, and reproductive status. The two Shuar community samples (remote village and integrated village) did not differ from the UCLA sample in age (although the Shuar high school students were significantly younger overall), and the Shuar high school sample was matched with the UCLA sample in marital and reproductive status of participants. Between-sample differences in preferences can also not be explained by differences in interrater agreement in the rankings of the target traits. In tests of variance, the samples displayed roughly equal interrater agreement with one exception: men from the integrated village displayed significantly greater agreement with each other in their rankings of physical attractiveness than did men in any of the other samples (all $p < .02$).

An intriguing result is the difference between Shuar samples in the pattern of preferences for specific resource-related traits, namely, the ability to acquire basic food resources. As summarized in Table 1, the only difference

Table 1
Characteristics of participants from different samples

	Age	Married	Age married	Children	Wage earning
Males					
Remote village	28.5 (12.09) _{a,c}	54.5 _a	23.5 (6.44) _a	2.8 (3.28) _a	45.5 _a
Integrated village	30.1 (11.88) _a	70.6 _a	19.9 (2.61) _a	3.4 (3.41) _a	70.6 _b
High school	17.4 (2.52) _b	12.5 _b	17.0 (1.00) _a	0.25 (0.61) _b	66.6 _{a,b}
UCLA	22.2 (3.44) _c	8.0 _b	23.0 (1.41) _a	0.04 (0.20) _b	–
Females					
Remote village	23.1 (8.15) _d	66.7 _c	18.0 (3.09) _b	1.7 (2.12) _c	60.0 _c
Integrated village	26.3 (8.08) _d	63.2 _c	16.8 (2.67) _b	2.7 (3.09) _c	89.5 _d
High school	16.0 (1.44) _f	0.0 _d	NA	0 _d	75.0 _{c,d}
UCLA	25.2 (8.87) _d	8.7 _d	21.5 (2.12) _b	0.30 (0.82) _d	–

All comparisons were tested *within sex* only. Samples with the same subscript do not significantly differ from one another on the characteristic listed. The values in the column labeled “Age” represent the mean age (S.D.) of participants; those in “Married,” the percentage of participants ever married; those in “Age married,” the mean age (S.D.) at marriage; those in “Children,” the mean number of children (S.D.) of all participants (including single and childless); and those in “Wage earning,” the percentage of participants with a regular wage earner in their household (i.e., self, spouse, or parent).

between participants from the two Shuar community samples was the percentage engaged in wage labor. Although the difference is only a statistical trend, in the remote village, in which there is less wage labor and a large proportion of daily calories are provided from women's gardens, men ranked the ability of a partner to provide basic food needs as more important compared with women. In contrast, in the integrated village, in which a larger proportion of individuals are engaged in wage labor and more food is purchased, women ranked the ability of a partner to provide food resources as significantly more important compared with men. This pattern was the same among the UCLA participants, for whom all food is likely to be purchased. Among the high school students, who come from villages that vary in their level of economic integration and reliance on women's food production, there was no significant difference between men's and women's preferences, although the trend was more similar to that of the remote village than that of the integrated village.

A limitation of Study 1, and of similar studies, is the use of hypothetical choices to determine the contribution of specific partner features to mate choice. As Li et al. (2002) noted, in the absence of realistic tradeoffs between traits, it is difficult to assess which traits are really the most important. In addition, Todd et al. (2007) have shown that it is similarly unclear as to what extent people's introspections about their most valued traits match their behavioral responses to potential partners. Thus, even when participants are given a hypothetical tradeoff (e.g., having to choose between intelligence and good looks in an imaginary partner), we do not know for sure that the trait they choose is the one that would sway their mating decisions when they are faced with real partners.

4. Study 2: desirability and trait ratings of peers

In Study 2, unmarried women and men rated known peers—individuals who form one another's primary pool of potential marriage partners—on both their personal characteristics and their desirability as long-term partners to address the shortcomings of using abstract rankings.

4.1. Participants

Participants were the same as those in the Shuar high school village, Unuinmaitai, described above: 24 women and 24 men completed all data collection sessions. An additional 4 women and 4 men completed the first two sessions but were unable to complete all three sessions due to time constraints. These 8 individuals were included as targets in the ratings described below such that there were 28 male and 28 female targets of evaluation in total.

4.2. Methods

4.2.1. Interview sessions

Individuals participated in three private interview sessions with the researcher, scheduled about 1 week apart. All

participants also agreed to have their picture taken and used in ratings by their peers. All photographs were taken on a single day, independent of interview sessions. In the first session, participants were asked to provide demographic information (e.g., age, natal village, and family composition) and were given several preference tasks related to another study. In the second session, individuals were shown photographs of the 28 opposite-sex peers who were also taking part in the study and asked to rate each one in terms of how desirable the rater found the individual pictured as a long-term romantic partner (defined as "a person with whom you would like to have a romantic relationship, marry, or possibly have children"). After completing a practice rating task to ensure that they understood the scale, participants rated the targets on a scale of 0–6, with 0 being "not at all desirable," 3 being "more or less desirable," and 6 being "very desirable." All ratings were done by physically placing photographs of the individual targets on a numerical scale about 2 ft in length. I presented the targets in random order. Participants were instructed not to rate close relatives (e.g., siblings, cousins, uncles, etc.) on this characteristic; on average, raters identified 2.74 (S.D.=3.13) of the 28 target individuals as relatives. After rating all opposite-sex targets, participants next rated their same-sex peers, including themselves, on a variety of characteristics using the same 0–6 scale, modified only to reflect the trait being rated (e.g., "not at all kind" to "very kind"). The same-sex ratings were collected for the purposes of another study and will not be reported here.

In the third session, individuals once again rated their opposite-sex peers, this time on eight mating-relevant characteristics ("physically attractive," "kind," "intelligent," "reliable," "hardworking," "leader," "interesting personality," and "similar sense of humor to self"). Participants rated all target individuals on a single trait, completed in random order, before rating them on the next trait. I presented the targets in random order for each rating task. The exact number of ratings each individual conducted and thus the exact number of people by whom each individual was rated varied, because participants had the option of not rating those individuals whom they felt they did not know well enough to assess. Overall, each participant rated an average of 24.8 other individuals.

4.2.2. Construction of composite variables

Within raters, the assessments of individual targets on each of the eight characteristics were highly correlated (see Table 2). Thus, if a rater evaluated a specific target as very intelligent, he or she was also likely to rate the target as very reliable, very humorous, and very good looking, etcetera. Factor analysis, conducted separately for men's and women's ratings, revealed two simple factors, the same in both sexes. The first factor, labeled "personality," consisted of the following four characteristics: physically attractive, sense of humor, interesting to talk to, and kind (female raters, $\alpha=.87$; male raters, $\alpha=.79$). Because of the theoretical importance of physical attractiveness independent of personality characteristics, this item was removed from the factor

Table 2
Pairwise correlations between the eight mating-relevant characteristics

	Kind	Intelligent	Physical attractive	Leader	Hard-work	Interesting personality	Sense of humor	Reliable
Kind		0.61	0.70	0.66	0.61	0.70	0.55	0.62
Intelligent	0.46		0.61	0.64	0.63	0.60	0.46	0.70
Physical attractive	0.53	0.36		0.61	0.57	0.65	0.55	0.58
Leader	0.49	0.60	0.42		0.61	0.64	0.49	0.62
Hard-worker	0.34	0.45	0.25	0.50		0.57	0.41	0.65
Interesting personality	0.54	0.47	0.44	0.55	0.41		0.63	0.59
Sense of humor	0.53	0.40	0.39	0.43	0.33	0.54		0.45
Reliable	0.46	0.60	0.35	0.54	0.44	0.49	0.35	

Correlations between women's ratings of men are shown above the divider, whereas correlations between men's ratings of women are shown below it.

and examined separately in all analyses. Removing physical attractiveness did not substantially affect the scale reliability of the factor (without physical attractiveness: female raters, $\alpha=.83$; male raters, $\alpha=.77$). The second factor, labeled "provider qualities," was composed of the remaining four characteristics: intelligent, hardworking, reliable, and a leader (female raters, $\alpha=.88$; male raters, $\alpha=.81$). There was no sex difference in how men and women rated their opposite-sex peers on any of the three factors ("personality," $z=-0.96$, $p=NS$, overall mean=2.98, S.D.=1.70; "physical attractiveness," $z=-1.05$, $p=NS$, overall mean=3.20, S.D.=1.56; "provider qualities," $z=-0.02$, $p=NS$, overall mean=3.16, S.D.=1.46).

4.2.3. Data analysis

Comparisons of men's and women's ratings of opposite-sex peers as potential long-term partners were conducted using the nonparametric Mann–Whitney test, as in Study 1. A single multilevel multiple regression analysis was conducted within each sex, using the two trait composites and physical attractiveness as independent variables and the rater as the group variable, thus controlling simultaneously for the effects of covariates and the interdependence of each individual's ratings of several targets, to directly examine the relationship of assessments of the different traits on assessments of a target's overall desirability as a partner. In total, there were 592 observations of women rating men (24 women rating an average of 24.7 men each) and 596 observations of men rating women (24 men rating an average of 24.8 women each). The average correlation of assessments of each of the characteristics with desirability was calculated across all individuals within each sex and all were then compared using t tests to conduct comparisons between the sexes. All analyses were conducted using Intercooled Stata 10, and all reported p values are two tailed.

4.3. Results

4.3.1. Assessments of targets as desirable partners

There were significant differences in how desirable women and men rated their opposite-sex peers as potential

long-term partners. On the 0–6 scale, women rated men an average of 1.37 (S.D.=1.73), whereas men rated women an average of 2.14 (S.D.=1.79; $z=3.58$, $p<.001$). Similarly, women rejected potential mates at a higher rate than did men ($z=2.96$, $p=.01$). On average, women rated as "not at all desirable" 55% of all potential mates (nonkin), whereas men chose "not at all desirable" for only 27% of all potential mates.

4.3.2. Desirability and personality

For both women and men, there was a significant relationship between ratings of a target's personality and ratings of his or her desirability as a romantic partner (women: $z=3.71$, $p<.001$; men: $z=5.31$, $p<.001$). Among women, the average correlation was .50 (S.D.=.17); among men, it was .40 (S.D.=.25). These correlations were not significantly different from one another ($t=-1.51$, $p=.14$).

4.3.3. Desirability and provider qualities

For women, but not men, there was a significant relationship between ratings of a target's provider qualities and ratings of his or her desirability as a romantic partner (women: $z=3.05$, $p<.01$; men: $z=0.92$, $p=.36$). Among women, the average correlation was .45 (S.D.=.16); among men, it was .26 (S.D.=.24). This difference was statistically significant ($t=-3.29$, $p<.01$).

4.3.4. Desirability and physical attractiveness

For both women and men, there was a significant relationship between ratings of a target's physical attractiveness and ratings of his or her desirability as a romantic partner (women: $z=5.21$, $p<.001$; men: $z=6.70$, $p<.001$). Among women, the average correlation was .48 (S.D.=.18); among men, it was .45 (S.D.=.14). The correlations were not significantly different from one another ($t=-0.52$, $p=.60$).

4.4. Discussion

In Study 2, the potential importance of partner traits can be inferred from the pattern of correlations between

participants' evaluations of the qualities of known peers and their attraction to those individuals as possible relationship partners. Among women, evaluations of men's personalities, provider qualities, and physical attractiveness were all significantly and positively related to assessments of them as partners, whereas among men, evaluations of women's personalities and physical attractiveness, but not their provider qualities, were positively related to assessments of them as partners. As predicted, the correlation of physical attractiveness to desirability was similar among women and men, as was the correlation of personality to desirability. These were also similar to each other, such that physical attractiveness was just as strongly correlated to desirability as was personality among both women and men. Contrary to predictions for this population, but in line with the general theory of mate preferences, the correlation between provider qualities and desirability was stronger among women than among men, and for women, provider qualities were about as strongly correlated to desirability as were personality and physical attractiveness.

These results indicate that stated preferences among the Shuar do not always correspond to the traits used in assessing the desirability of real potential partners. The same Shuar participants who in Study 1 ranked physical attractiveness as the least important of 19 traits appeared to weigh attractiveness heavily in their assessments of potential partners in Study 2. In fact, inspection of the strength of the correlations suggests that both women and men weighted attractiveness more heavily than resource-related traits, which in Study 1 were consistently ranked as more important than physical attractiveness.

One limitation of this study was the limited number of characteristics examined. Because the traits evaluated included only "positive" traits, and only those expected to weigh heavily in mate choice, most of the characteristics measured were strongly related to target desirability. In addition, because participants were mostly single and still living in their parents' homes, evaluations of some important resource-related characteristics, such as ability to provide food, were not examined. Instead, the resource-related traits in Study 2 corresponded to intellectual ability and status. To fully examine the relative importance of different characteristics in mate choice, future studies should include a wider variety of traits and should include traits for which we expect variation in the pattern of effects (e.g., food-related vs. status-related resource traits).

The results of this study tell us only how trait and desirability assessments are correlated in the evaluator's mind. For example, it is possible that attraction to a target, which could be based on traits not assessed in the study, led to inflated assessments of the target on the positive attributes that were assessed in the study. A similar hypothesis is that targets who are generally liked (who are "friends") are evaluated more favorably on positive traits and desirability, leading to the correlations observed. These possibilities aside, without question, what the data do show is that, in the

evaluator's—either male or female—mind, physical attractiveness and desirability are linked.

5. General discussion

Results from these two studies show that, among the Shuar, women and men are similar in their preference for physical attractiveness in a long-term romantic partner but that the overall importance of physical attractiveness appears to vary depending on the methodology. In the ranking task, Shuar women and men stated that physical attractiveness was of little importance, but correlations between assessed physical attractiveness and desirability suggest the opposite. Among the Shuar, preferences for resource-related traits are more nuanced and highlight the multifaceted nature of a collection of traits that are often treated as a unitary concept (e.g., "resources" or "status") in the mate preference literature. For example, whereas Shuar women and men report similar preferences for several resource-related traits, the preference for a partner's ability to acquire food resources appears to vary with involvement in the wage economy: In villages where families depend most strongly on women's food production, men express a greater preference for this trait compared with women. The correlation between assessed provider qualities—measured as social status, intelligence, responsibility, and ability to work—and desirability was stronger among women than among men. This result is consistent with data from college-educated samples, and it is possible that the sex difference in preferences for abilities related to social resources is more generalizable across college-educated and small-scale samples than that in preferences for other resource-related traits.

Investigators have argued that differences in the adaptive challenges faced by women and men have led to sex differences in mate preferences, with women preferring status and resources more than men and men preferring physical attractiveness more than women (Buss & Barnes, 1986; Symons, 1979). Previous research had confirmed these predictions (e.g., Buss, 1989a; Li et al., 2002). Other work had documented exceptions to these patterns in small-scale or subsistence societies (e.g., Marlowe, 2004). The current work further supports the hypothesis that sex differences in mate preferences may not be universal but may instead vary in predictable ways depending on the local culture and ecology. In addition, these results provide further evidence that self-reported trait preferences differ from preferences as revealed using other methodologies, suggesting that intuitions about what is important may not always reflect the features that actually promote attraction. In sum, this investigation highlights the importance of investigating mate choice within small-scale societies and the use of multiple methods to elucidate the decision-making mechanisms that underlie such choice.

Acknowledgments

I thank the anonymous Shuar participants and hosts for their collaboration and support; Clark Barrett for invaluable aid and advice in the field; and Clark Barrett, Dan Fessler, Martie Haselton, the UCLA Experimental Biological Anthropology and Evolutionary Psychology lab groups, and two anonymous reviewers for their comments on previous drafts of the manuscript.

Appendix A. Supplemental materials

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.evolhumbehav.2008.01.005](https://doi.org/10.1016/j.evolhumbehav.2008.01.005).

References

- Allal, N., Sear, R., Prentice, A. M., & Mace, R. (2004). An evolutionary model of stature, age at first birth and reproductive success in Gambian women. *Proceedings of the Royal Society of London Series B-Biological Sciences*, 271(1538), 465–470.
- Bird, R. (1999). Cooperation and conflict: The behavioral ecology of the sexual division of labor. *Evolutionary Anthropology: Issues, News, and Reviews*, 8(2), 65–75.
- Boyd, R., & Richerson, P. J. (1988). The evolution of reciprocity in sizable groups. *Journal of Theoretical Biology*, 132(3), 337–356.
- Brown, D. E. (1991). *Human universals*. New York: McGraw-Hill.
- Buss, D. M. (1989a). Sex differences in human mate preferences: Evolutionary hypotheses tested in 37 cultures. *Behavioral and Brain Sciences*, 12(1), 1–49.
- Buss, D. M. (1989b). Toward an evolutionary psychology of human mating. *Behavioral and Brain Sciences*, 12, 39–49.
- Buss, D. M., & Barnes, M. (1986). Preferences in human mate selection. *Journal of Personality and Social Psychology*, 50(3), 559–570.
- Buunk, B. P., Dijkstra, P., Fetchenhauer, D., & Kenrick, D. T. (2002). Age and gender differences in mate selection criteria for various involvement levels. *Personal Relationships*, 9(3), 271–278.
- Campbell, L., Simpson, J. A., Kashy, D. A., & Fletcher, G. J. O. (2001). Ideal standards, the self, and flexibility of ideals in close relationships. *Personality and Social Psychology Bulletin*, 27(4), 447–462.
- Daly, M., & Wilson, M. (1983). *Sex, evolution, and behavior* (2nd ed.). Boston: Willard Grant Press.
- Eastwick, P. W., Finkel, E. J., Mochon, D., & Ariely, D. (2007). Selective versus unselective romantic desire: Not all reciprocity is created equal. *Psychological Science*, 18(4), 317–319.
- Figueredo, A. J., Sefcek, J. A., & Jones, D. N. (2006). The ideal romantic partner personality. *Personality and Individual Differences*, 41(3), 431–441.
- Furnham, A., Tan, T., & McManus, C. (1997). Waist-to-hip ratio and preferences for body shape: A replication and extension. *Personality and Individual Differences*, 22(4), 539–549.
- 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.
- Gangestad, S. W., & Simpson, J. A. (2000). Trade-offs, the allocation of reproductive effort, and the evolutionary psychology of human mating. *Behavioral and Brain Sciences*, 23(4), 624–644.
- Gangestad, S. W., Thornhill, R., & Yeo, R. A. (1994). Facial attractiveness, developmental stability, and fluctuating asymmetry. *Ethology and Sociobiology*, 15(2), 73–85.
- Greitemeyer, T. (2007). What do men and women want in a partner? Are educated partners always more desirable? *Journal of Experimental Social Psychology*, 43(2), 180–194.
- Hagen, E. H., Barrett, H. C., & Price, M. E. (2006). Do human parents face a quantity–quality tradeoff?: Evidence from a Shuar community. *American Journal of Physical Anthropology*, 130(3), 227–244.
- Hatfield, E., & Sprecher, S. (1995). Men's and women's preferences in marital partners in the United States, Russia, and Japan. *Journal of Cross-Cultural Psychology*, 26(6), 728–750.
- Hill, K. R., & Hurtado, A. M. (1996). *Ache Life History: The ecology and demography of a foraging people*. Hawthorne, NY: Aldine de Gruyter.
- Henss, R. (1995). Waist-to-hip ratio and attractiveness—Replication and extension. *Personality and Individual Differences*, 19(4), 479–488.
- Khallad, Y. (2005). Mate selection in Jordan: Effects of sex, socio-economic status, and culture. *Journal of Social and Personal Relationships*, 22(2), 155–168.
- Koyama, N. F., McGain, A., & Hill, R. A. (2004). Self-reported mate preferences and “feminist” attitudes regarding marital relations. *Evolution and Human Behavior*, 25(5), 327–335.
- Kurzban, R., & Weeden, J. (2005). HurryDate: Mate preferences in action. *Evolution and Human Behavior*, 26(3), 227–244.
- Li, N. P., Bailey, J. M., Kenrick, D. T., & Linsenmeier, J. A. W. (2002). The necessities and luxuries of mate preferences: Testing the tradeoffs. *Journal of Personality and Social Psychology*, 82(6), 947–955.
- 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.
- Little, A. C., Apicella, C. L., & Marlowe, F. W. (2007). Preferences for symmetry in human faces in two cultures: Data from the UK and the Hadza, an isolated group of hunter-gatherers. *Proceedings of the Royal Society B-Biological Sciences*, 274(1629), 3113–3117.
- Little, A. C., & Jones, B. C. (2006). Attraction independent of detection suggests special mechanisms for symmetry preferences in human face perception. *Proceedings of the Royal Society B-Biological Sciences*, 273(1605), 3093–3099.
- Marlowe, F. W. (2004). Mate preferences among Hadza hunter-gatherers. *Human nature—An interdisciplinary biosocial perspective*, 15(4), 365–376.
- Marlowe, F., Apicella, C., & Reed, D. (2005). Men's preferences for women's profile waist-to-hip ratio in two societies. *Evolution and Human Behavior*, 26(6), 458–468.
- Marlowe, F., & Wetsman, A. (2001). Preferred waist-to-hip ratio and ecology. *Personality and Individual Differences*, 30(3), 481–489.
- Moore, F. R., & Cassidy, C. (2007). Female status predicts female mate preferences across nonindustrial societies. *Cross-Cultural Research*, 41(1), 66–74.
- Moore, F. R., Cassidy, C., Law Smith, M. J., & Perrett, D. I. (2006). The effects of female control of resources on sex-differentiated mate preferences. *Evolution & Human Behavior*, 27(3), 193–205.
- Murray, S. L. (1995). *Is love blind? Positive illusions, idealization, and the construction of satisfaction in close relationships*. Canada: U Waterloo.
- Murray, S. L., Holmes, J. G., Dolderman, D., & Griffin, D. W. (2000). What the motivated mind sees: Comparing friends' perspectives to married partners' views of each other. *Journal of Experimental Psychology*, 36, 600–620.
- Panchanathan, K., & Boyd, R. (2004). Indirect reciprocity can stabilize cooperation without the second-order free rider problem. *Nature*, 432(7016), 499–502.
- Penton-Voak, I. S., Jacobson, A., & Trivers, R. (2004). Populational differences in attractiveness judgments of male and female faces: Comparing British and Jamaican samples. *Evolution and Human Behavior*, 25(6), 355–370.
- Pollet, T. V., & Nettle, D. (in press). Taller women do better in a stressed environment: Height and reproductive success in rural Guatemalan women. *American Journal of Human Biology*.
- Pomiankowski, A. (1988). The evolution of female mating preferences for male genetic quality. *Oxford Survey of Evolutionary Biology*, 5, 136–184.

- Shackelford, T. K., Schmitt, D. P., & Buss, D. M. (2005). Universal dimensions of human mate preferences. *Personality and Individual Differences*, 39(2), 447–458.
- Singh, D. (1993). Adaptive significance of female physical attractiveness—Role of waist-to-hip ratio. *Journal of Personality and Social Psychology*, 65(2), 293–307.
- Stewart, S., Stinnett, H., & Rosenfeld, L. B. (2000). Sex differences in desired characteristics of short-term and long-term relationship partners. *Journal of Social and Personal Relationships*, 17(6), 843–853.
- Sugiyama, L. S. (2003). Illness, injury, and disability among Shiwiar forager-horticulturalists: Implications of health-risk buffering for the evolution of human life history. *American Journal of Physical Anthropology*, 123(4), 371–389.
- Sugiyama, L. S. (2004). Is beauty in the context-sensitive adaptations of the beholder? Shiwiar use of waist-to-hip ratio in assessments of female mate value. *Evolution and Human Behavior*, 25(1), 51–62.
- Swami, V., & Tovée, M. J. (2007). Perceptions of female body weight and shape among indigenous and urban Europeans. *Scandinavian Journal of Psychology*, 48(1), 43–50.
- Symons, D. (1979). *The evolution of human sexuality*. New York: 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 (Chicago Series on Sexuality, History, and Society)* (pp. 80–119). Chicago, IL: University of Chicago Press.
- Thornhill, R., & Gangestad, S. W. (1999). Facial attractiveness. *Trends in Cognitive Sciences*, 3(12), 452–460.
- Todd, P. M., Penke, L., Fasolo, B., & Lenton, A. P. (2007). Different cognitive processes underlie human mate choices and mate preferences. *Proceedings of the National Academy of Sciences of the United States of America*, 104(38), 15011–15016.
- Tovée, M. J., Swami, V., Furnham, A., & Mangalparsad, R. (2006). Changing perceptions of attractiveness as observers are exposed to a different culture. *Evolution and Human Behavior*, 27(6), 443–456.
- Trivers, R. L. (1972). Parental investment and sexual selection. In B. Campbell (Ed.). *Sexual selection and the descent of man, 1871–1971* (pp. 136–179). Chicago: Aldine.
- Wiederman, M. W., & Allgeier, E. R. (1994). Male economic status and gender differences in mate selection preferences: Evolutionary versus sociocultural explanations. In L. Ellis (Ed.). *Social stratification and socioeconomic inequality: Vol. 2. Reproductive and interpersonal aspects of dominance and status* (pp. 1–12). Westport, CT: Praeger Publishers/Greenwood Publishing Group.
- Wilson, T. deC., & Nisbett, R. E. (1978). The accuracy of verbal reports about the effects of stimuli on evaluations and behavior. *Social Psychology*, 41(2), 118–131.
- Yu, D. W., & Shepard, G. H. (1998). Is beauty in the eye of the beholder? *Nature*, 396(6709), 321–322.
- Zeh, D. W., & Smith, R. L. (1985). Paternal investment by terrestrial arthropods. *American Zoologist*, 25(3), 785–805.