Cognitive processes underlying human mate choice: The relationship between self-perception and mate preference in Western society

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This study tested two hypotheses concerning the cognitive processes underlying human mate choice in Western society: (*i*) mate preference is conditional in that the selectivity of individuals' mate preference is based on their perception of themselves as long-term partners, and (*ii*) the decision rule governing such conditional mate preference is based on translating perception of oneself on a given attribute into a comparable selectivity of preference for the same attribute in a mate. Both hypotheses were supported. A two-part questionnaire was completed by 978 heterosexual residents of Ithaca, New York, aged 18–24; they first rated the importance they placed on 10 attributes in a long-term partner and then rated their perception of themselves on those same attributes. Both women and men who rated themselves highly were significantly more selective in their mate preference. When the 10 attributes were grouped into four evolutionarily relevant categories (indicative of wealth and status, family commitment, physical appearance, and sexual fidelity), the greatest amount of variation in the selectivity of mate preference in each category was explained by self-perception in the same category of attributes. We conclude that, in Western society, humans use neither an "opposites-attract" nor a "reproductive-potentials-attract" decision rule in their choice of long-term partners but rather a "likes-attract" rule based on a preference for partners who are similar to themselves across a number of characteristics.

decision rules | assortative mating | marriage | reproductive success | alternative hypotheses

In all human societies most men and women form long-term pair bonds that typically are formalized as marriages. These marriages form as a result of specific mate-choice decisions made by both male and female partners or by their parents and other kinsfolk. If we assume there is variation in reproductive success among different marriages, then the decision rules that lead to the most reproductively successful marriages should be favored by natural selection.

In recent years there has been a surge of interest among evolutionary biologists and psychologists in the topic of human mate choice. Much of the current literature is founded on Trivers' (1) theory of parental investment, which highlighted the facts that females require only a few matings to fertilize all their eggs, whereas males have the potential to fertilize more eggs than a single female can produce. Because of this difference, reproductive success of a female tends to be limited by access to resources to nourish each of her eggs, whereas reproductive success of a male tends to be limited by his access to female eggs. Thus the mating strategies of males and females are predicted to differ, and many studies have sought and found differences between the sexes in the relative importance they place on specific traits in long-term partners.

For example, it has been shown repeatedly that women exhibit a stronger preference than men for attributes of ambition, social status, and financial wealth in a partner as well as for a desire for children and a commitment to family, all of which are indicative of the partner's ability to obtain and willingness to invest the resources necessary for the survival and success of offspring (e.g., refs. 2–10). Similarly, men exhibit a stronger preference than women for features of youthfulness, health, and physical attractiveness in a partner, all of which are indicative of high fecundity and reproductive potential (e.g., refs. 2, 4–8, and 10–12). Furthermore, men often exhibit a stronger preference than women for indicators of sexual fidelity, presumably because males suffer higher costs from being cuckolded than do females (5, 10, 13–14). Although researchers have focused on the differences in the mean level of preference expressed by the sexes, it should be emphasized that all studies have also reported considerable overlap in the distribution of preferences expressed by males and females (e.g., refs. 4 and 5).

The reproductive potential of an individual's partner, however, may not be the only factor that contributes to the reproductive output of their partnership. The stability of the partnership may also influence its reproductive output (15). In socially monogamous societies, an individual with an open-ended mate preference (a preference for the most preferred partner available) would only obtain a stable long-term partnership if she/he waited until the more preferred, same-sex members of the population had paired. Individuals who did not wait would be prone to form partnerships with mates of very different quality than themselves, and such partnerships are expected to be unstable, because the higher-quality mate has many opportunities for trading up in partner quality. A strategy more likely to lead to stable long-term pairings would be to assess one's own relative quality as a mate, form a mate preference based on this self-perception, and choose a partner of similar mate quality (10, 16, 17). Such a strategy requires cognitive processes that enable an individual to assess both his or her own relative quality, and relative quality of the potential mate, within the local population.

There is evidence to suggest that both self-perception and mate assessment are relativistic and may be influenced by exposure to different local populations. Self-perception as a potential mate is influenced by exposure to desirable same-sex models. Women lowered their self-assessment when exposed to profiles of physically attractive females (18–20), whereas men lowered their self-assessment when exposed to profiles of socially dominant males (20). Further, an individual's assessment of their mate is influenced by exposure to desirable opposite-sex models. Women's feelings about their current partner were affected adversely by exposure to profiles of socially dominant men (21), whereas men's feelings about their current partner were affected adversely by exposure to profiles of physically attractive women (21–23). For these cognitive processes to result in stable long-term partnerships, all one needs to show is that self-perception positively correlates with the selectivity of mate preference.

Waynforth and Dunbar (10) and Bereczkei *et al.* (2) provide initial support for the link between self-perception and selectivity of mate preference. Using data from the wording of lonely

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hearts advertisements, they reported that women offering cues of physical attractiveness made higher overall demands of potential long-term partners (10) and higher specific demands for male financial and occupational status (2) than did women who did not offer such cues. Similarly, men offering cues of wealth and status made higher overall demands in their advertisements for long-term partners (10) and higher specific demands for female physical attractiveness (2) than did men who did not offer such cues. More recently, Little *et al.* (24) provided additional evidence for mate preference being influenced by self-perception by showing (using computerized faces) that a woman's self-perceived level of attractiveness was positively related to her preferences for masculinized and symmetrical facial features in a potential long-term partner. Thus, there is evidence that selectivity of mate preference is conditional on self-perception in Western societies.

Most evolutionary studies of human mate choice have focused on individuals' open-ended preferences for indicators of reproductive potential in a partner and the impact that a partner's reproductive potential has on fitness (3, 5–9, 11–14). More recent studies have focused on conditional preferences for indicators of reproductive potential and the impact that both partnership stability and a partner's reproductive potential have on fitness (2, 10, 15, 17). Here we investigate whether mate preferences are relativistic, i.e., whether individuals' mate preferences are based on their perception of themselves as long-term partners, as is predicted when partnership stability is an important component of fitness. We then consider the possibility that such relativistic preferences may be generated in ways other than forming a conditional preference for indicators of reproductive potential.

We investigate two alternative hypotheses regarding how self-perception on one trait is translated into selectivity of mate preference in Western society: (*i*) individuals relate self-perception on sex-specific indicators of reproductive potential to selectivity of mate preference for sex-specific indicators of reproductive potential in the opposite sex; or (*ii*) individuals relate self-perception on one trait to selectivity of mate preference in the same trait. The first relativistic decision rule, "prefer individuals with reproductive potential similar to your own" (hereafter called the "potentials-attract" hypothesis) predicts that individuals who are well endowed in sex-specific traits indicative of high reproductive potential will be able to make strong demands for traits that indicate high reproductive potential in the opposite sex. This cognitive mechanism emphasizes the difference between the strategies of the sexes (5), and it is the mechanism implicitly assumed in previous evolutionary studies of conditional human mate choice (e.g., refs. 2, 5, 20, and 21). The second relativistic decision rule, "prefer individuals with traits similar to your own" (hereafter called the "likes-attract" hypothesis) predicts that individuals who are well endowed in a particular trait will make strong demands for the same trait in the opposite sex. This cognitive mechanism emphasizes the similarity of the strategies of the sexes (4, 5), yet it is rarely considered in evolutionary studies of human mate choice. Both relativistic hypotheses assume that the degree of similarity of partners, measured either on traits indicative of reproductive potential or on a trait-by-trait basis, will increase the stability of long-term partnerships and thereby positively influence reproductive success (15).

In this study we used questionnaires to determine whether the importance that one places on attributes of a potential mate are conditional on his/her self-perception as a mate. We also looked in detail at the relationships between self-perception and selectivity of mate preference for each of four evolutionarily relevant categories of traits to determine whether individuals are using a potentials-attract or likes-attract decision rule. We find that the selectivity of long-term mate preference is strongly conditional on one's perception of oneself as a long-term partner, for both

women and men. Further, our results provide strong support for the hypothesis that a likes-attract cognitive process underlies the translation of self-perception into the selectivity of mate preference in Western society.

Methods

We conducted combined mate preference and self-perception surveys in and around Ithaca, New York in the autumn of 1999. Each of 122 students enrolled in extra-credit discussion sections of the Cornell University Introduction to Animal Behavior course were asked to administer questionnaires to 10 other people.

The questionnaire consisted of two parts. In part one, the mate-preference survey, questions had to be answered regarding the importance of 10 attributes when choosing a long-term partner. The attributes were financial resources (e.g., expected income and inheritance), physical attractiveness, faithfulness, parenting qualities, social status, health, desire for children, devotion, ambition, and strength of family bonds (closeness to their parents and siblings). Respondents rated each attribute by using a nine-point scale (1 = not at all important and 9 = extremely important). We considered the scores of a respondent to be indicative of the selectivity of their mate preference on each attribute. In part two, the self-perception survey, participants rated themselves as long-term partners for the same 10 attributes on an analogous nine-point scale (1 = low and 9 = high). For each individual we then calculated two mean scores, one for the importance of the 10 attributes in mate choice (which we call "overall mate-preference score") and one for self-perception on the 10 attributes as a potential mate (which we call "overall self-perception score").

We tested the hypothesis that the mate preference of an individual would be contingent on his/her self-perception. We predicted that mate-preference scores would be positively related to self-perception scores. For females and males separately, we conducted linear and second-order polynomial regression analyses, with overall mate-preference score as the dependent variable and overall self-perception score as the independent variable.

To discriminate between the two mechanisms (potentials-attract or likes-attract) by which self-perception might translate into mate preference, we grouped the 10 attributes in the questionnaire into four evolutionarily relevant categories (in the sense of refs. 2 and 10). These categories were (*i*) wealth and status (financial resources, social status, and ambition); (*ii*) family commitment (parenting qualities, desire for children, and strength of family bonds); (*iii*) physical appearance (physical attractiveness and health); and (*iv*) sexual fidelity (devotion and faithfulness). For each individual we calculated a mean score for mate preference and self-perception in each category.

The potentials-attract mechanism predicts that women with high self-perception of their own physical appearance and sexual fidelity will place great importance on wealth and status and family commitment in a potential long-term male mate and likewise that males who perceive themselves highly for wealth and status and family commitment will place great importance on physical appearance and sexual fidelity in a potential long-term female mate. Thus we predicted positive relationships between the self-perception scores of respondents in categories indicative of their own reproductive potential and mate-preference scores of respondents in categories indicative of the reproductive potential of a mate (Table 1).

In contrast, the likes-attract hypothesis predicts that individuals who have high self-perception in a particular category will place great importance on the same category in the opposite sex. Thus, females' physical-appearance self-perception scores are predicted to be positively related to their physical-appearance mate-preference scores, and males' physical-appearance self-

Table 1. Predicted associations of the potentials-attract hypothesis

Categorical self-perception score	Categorical mate-preference score			
	Wealth and status	Family commitment	Physical appearance	Sexual fidelity
Wealth and status			M	M
Family commitment			M	M
Physical appearance	F	F		
Sexual fidelity	F	F		

Schematic representation of the predicted associations between the importance placed on traits of a long-term mate and one's perception of oneself as a long-term mate according to two hypothesized cognitive mechanisms is shown. M and F indicate, for males and females, respectively, that a positive relationship is predicted between those categories of mate-preference score and self-perception score (see also Table 2). The potentials-attract hypothesis predicts strong relationships between self-perception scores on traits indicative of the respondent's own reproductive potential and mate-preference scores on traits indicative of a mate's reproductive potential.

perception scores are predicted to be positively related to their physical-appearance mate-preference scores. Indeed, positive relationships are predicted between self-perception and mate-preference scores for each category of attributes for both sexes (Table 2).

In the event that both hypotheses were supported (e.g., if females' mate-preference scores for wealth and status were positively related to their self-perception scores for both wealth and status and physical appearance), we compared the goodness of fit of the different regressions using a likelihood ratio test. This enabled us to ask which of the independent variables (categorical self-perception scores) was the better predictor of the dependent variable (categorical mate-preference score) and thereby to discriminate between the two hypotheses.

Results

Included in this study are 978 questionnaire respondents. They range in age from 18 to 24 years (females: $n = 507$, mean age = 19.5, SD = 1.2; males: $n = 471$, mean age 19.8, SD = 1.4) and declared themselves to be heterosexual. We eliminated responses from declared gays and lesbians, because this study focused on long-term heterosexual mate preference.

Individuals who rated themselves favorably as long-term partners placed more importance on the attributes they sought in a long-term mate than individuals who rated themselves less favorably. For both women and men the overall mate-preference score was significantly positively related to the overall self-perception score [womens' second-order polynomial regression: df = 506, $F = 274.4$, $P < 0.0001$, $R^2 = 0.36$ (Fig. 1); mens' second-order polynomial regression: df = 470, $F = 139.1$, $P < 0.0001$, $R^2 = 0.37$ (Fig. 2)]. For both sexes the second-order polynomial regression provided a better fit than the simple linear

Table 2. Predicted associations of the likes-attract hypothesis

Categorical self-perception score	Categorical mate-preference score			
	Wealth and status	Family commitment	Physical appearance	Sexual fidelity
Wealth and status	M, F			
Family commitment		M, F		
Physical appearance			M, F	
Sexual fidelity				M, F

The likes-attract hypothesis predicts strong relationships between the self-perception scores in one trait and mate preference scores in the same trait, for all traits, in both sexes.
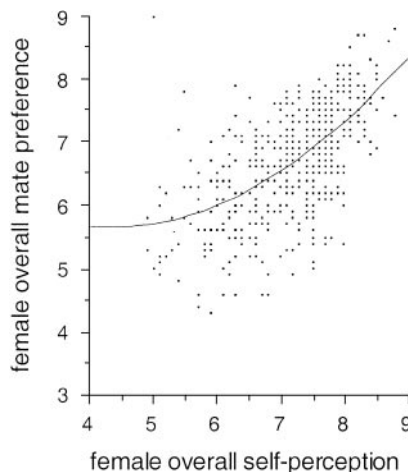
Fig. 1. For women the overall mate-preference score depends on overall self-perception score. Females who rated themselves highly as potential long-term mates placed more importance on the attributes of potential long-term male partners.

regression (female likelihood ratio test comparing the polynomial regression to the linear regression: df = 1, $\chi^2 = 5.1$, $P < 0.025$; male likelihood ratio test comparing the polynomial regression to the linear regression: df = 1, $\chi^2 = 38.9$, $P < 0.001$).

By which cognitive mechanism is self-perception translated into mate preference? We tested the predictions of the potentials-attract and likes-attract hypotheses by analyzing the regressions of mate-preference scores on self-perception scores for all combinations of the four evolutionarily relevant categories of attributes. Of the 32 regressions (16 for each sex), 27 were positive and significant at the level of $P < 0.01$, whereas 5 were not significant. The results (F and P values) of all regressions for women and men can be found in Tables 3 and 4. These results provide preliminary support for both the potentials-attract and likes-attract hypotheses.

Which cognitive hypothesis provided the better explanation of how self-perception is translated into mate preference? Closer examination of Tables 3 and 4 reveals that the highest coefficients of determination (R^2 values) were consistently those between the same categories of self-perception and mate pref-
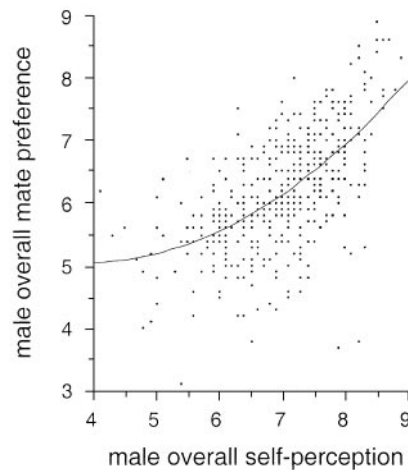

Fig. 2. For men the overall mate-preference score depends on overall self-perception score. Males who rated themselves highly as potential long-term mates placed more importance on the attributes of potential long-term female partners.

Table 3. Females

Categorical self-perception score	Categorical mate-preference score			
	Wealth and status	Family commitment	Physical appearance	Sexual fidelity
Wealth and status	**146.9**	17.8	26.3	4.3
	***	***	***	ns
	0.23	0.03	0.05	0.01
Family commitment	10.3	**623.7**	2.4	14.4
	*	***	ns	**
	0.02	**0.55**	0.01	0.03
Physical appearance	*32.0*	*22.4*	**118.2**	17.3
	***	***	***	***
	0.06	*0.04*	**0.19**	0.03
Sexual fidelity	*8.0*	*45.2*	2.6	**157.4**
	*	***	ns	***
	0.02	*0.08*	0.01	**0.24**

Summary of the outcome of linear regressions between categorical self-perception and mate-preference scores for all combinations of four evolutionarily relevant categories. In each cell the first line gives the F statistic, the second gives the P value (***, $P < 0.0001$; **, $P < 0.001$; *, $P < 0.01$; ns, $P > 0.01$), and the third gives the coefficient of determination (R^2, the amount of variation explained), and all df = 506. The potentials-attract hypothesis predicts strong positive relationships between self-perception and mate-preference scores in cells with italicized type, whereas the likes-attract hypothesis predicts strong positive relationships in cells with bold type (see Table 1). Although 13 of the 16 regressions were statistically significant, those predicted by the likes-attract hypothesis explained more of the observed variation in mate preference than did those predicted by the potentials-attract hypothesis.

erence. On average, only 5% of the variation in women's mate-preference scores for wealth and status and family commitment (categories assumed to be important indicators of the reproductive potential of males) was explained by their percep-

Table 4. Males

Categorical self-perception score	Categorical mate-preference score			
	Wealth and status	Family commitment	Physical appearance	Sexual fidelity
Wealth and status	**109.3**	24.8	*37.2*	15.9
	***	***	***	***
	0.19	0.05	*0.07*	*0.03*
Family commitment	8.9	**342.9**	*7.8*	10.2
	*	***	*	*
	0.02	**0.42**	*0.02*	*0.02*
Physical appearance	24.7	20.5	**55.2**	25.0
	***	***	***	***
	0.05	0.04	**0.11**	0.05
Sexual fidelity	0.0	46.8	0.3	**70.5**
	ns	***	ns	***
	0.00	0.09	0.00	**0.13**

Summary of the outcome of linear regressions between categorical self-perception and mate-preference scores for all combinations of four evolutionarily relevant categories. In each cell the first line gives the F statistic, the second gives the P value (***, $P < 0.0001$; **, $P < 0.001$; *, $P < 0.01$; ns, $P > 0.01$), and the third gives the coefficient of determination (R^2, the amount of variation explained), and all df = 470. The potentials-attract hypothesis predicts strong positive relationships between self-perception and mate-preference scores in cells with italicized type, whereas the likes-attract hypothesis predicts strong positive relationships in cells with bold type (see Table 1). Although 15 of the 16 regressions were statistically significant, those predicted by the likes-attract hypothesis explained more of the observed variation in mate preference than did those predicted by the potentials-attract hypothesis.

tion of themselves in terms of physical appearance and sexual fidelity (categories assumed to be important indicators of reproductive potential of females), whereas >35% of the variation in these categories of women's mate-preference scores was explained by their perception of themselves in the same categories (see the comparison of italicized versus bold type in Table 3). Similarly, men's self-perception in terms of wealth and status and family commitment (categories assumed to be important indicators of reproductive potential of males) explained, on average, only 4% of the variation in the selectivity of their mate preference for physical appearance and sexual fidelity (categories assumed to be important indicators of the reproductive potential of females), but an average of 12% of the variation in these categories of men's mate preference was explained by their self-perception in the same categories (see comparison of italicized versus bold type in Table 4).

We compared the goodness of fit of the regressions predicted by the two hypotheses using likelihood ratio tests. For females and males the categorical mate-preference score was predicted best by self-perception score in the same category (likelihood ratio tests: females, df = 1, all $P < 0.001$; males, df = 1, all $P < 0.001$). These results provide strong support for the likes-attract hypothesis. Individuals appeared to translate self-perception on one trait into a comparable selectivity of mate preference for the same trait.

Discussion

Our study provides strong support for the hypothesis that the importance that one places on the attributes of a potential long-term partner is conditional on his/her self-perceived value as a mate. Individuals who had a high self-perception of themselves were more discriminating in their mate preferences than were individuals with lower self-perception scores. This conclusion was equally robust for both women and men ($R^2 = 0.36$ and 0.37, respectively, both $P < 0.0001$; Figs. 1 and 2). The observation that the second-order polynomial regression provided a better fit than the simple linear model suggests that there may be some minimal selectivity for long-term mate preference. The implication of this result is that in an open marriage market, individuals of low self-perception will find it hard to find and keep a satisfactory partner, because such partners will themselves be seeking individuals of higher mate quality.

Our study also provides evidence that the conditionality of mate preference is based on a cognitive mechanism that translates self-perceived score on one trait into a comparable mate-preference score for the same trait (the likes-attract hypothesis). Thus human mate choice in Western society seems to be based on a preference for long-term partners who are similar to one's perception of self across a number of evolutionarily relevant categories of traits.

Previous studies have also reported conditionality in human mate preference in Western society. Little *et al.* (24) found that women with a high self-perception of their physical attractiveness modified computer images of male faces to be more "masculine" and more symmetrical than did women with lower self-perceived attractiveness. Waynforth and Dunbar (10) and Bereczkei *et al.* (2) reported sex-specific conditionality in mate choice strategies used in lonely hearts advertisements based on their findings that what was requested of a partner in an advertisement was contingent on what the individual placing the advertisement had to offer. Waynforth and Dunbar and Bereczkei *et al.* both discuss their results in a manner that implicitly assumes that individuals select partners by using a potentials-attract mechanism.

Although the results of Waynforth and Dunbar (10) and Bereczkei *et al.* (2) demonstrate conditionality in human mate choice, we do not believe that they are sufficient to discriminate between the potentials-attract and likes-attract hypotheses. This

is because neither study contrasted the predictions of the two alternatives. Had we only presented the regressions predicted under the potentials-attract hypothesis, our results also would have seemingly provided support for that mechanism. We too found a highly significant regression between women's self-perception of their physical appearance and the selectivity of their mate preference for wealth and status (Table 3; refs. 2 and 10). We also found a highly significant regression between men's self-perception of their wealth and status and the selectivity of their mate preference for physical appearance (Table 4; refs. 2 and 10).

Although our results are consistent with the potentials-attract mechanism, they provide stronger support for an alternative, likes-attract mechanism underlying human mate choice in Western society. After close examination the regressions between self-perception and mate-preference scores for the same category of traits (those predicted by the likes-attract hypothesis) explained significantly more of the variation in mate-preference scores than did the regressions between self-perception and mate-preference scores for traits indicative of sex-specific reproductive value (those predicted by the potentials-attract hypothesis). Selectivity of mate preference on every category of attributes was predicted best by self-perception on the same category of attributes.

This analysis illustrates the danger of attempting to confirm a specific hypothesis without contrasting its predictions against those of alternative hypotheses. It is potentially very misleading to use regression statistics to test any one specific hypothesis about the conditionality of mate choice without providing the full matrix of regression statistics for all relevant categories of attributes. Further, when sample sizes are large (as they typically are in human mate-preference studies), regressions may achieve significance yet explain very little of the association between variables. For this reason, coefficients of determination (R^2 values) and goodness-of-fit tests (which can be used to compare model quality) will be much better measures for differentiating among hypotheses than will significance levels alone.

The finding that the selectivity of long-term mate preference is conditional on perception of one's self as a long-term mate is the final link in the chain that stems from the cognitive process of self-perception, through a cognitive process of mate preference, to the behavioral outcome of mate choice. If mate choices indeed are based on likes-attract decision rules, then the most frequent form of assortative mating in Western society is expected to be one of strict homogamy (25), i.e., marriages between partners who share many attributes in common. There is, in fact, some evidence that this is true (4, 26–32).

Furthermore, if the likes-attract mechanism represents an evolved mate-choice mechanism, then marriages between individuals who accurately assess themselves and prospective partners and who pair assortatively on a trait-by-trait basis are expected be more successful on average (i.e., to have higher satisfaction ratings, greater stability, and more surviving children) than pairings of otherwise comparable individuals who are less accurate in their assessments or who use alternative mate-choice mechanisms. Once again, there is some evidence that this is true (summarized in refs. 28 and 33). Similarity in personality traits reportedly contributes to marriage quality and marital stability (29, 34–36), which in turn may contribute to higher reproductive success (15). Low but consistent correlations have also been found between mate similarity for body dimensions and fecundity (37) and between mate similarity on educational attainment and number of children (38).

This study is important because it shows that, in Western society, humans use a conditional, likes-attract decision rule when forming their preferences for long-term partners. This in turn may help to explain why homogamous marriages have been found to be more common and more successful than marriages between more disparate individuals. If these findings are confirmed by future work, then this study will have major implications not only for basic researchers interested in the cognitive mechanisms and fitness effects of human mate choice but also for marriage counselors and the public at large. From the perspective of researchers trying to understand human monogamy, our results suggest that the emphasis should be shifted away from the standard approach that focuses on indicators of reproductive potential toward understanding how matching on a trait-by-trait basis contributes to marital stability and possibly to reproductive success. From the counselors' perspective, our results highlight three areas in which people might have problems when it comes to forming lasting relationships: (*i*) in the assessment of the attributes of others, (*ii*) in the assessment of themselves, and (*iii*) in translating their self-perception into their mate preference. From the public's perspective, our results suggest that individuals seeking stable long-term relationships should not seek the highest quality partner available but should simply look for partners who are similar to themselves.

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