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Sex Differences in Intra-Sex Variations in Human Mating Tactics: An Evolutionary Approach

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We assessed sex differences in the effects of physical attractiveness and earning potential on mate selection, and sex differences in preferences and motivations with regard to short-term and long-term mating. We also investigated the effect of a variable likely to produce intra-sex variations in the selection of mating tactics, self-perceived mating success. Forty-eight university students were presented with pictures and short descriptions of persons of the opposite sex varying in physical attractiveness and earning potential. Dating interest was influenced, for both sexes, by stimulus-person's physical attractiveness *and* earning potential, but these two characteristics interacted only for female raters. Male and female subjects showed discrepant preferences and motivations with regard to short-term and long-term mating. In addition, self-perceived mating success was related to mating tactics in males only: Males who perceived themselves as more successful, compared to males who perceived themselves as less successful, tended to prefer and to more often select short-term mating. This effect was maximized when the stimulus person was very attractive and of high earning potential. These results confirm sex differences in mating preferences, strongly suggest a proximal factor of tactic selection, and suggest that males' mating strategies may be more variable than females'.

KEY WORDS: Tactics; Preferences; Sex differences; Mating success.

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INTRODUCTION

Students of human mating have observed reliable differences between males' and females' relative preference for certain *mate characteristics,* such as physical attractiveness, age, industriousness, and earning potential (Buss 1989; Buss and Barnes 1986; Coombs and Kenkel 1966; Daniel et al. 1985; Green et al. 1984; Hoyt and Hudson 1981; Kenrick et al. 1993; Kenrick and Keefe 1992; Kenrick et al. 1990; Nevid 1984; Roscoe et al 1987; Sprecher 1989; Townsend 1989; Townsend and Levy 1990; Wiederman and Allgeier 1992). Sex differences have also been observed in preferred *mating tactics,* such as preferred duration and nature of heterosexual relationships (e.g., short-term or long-term), willingness to engage in sexual activities, use of mating deception, use of tactics of mate attraction and mate retention, and propensity for extra-pair romances (Buss 1988a, 1988b; Buss and Schmitt 1993; Clark 1990; Clark and Hatfield 1989; Symons and Ellis 1989; Tooke and Camire 1991; Townsend and Levy 1990). These sex differences in preferences have been hypothesized by evolutionary theorists to have evolved as responses to different problems that faced males and females in the human environment of evolutionary adaptedness (Buss 1994; Symons 1979).

Evolutionary theory provides a powerful framework to explain and integrate sex differences in mating preferences. A less exploited use of evolutionary theory, at least in its application to humans, is that it can also guide the investigation of intra-sex variations in mating preferences and behaviors. For example, Gangestad and Simpson (1990) studied variations in female sexual restrictiveness using the population genetic notion of frequency-dependent selection. They proposed that genetic variation underlying different extremes of sexual restrictiveness in females (i.e., requiring more or less time and commitment before engaging in sexual behaviors) may arise and be maintained in the population when the gene frequency ratio promotes similar fitness advantages for both extremes (stable polymorphism). Restricted females would benefit from securing support and resources from a male, and less restricted females would benefit from obtaining the best male genes. Frequency-dependent selection implies heritability of the trait in question.

There are other causes of intra-sex variations in mating tactics that do not presuppose heritability of the trait. For instance, individuals may display tactics that are developmentally or concurrently contingent (Buss 1991; Crawford and Anderson 1989). In these cases, the intra-sex genetic variation underling tactic variation is negligible, which denotes that the observed tactics are related to environmental variations.

An example of environmentally contingent tactics is offered by Belsky et al. (1991). They proposed that different early familial conditions, such as a stressful or a stable rearing environment, may differently affect future patterns of sexual behaviors. Again, to be maintained, these alternative tactics would have to promote similar long-term reproductive advantages. Noteworthily, particularly in the case of concurrently contingent tactics, the selection of some

mating tactics may show individual variability, whereas the preference for particular mating tactics may not.

The distinction between *preference* for particular mating tactics and *selection* of particular mating tactics is important in this context. A preference is what an individual would do in an ideal world of unlimited choice, whereas a selection is what an individual actually does in the real world of limited choice. For some individuals, perhaps a small fraction of the population, the tactics selected reflect only preferences.

The distinction between preference and selection can be related to the distinction offered in the evolutionary literature between *strategy* and *tactic* (Crawford and Anderson 1989; Dunbar 1982). A mating strategy may be seen as a system of decision rules involving one or more sets of alternative behavioral tactics. These behavioral tactics are selected according to the specifics of the mating context, in accordance with the decision rules. One set of behavioral tactics is preferred over others, but it cannot always be selected because of environmental constraints (see below). A mating strategy, thus, is a psychological mechanism that is seen as a direct product of phylogenetic selection, and a mating tactic is an action that is seen as a direct product of a particular mating environment (hence of ontogenetic selection) in accordance with the underlying strategy.

Parental Investment and Intra-Sex Variations

The notion of differential parental investment (Bateman 1948; Trivers 1972) can be used to understand sex differences and intra-sex variations in preference and selection of mating tactics. Briefly, sex differences in minimal parental investment in many species result in sex differences in the definition of an optimal (preferred) mating tactic: Males' reproductive success as a function of mating effort is considered optimal when they select and successfully implement a tactic of short and non-committing sexual relationships with a large number of females; females' reproductive success is considered optimal when they select and successfully implement a tactic of securing lasting support and resources from one or more males. (See Symons 1979 for a thorough discussion of this sex difference in optimal mating tactics.)

However, these tactics cannot always be successfully implemented by all individuals in a given population. As a consequence, success in securing sexual opportunities from a large number of females, for males, and support and resources from males, for females, may determine the tactics selected. The selection of alternative tactics may be adaptive for individuals who, relative to other members of the population, have less success in implementing their sex-specific preferred tactics.

This simple syllogism is complicated by additional features of mating effort that are not described here (e.g., mate guarding and paternity confidence, sperm competition). The important point is that intra-sex competition (mostly in males) and epigamy (mostly female based) leads to a situation where not all

individuals can select the preferred mating tactics. Buss and Schmitt (1993) recently made a similar point and used a proximal factor, mate value, to explain intra-sex individual differences: "Individuals of high mate value should be more able to carry out their sex-typical preferred strategy ["tactic" in this article], whereas those whose mate value is low may be forced to settle for a less preferred [tactic]" (p. 299). Thus, sex differences in mating tactics mainly result from different minimal requirements in reproduction, and intra-sex differences mainly result from ability to successfully carry out the optimal sex-specific tactics. Because of the nature of the human mating system (i.e., slightly polygynous), intra-sex variations should be larger in males.

In this study, we investigated both sex differences and intra-sex variations with regard to dating interest and relationship commitment. First, we assessed sex differences in the role of physical attractiveness and earning potential in mate selection, and sex differences in preferences and motivations with regard to short-term and long-term mating. In general, males, relative to females, have been found to place more value on physical attractiveness for selecting a partner, whereas females, relative to males, have been found to place more value on the earning potential of their potential partner (Buss 1987, 1994; Feingold 1990, 1992). In this study, subjects were presented with stimulus persons varying in physical attractiveness and earning potential and were asked how interested they would be to date that person; this laboratory procedure has rarely been used for investigating these sex differences (Feingold 1991). Males and females also seem to have different motivations and desires with regard to romantic relationships: Males are more likely to focus on the sexual aspects of romantic relationships, whereas females are more likely to focus on the commitment and durability aspects of romantic relationships (Ellis and Symons 1990; Symons and Ellis 1989). The roles of sex and commitment in romantic relationships were assessed in this study.

Second, we investigated intra-sex differences in tactic preference and tactic selection. Males and females face different problems in short-term and long-term mating contexts (Buss and Schmitt 1993), but the factors causing the selection of one or the other tactic have not been investigated. We anticipated that self-perceived mating success would create or reflect intra-sex variations in the selection of, but not in the preference for, short-term (mainly sexual) or long-term mating (lasting emotional commitment). Self-perceived mating success was assessed using an eight-item scale. This scale describes the extent to which individuals believe they can attract mates of the preferred sex and is aimed at indexing differential access to preferred mates. The effect of self-perceived mating success was also investigated in the context of differing levels of target mate value. Physical attractiveness and earning potential are mate values that may moderate the effects of self-perceived mating success on the tactics selected. For example, males who perceive themselves as less successful may be more likely to select long-term mating tactics with attractive females but less so with unattractive females.

The following five predictions were tested. First, males and females should differ in their dating interest in potential mates of different levels of

physical attractiveness and earning potential. More specifically, males' dating interest, relative to females', should be more affected by stimulus-person physical attractiveness than earning potential; the inverse pattern is predicted for females. Second, males and females should differ in their preferences/motivations with regard to short-term and long-term mating, males should be more oriented toward variety of sexual partners, short-term relationships, and extra-pair relationships, and females should be more oriented toward emotional commitment to one partner, long-term relationships, and monogamy. Third, when presented with mating opportunities, males should prefer, relative to females, short-term mating over long-term mating, and males should select, relative to females, short-term mating over long-term mating. Fourth, self-perceived mating success should influence, for both sexes, and perhaps more for males, the selection of short-term or long-term mating but not the preference for short-term or long-term mating; individuals with higher self-perceived mating success should more often select the tactics representing their sex-typical preferred tactic. Finally, the effect of self-perceived mating success, if obtained, may be moderated by the target partner's mate value; that is, the effect of self-perceived mating success may be maximized when the target partner possesses highly valued characteristics.

METHOD

Male and female subjects were shown pictures and descriptions of persons of the opposite sex who varied in attractiveness and earning potential. Subjects were asked how interested they would be in dating the stimulus persons, whether they would prefer to engage in a short-term or a long-term relationship with the stimulus persons, and whether they would be more likely to attempt to engage in a short-term or a long-term relationship with the stimulus person. The last two questions attempted to distinguish between tactic preference and tactic selection. Also, subjects answered a number of questions to assess self-perceived mating success, sex differences in preferences and motivations with regard to short-term and long-term mating, and current dating status.

Subjects

Twenty-four male and 24 female heterosexual subjects were recruited from a first year psychology course. Male subjects' age ranged from 18 to 20 years (M = 19.0, SD = 0.5) and female subjects' age ranged form 18 to 22 years (M = 19.2, SD = 0.8). Heterosexuality was determined using a modified Kinsey Scale (Kinsey et al. 1948).

Stimuli

Stimuli consisted of 24 stimulus persons, 12 of each sex, selected in terms of their relative attractiveness in a previous study using different subjects (Landolt

1993). Stimuli depicted the head and shoulders of young adults categorized as either not attractive, moderately attractive, or very attractive. On a scale of 1 (not attractive) to 7 (very attractive), the mean rating for each category was 1.85, 3.65, and 5.55, respectively, for male raters of female stimuli. The corresponding values for female raters of male stimuli were 1.50, 2.40, and 4.25 (Landolt 1993). Presentation of each stimulus person was accompanied by a brief commentary describing in a neutral fashion general interests, and a statement indicating earning potential. Commentary and statements were adapted to the population studied. Statements were of two kinds: relatively low earning potential (poor or out of work) or relatively high earning potential (wealthy or university educated). For example, "I am a cashier in a record store. Activities I enjoy include taking art classes and listening to music"; "I am presently in medical school, and my hobbies include jogging and cooking."

Apparatus

Two slide projectors were used in the viewing task to concurrently present a slide of the stimulus person and a slide of the commentary and the statement. The rate of slide presentation was controlled by subjects through the use of a wooden lap panel placed across the arms of an easy chair. The lap panel was equipped with a button and a switch located on the top right-hand side. Pressing the button advanced the slide, while turning the switch on illuminated the slide. Illumination time was recorded unobtrusively to assess the three levels of attractiveness of the stimulus persons; past research in our laboratory has shown that illumination time varies directly as a function of stimulus-person attractiveness (Ketsetzis 1992).

Procedure

Subjects were tested individually. Upon arrival, subjects were given a consent form to complete and a brief description of the proceedings. Subjects were told that complete confidentiality would be assured. Subjects remained alone throughout the testing session.

Subjects first completed a questionnaire that asked about age, gender, marital status, education, parents' occupation (Blishen et al. 1987), and gender preferences (Kinsey et al. 1948). They then answered five questions for each of the 12 slides viewed (Table 1). Question 3 is not considered here. Prior to slide presentation, the experimenter explained in a detailed, standard manner the nature of Questions 4 and 5, stressing the difference between preference and likely behavior, and between an ideal and a more realistic situation. Slides were presented in four sets of three. The three levels of attractiveness were represented in each set, and each set was associated with one of the two levels of earning potential. If one set was associated with high-earning-potential descriptions for one subject, it was associated with low-earning-potential

Table 1. Stimulus-Person Questionnaire

1. How physically attractive is this person to you?

1	2	3	4	5	6	7
Very unattractive			Moderately attractive			Very attractive

2. How interested would you be in dating the target person?

1	2	3	4	5	6	7
Not at all			Somewhat			Very

3. The person in the slide appears to be _____ years old.
4. Imagine that you meet this person and you have reason to believe that s/he is interested in you. What would you *prefer?* Getting into a non-committing sexual relationship only or maybe getting into a committing intimate relationship with this person?

   _____ Non-committing relationship only _____ Possible committing relationship

5. Imagine that you meet this person but you are given no indication as to his/her interest in you. What would you be more *likely to do?* Attempt to engage in a non-committing sexual relationship only or possibly consider attempting a committing intimate relationship with this person?

   _____ Non-committing relationship only _____ Possible committing relationship

descriptions for another. Slides within sets and sets were randomly presented to each subject separately.

After the viewing task, subjects were asked to fill out an eight-item questionnaire to assess self-perceived mating success (Table 2), and an eight-item questionnaire to assess preferences and motivations with regard to short-term and long-term mating (Table 3). Subjects also answered five other questions inquiring about relationship status and present sexual activities, and two other questions inquiring about number of sexual invitations received in the past year and in the past three years. The duration of the experiment was about 20 min.

RESULTS

Data from 24 male and 24 female subjects were included in the analyses. Data from seven other subjects were not included: three because they belonged to a different age group (27 to 44 years old), and four because of equipment failure.

Table 2. Self-Perceived Mating Success Scale[a]

1. Members of the opposite sex that I like, tend to like me back.
2. Members of the opposite sex notice me.
3. I receive many compliments from members of the opposite sex.
4. Members of the opposite sex are not very attracted to me.
5. I receive sexual invitations from members of the opposite sex.
6. Members of the opposite sex are attracted to me.
7. I can have as many sexual partners as I choose.
8. I do not receive many compliments from members of the opposite sex.

[a]Subjects responded on a scale of 1 to 7 indicating how much they agreed with each item (1 = disagree, 7 = agree).

Table 3. Preferences and Motivations With Regard to Short-Term and Long-Term Mating[a]

	Males	Females
	Mean (SD)	
I prefer short-term sexual relationships.	3.0 (1.7)	1.2 (0.5)***
Ideally, I would have many sexual partners.	3.0 (0.7)	1.2 (1.8)***
Ideally, I would have one steady sexual partner.	5.2 (2.0)	6.8 (0.6)**
I prefer a long-term relationship with one partner.	5.8 (1.6)	6.7 (0.8)*
I enter a long-term relationship because it offers me a greater guarantee of sexual relations.	3.2 (1.9)	2.0 (1.7)*
I enter a long-term relationship because it offers me a greater guarantee of emotional commitment.	5.8 (1.5)	6.4 (0.7)[b]
If I could maintain a long-term relationship with one partner while having sexual relations outside of my relationship, I would do so.	3.0 (2.2)	1.3 (0.7)**
Western society values monogamy between sexual partners.	4.2 (1.2)	4.2 (1.2)

[a]Subjects responded on a scale of 1 to 7 indicating how much they agreed with each item (1 = disagree, 7 = agree).
[b]$p = 0.087$.
*$p < 0.05$ **$p < 0.01$ ***$p < 0.001$ (all two-tailed); the same probability values were obtained using separate variance estimate where necessary.

Preliminary Analyses

Data from two measures of stimulus-person attractiveness, attractiveness ratings and illumination time, were analyzed to confirm that subjects recognized the three levels of stimulus-person attractiveness. Attractiveness ratings refer to the question, "How physically attractive is this person to you?" (Question 1, Table 1), and was measured on a Likert scale of 1 to 7. Illumination time scores were standardized within each subject. These two variables were separately analyzed using a mixed three factor ANOVA (sex of subject, attractiveness, earning potential), with repeated measures on the last two factors. Scores for each slide were averaged for each stimulus category.

The main effect of attractiveness was found to be significant for both attractiveness ratings, $F(2,92) = 364.52$, $p < 0.0001$, and illumination time, $F(2,92) = 4.75$, $p < 0.05$. No other main effect or interaction was significant, except for the interaction of sex of subject with attractiveness for attractiveness ratings, $F(2,92) = 3.70$, $p < 0.05$. Trend analyses showed that attractiveness ratings and illumination time increased linearly with increases of stimulus-person attractiveness for both male and female subjects. This relationship is illustrated in Figure 1. These analyses confirm that subjects recognized the three levels of stimulus-person attractiveness.

Sex Differences in the Effect of Stimulus-Person Attractiveness and Earning Potential on Dating Interest

Dating interest refers to the question, "How interested would you be in dating the target person?" (Question 2, Table 1). Subject who were involved in a sexual and/or long-term relationship (42%) at the time of the study were asked to answer as if they were not involved. A mixed three factor ANOVA (sex of subject, attractiveness, earning potential), with repeated measures on the last two factors was used. The results of the ANOVA are reported in Table 4. It can be observed that the main effects of attractiveness and earning potential were

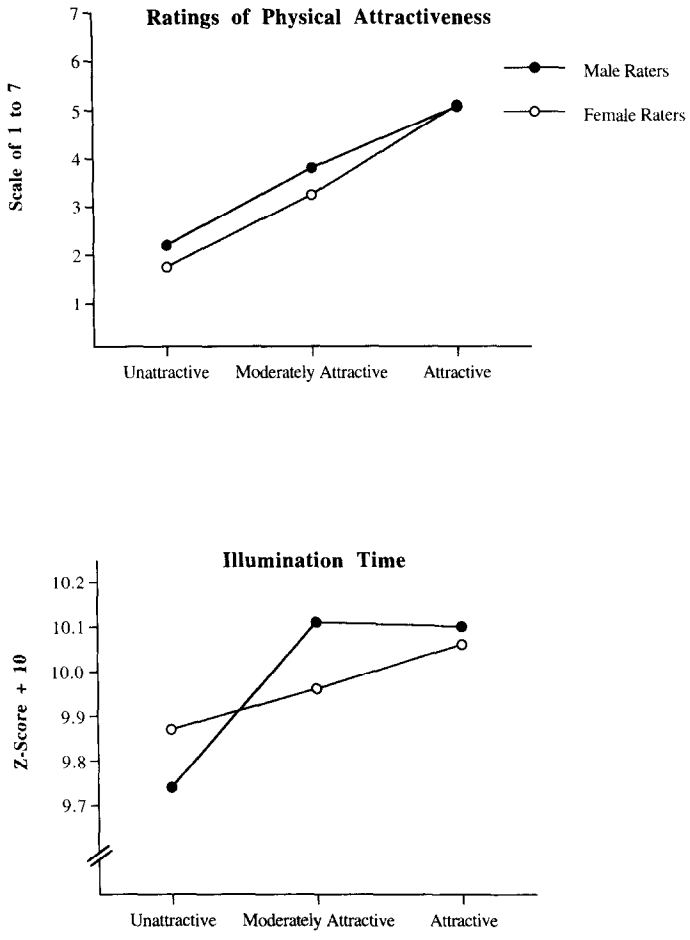

Figure 1. Ratings of physical attractiveness and illumination time as a function of stimulus-person attractiveness and sex of subjects (collapsed over stimulus-person earning potential).

significant, as well as the interaction of attractiveness with earning potential. The three-way interaction attractiveness by earning potential by sex of subject approached significance and is depicted in Figure 2.

The three-way interaction was decomposed over the factor sex of subject. For males, the main effects of attractiveness, $F(2,92) = 107.24$, $p < 0.0001$, and earning potential, $F(1,46) = 4.98$, $p < 0.05$, were significant. The interaction between these two variables was not significant, $F(2,92) < 1.0$. Separate trend analyses revealed that dating interest increased linearly with increases in stimulus-person attractiveness and earning potential.

For females, the main effects of attractiveness, $F(2,92) = 133.70$, $p < 0.0001$, and earning potential, $F(1,46) = 15.83$, $p < 0.001$, were significant. Contrary to males, the interaction of attractiveness with earning potential was significant, $F(2,92) = 5.66$, $p < 0.01$). Given the ordinal nature of the

Table 4. The Effects of Sex of Subject, Attractiveness, and Earning Potential on Dating Interest

Source of Variation	SS	df	MS	F
Sex of subject (SS)	0.32	1	0.32	0.12
Error	122.16	46	2.66	
Attractiveness (A)	364.61	2	182.30	240.18*
SS × A	1.15	2	0.57	0.76
Error	69.83	92	0.76	
Earning Potential (EP)	24.21	1	24.21	19.28*
SS × EP	1.92	1	1.92	1.53
Error	57.75	46	1.26	
A × EP	4.67	2	2.33	2.83[a]
SS × A × EP	4.67	2	2.33	2.83[a]
Error	75.91	92	0.83	

[a] $p = 0.0642$, $p = 0.0683$ after G-G correction.
* $p < 0.0001$

interaction, separate trend analyses were conducted for both variables. Results showed that females' dating interest corresponded to increases in stimulus-person attractiveness and earning potential. Thus, the sex difference in dating interest lies in the interactive effect of attractiveness and earning potential only for females.

Sex Differences in Preferences and Motivations With Regard to Short-Term and Long-Term Mating

These tests of sex differences refer to the eight items presented in Table 3. *t*-tests for independent samples showed, overall, that male subjects, compared to female subjects, were more inclined towards short-term relationships, variety of sexual partners, and extra-pair sexual relationships. They were also more motivated than females by the sexual components of long-term relationships. Female subjects, compared to male subjects, were more inclined towards having a steady sexual partner, and were more motivated by the emotional commitment components of long-term relationships. There was no sex difference with regard to the degree subjects believed Western society values monogamy.

Sex Differences in Tactic Preference and Tactic Selection

This analysis refers to Questions 4 (tactic preference) and 5 (tactic selection), shown in Table 1. For this analysis, a 2 × 2 contingency table was formed for each question separately by crossing subjects' sex and subjects' tactic answer (short-term or long-term) for each of the 12 slides viewed. Data were collapsed over stimulus-person attractiveness and earning potential. Each subject therefore provided 12 data points to each of the two contingency tables. The percentage of subjects answering short-term is presented in Figure 3. It can be observed that males, compared to females, stated a preference for short-term mating, $\chi^2(1) = 13.61$, $p < 0.001$, and were more likely to select short-term mating, $\chi^2(1) = 26.98$, $p < 0.001$.

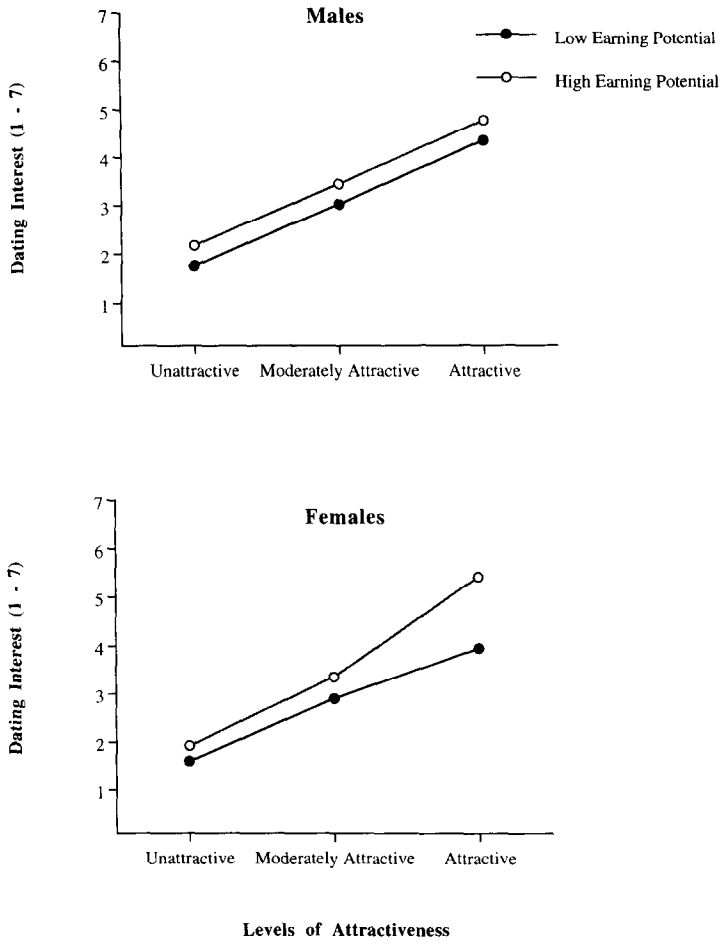

Figure 2. Dating interest as a function of sex of subject, stimulus-person attractiveness, and stimulus-person earning potential.

Self-Perceived Mating Success

The variable "self-perceived mating success" was assessed using the eight-item scale presented in Table 2. Excluding the two reversed items, the internal consistency (Cronbach alpha) was 0.83 and the corrected item-scale correlations varied from 0.41 to 0.78. The total scale scores correlated significantly with "approximate number of sexual invitations received over the past year," $r(46) = 0.49$, $p < 0.001$, and "over the past three years," $r(46) = 0.48$, $p < 0.001$. The total scale scores did not vary significantly as a function of whether subjects were involved or not at the time of the study in a long-term relationship, $t(46) = 0.23$, or in a sexual relationship, $t(46) = 0.42$. Males' and females' average total success score did not differ significantly, $t(46) = -0.32$, and their score distributions were approximately normal, Shapiro-Wilks statistic (24) = 0.96 for males and 0.97 for females ($p > 0.40$). Subject socioeconomic status (indexed by parents' occupation) was not significantly correlated with total

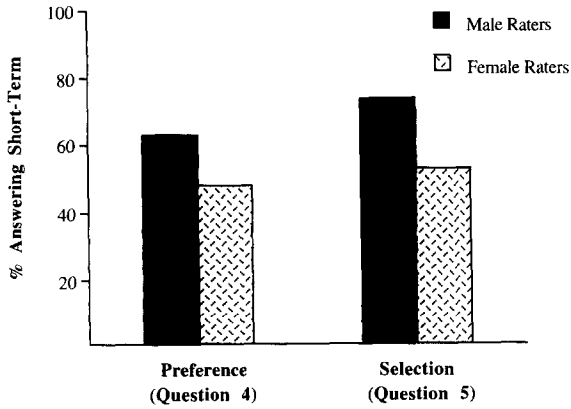

Figure 3. Percentage of males and females who stated a preference and a selection of short-term mating (collapsed over stimulus-person attractiveness and earning potential).

success score, $r(46) = -0.06$. The median total score was used to assigned subjects to low and high self-perceived mating-success categories.

Intra-Sex Variations in Tactic Preference and Tactic Selection: The Effect of Self-Perceived Mating Success

In this analysis, 2 × 2 contingency tables were formed for each sex and for tactic preference (Question 4) and tactic selection (Question 5) separately, by crossing subjects' self-perceived mating-success scores (low or high) and subjects' tactic answer (short-term or long-term) for each of the twelve slides viewed. Data were collapsed over stimulus-person attractiveness and earning potential. Each subject therefore provided 12 data points to two of the four contingency tables. The percentage of subjects answering short-term is presented in Figure 4. Results showed that high-success males preferred

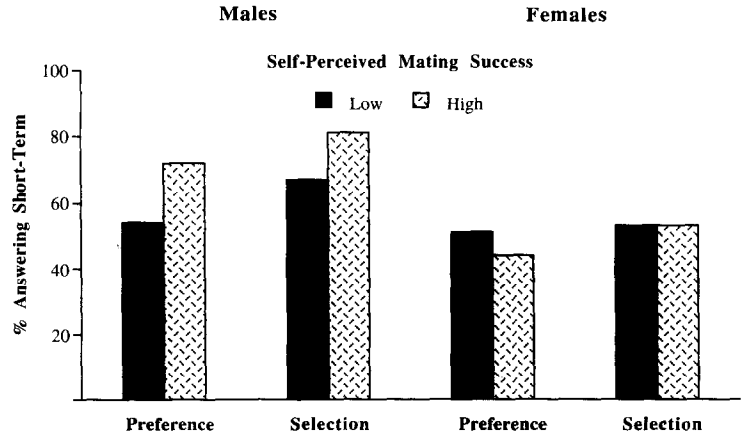

Figure 4. Percentage of males and females who stated a preference and a selection of short-term mating as a function of self-perceived mating success (collapsed over stimulus-person attractiveness and earning potential).

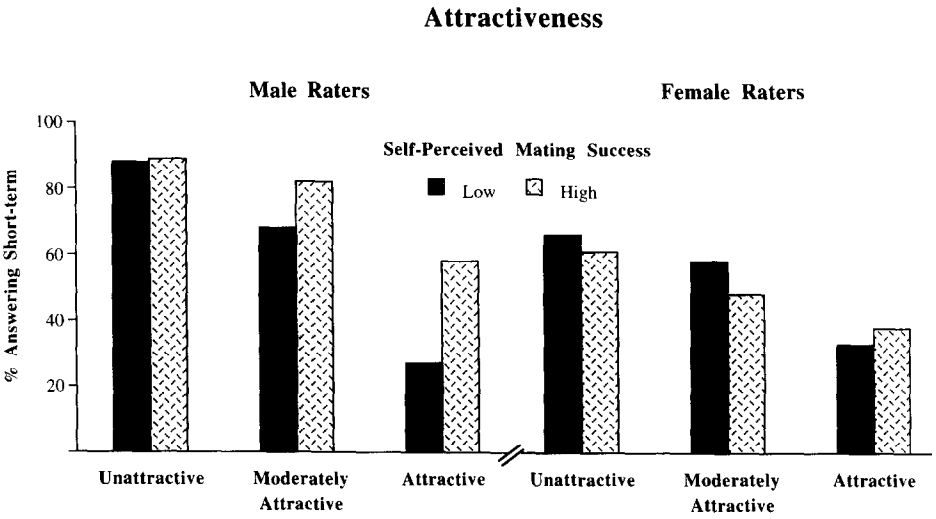

Figure 5. Percentage of males and females who stated a preference and a selection of short-term mating as a function of self-perceived mating success and stimulus-person attractiveness (collapsed over stimulus-person earning potential).

short-term to long-term mating to a greater extent than low-success males, $\chi^2(1) = 10.91$, $p < 0.001$. The same results were obtained with regard to tactic selection, $\chi^2(1) = 6.51$, $p < 0.05$. For females, neither tactic preference, $\chi^2(1) = 1.39$, $p > 0.20$, nor tactic selection, $\chi^2(1) = 0.01$, $p > 0.20$, varied significantly as a function of self-perceived mating success.

Intra-Sex Variations in Tactic Preference and Tactic Selection: The Effect of Self-Perceived Mating Success as a Function of Stimulus-Person Attractiveness

To simplify interpretation, the effects of stimulus-person attractiveness and earning potential on mating tactics were tested separately. In this analysis, a three-way 2 × 2 × 3 contingency table was formed for each sex by crossing subjects' self-perceived mating-success score (low or high), subjects' tactic answer (short-term or long-term), and stimulus-persons' attractiveness (unattractive, moderately attractive, or attractive). This contingency table was initially constructed for tactic preference and tactic selection separately, but it was found that this distinction did not produce different patterns of results: Therefore, to increase the number of data points, data were collapsed over tactic preference and tactic selection. Each subject therefore provided 24 data points. The percentage of subjects answering short-term mating as a function of stimulus-person attractiveness is illustrated in Figure 5. It can be seen that an increase in stimulus-person attractiveness resulted in a decrease in the percentage of males and females answering short-term.

A log linear analysis was used to test the effects of stimulus-person attractiveness on tactic answers, and to test whether this effect was moderated by self-perceived mating success. Two models were therefore tested using

likelihood χ^2 ratios: The first included all main effects and the interaction of attractiveness by tactic answer; the second included all main effects, all first-order interactions, and the interaction of attractiveness by tactic answer by self-perceived mating success. The difference in fit between these two models was compared by calculating the difference between the two obtained χ^2 and associated degrees of freedom.

Male subjects. The first model did not provide a good fit to the data, $\chi^2(5) = 25.08$, $p < 0.001$. The second model did provide a good fit, $\chi^2(2) = 5.20$, $p > 0.07$. The difference in fit between the two models was significant, $\chi^2(3) = 19.88$, $p < 0.001$. These results indicate that the effects of stimulus-person attractiveness on the selection of mating tactic differ as a function of self-perceived mating success. Inspection of Figure 5, left panel, reveals that low-perceived-mating-success males, compared to high-perceived-mating-success males, tended to choose short-term mating to a lesser extent as the attractiveness of the stimulus person increased.

Female subjects. Both the first model, $\chi^2(5) = 2.82$, $p > 0.70$, and the second model, $\chi^2(2) = 2.82$, $p > 0.30$, provided a good fit to the data. The difference in fit was not significant, $\chi^2(3) = 0.73$, $p > 0.20$, indicating that the effects of stimulus-person attractiveness on mating tactic did not vary significantly as a function of self-perceived mating success. Inspection of Figure 5, right panel, reveals that the percentage of female subjects answering short-term mating decreased as the attractiveness of the stimulus person increased, for both low and high self-perceived mating-success groups.

Intra-Sex Variations in Tactic Preference and Tactic Selection: The Effect of Self-Perceived Mating Success as a Function of Earning Potential

In this analysis, a 2 × 2 × 2 contingency table was formed for each sex by crossing subjects' self-perceived mating-success score (low or high), subjects' tactic answer (short- or long-term), and stimulus-person' earning potential (low or high). Again, for the same reasons as above, data from Questions 4 (tactic preference) and 5 (tactic selection) were collapsed. Each subject therefore provided 24 data points. The percentage of subjects answering short-term mating as a function of stimulus-person earning potential is illustrated in Figure 6. It can be observed that an increase in stimulus-person earning potential resulted in a decrease in the percentage of males and females answering short-term. Again, a log linear analysis was used to test the moderating effect of self-perceived mating success.

Male subjects. The first model (not including self-perceived mating success as an interacting factor) did not provide a good fit to the data, $\chi^2(3) = 17.33$, $p < 0.001$. The second model (including self-perceived mating success as an

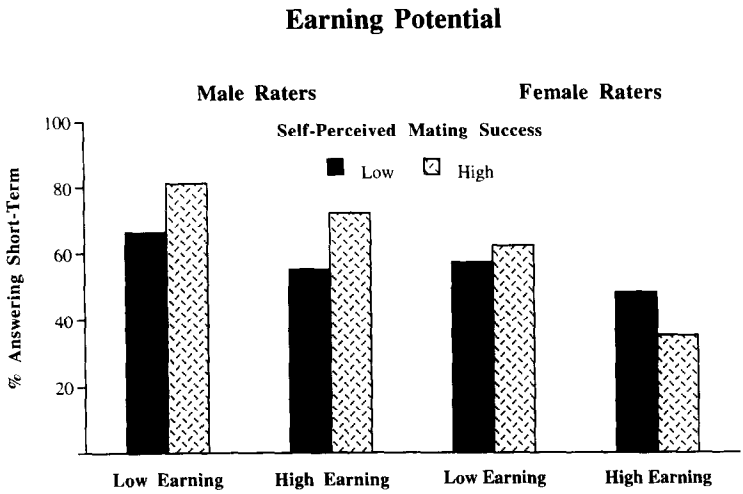

Figure 6. Percentage of males and females who stated a preference and a selection of short-term mating as a function of self-perceived mating success and stimulus-person earning potential (collapsed over stimulus-person attractiveness).

interacting factor) provided a perfect fit $\chi^2(1) = 0.00$, $p = 1.0$. The difference in fit between the two models was significant, $\chi^2(2) = 17.33$, $p < 0.001$. Inspection of Figure 6, left panel, reveals that low-perceived-success males, compared to high-perceived-success males, tended to choose short-term mating to a lesser extent as the earning potential of the stimulus-person increased.

Female subjects. The first model provided a good fit to the data, $\chi^2(3) = 6.11$, $p > 0.10$ and the second model did not, $\chi^2(1) = 5.24$, $p < 0.05$. The difference in fit between the two models was not significant, $\chi^2(2) = 0.87$, $p > 0.20$, indicating that the effects of stimulus-person earning potential on mating tactic did not vary significantly as a function of self-perceived mating success. Inspection of Figure 6, right panel, reveals that short-term mating answers decreased as the earning potential of the stimulus person increased, for both low and high self-perceived mating-success females.

DISCUSSION

Results from this study support the view that sex differences in minimal parental investment lead to sex differences in preferred mate characteristics and preferred mating tactics, and that differential access to mates of the opposite sex leads to intra-sex variations in tactic selection. All three predictions derived from this model on sex differences were supported, and the two predictions on intra-sex variations were partially supported.

Sex Differences

First, males' and females' dating interest in potential mates varied as a function of stimulus-persons' physical attractiveness and earning potential. Although

both sexes showed more interest in stimulus persons of higher attractiveness and of higher earning potential, these two mate characteristics interacted for female subjects only. Male stimuli who were very attractive and of high earning potential produced the highest female dating interest.

These results confirm previous findings of sex differences in preferred mate characteristics (Buss 1987, 1994; Feingold 1990, 1992). They also show that both males' and females' dating interest is influenced by the physical attractiveness and the earning potential of potential mates, perhaps to a greater extent than expected from previous findings. Recent evolutionary models have been proposed to explain female interest in attractive males (Gangestad and Simpson 1990), and male use of more stringent requirements in mate selection under certain conditions (Kenrick et al. 1990). Results from this study do not allow a test of these models, but they perhaps suggest that the nature and the magnitude of observed sex differences in mate preferences may vary with the research procedure used (e.g., visual presentation of people versus asking, "What is important for you in choosing a mate?"). In support of this possibility, Feingold (1990) found that self-reports produced larger sex differences (with regard to the importance of physical attractiveness) than observed social behavior.

An effect of similarity (Feingold, 1991) may also explain the obtained significant main effects of attractiveness for female subjects and earning potential for male subjects. Subjects in this study were of relatively high earning potential and educated. Most high-earning-potential stimulus persons were also described as educated, which may explain males' attraction for high-earning-potential females. However, the effects of subjects' own physical attractiveness and earning potential on dating interest was not investigated in this study. Furthermore, more "direct" manipulation of earning potential could accentuate sex differences if earning potential is easier to evaluate when subjects have access to more direct information about the personality of the target mate.

The second set of findings pertaining to sex differences concerns males' and females' preferences and motivations with regard to short-term and long-term mating. As expected, males, compared to females, preferred short-term relationships and variety of partners, were more motivated by the guarantee of sexual relations in long-term relationships, and were more inclined toward extra-pair sexual relations. In contrast, females, compared to males, preferred long-term relationships, and were more motivated by the guarantee of emotional commitment in long-term relationships.

These findings agree with a small but growing literature on mating preferences. For example, Ellis and Symons (1990) and Symons and Ellis (1989) found sex differences in the content of sexual fantasies (males focusing more, for example, on sexual variety and females focusing more on emotional context) and sex differences in propensity for extra-pair sexual relations. It is unlikely from the parental investment model described above, that these broad preferences vary within each sex. Intra-sex individual variations are more

likely to be expressed at the behavioral level (mate or tactic selection) as a result of differential access to preferred mates. In this study, male subjects showed, in general, more variability than female subjects in their preferences and motivations (Table 3). However, supplementary analyses using intra-sex correlations showed that self-perceived mating success was not significantly correlated to subjects' responses to these items. Further study with a larger number of subjects and greater item variety should be conducted to confirm these findings.

Finally, male and female subjects differed with regard to their tactic preference and tactic selection. As predicted from the parental investment model, males more often than females preferred and selected short-term mating. It should be pointed out that this conclusion is based on the relative observed frequencies of stated preference and selection, not on the absolute observed frequencies. An interpretation of the absolute frequencies of stated preference and selection would be misleading because subjects did not have the option of simply rejecting the mating opportunity, a situation quite different from more realistic encounters. This option was not included in this study because it was expected that subjects (and perhaps more often females) would too frequently opt to reject. Future studies could investigate whether the obtained sex difference would remain if subjects had an alternative option to reject the mating opportunity. Figure 3 also shows, however, that not all subjects stated a preference and a selection of their sex-typical, optimal tactic.

Intra-Sex Variations

Self-perceived mating success, a variable indexing differential access to mates, was related to males' but not females' tactic preference and tactic selection. It was expected that high self-perceived mating-success subjects would select tactics associated with their sex-typical preferred tactics. Results showed that high-perceived-success males selected short-term mating more often than low perceived success males.

It is clear that subjects' tactic answers to Questions 4 (tactics preference) and 5 (tactic selection) were largely similar, even though the experimenter was quite explicit in describing the distinct nature of these questions. The most parsimonious explanations of this lack of discrimination are that the questions were poorly stated or that the forced-choice format did not allow subjects to differentially respond to these two questions. A less parsimonious but theoretically interesting explanation is that some preferences are malleable during development and may shift according to sexual experience and mating success. This malleability would certainly reduce discordance between desire and obtained outcome. One could further argue that preferences for certain mate attributes or certain mating tactics may be detrimental when they relate too tightly to unsuccessful tactic selections. Certainly, more research is needed to determine how self-perceived mating success influences tactic preference and

tactic selection with regard to short-term and long-term mating, and how tactic preference and tactic selection relate to one another. Moreover, it may be worthwhile to investigate what influences self-perceived mating success, whether self-perceived mating success can be modified, once established, by certain life events, and whether self-perceived mating success is mostly malleable during sensitive periods.

The second set of findings with regard to intra-sex variations concerns the moderating effect of self-perceived mating success on the effect of physical attractiveness and earning potential on tactic selection. It was found that low self-perceived success males, compared to high self-perceived success males, less frequently preferred and selected short-term mating when the value of the potential mate increased. This effect was not present for female subjects. Again, this suggests that males' mating strategies may be more environmentally constrained than females'. If the parental investment model presented in this article is correct, one can also tentatively conclude from the observed findings that males, but especially low-perceived-mating-success males, adjust their tactics to meet the sex-specific preferences of females when the value of the target mate is high. In contrast, females, regardless of their self-perceived value, are more likely to choose their sex-specific preferred tactic when the value of the target mate is higher. Informal discussions with subjects revealed that females answered short-term mating more frequently when presented with unattractive, low-earning-potential males, mainly because they would "simply want to get it over with." Some males, in contrast, stated that they did not think they could engage or maintain a relationship with very attractive females. More formal questioning in further study could reveal interesting intra- and inter-sex differences in this regard.

The findings of a relationship between self-perceived mating success and tactic preference and tactic selection, in association with the findings that this association is affected by target-mate value, suggest that males' tactic preference and selection are more variable than females'. This suggestion agrees with the idea that human's polygynous mating system promoted the male evolution of alternative mating tactics in our ancestral environment. Alternative tactics displayed by males are also observed in other animal species having the same kind of mating system (Daly and Wilson 1983). The idea that mating tactics may be developmentally or concurrently contingent has also been used to explain sexual coercion in animals, including humans (Thornhill and Thornhill 1992; Thornhill et al 1986). We are currently investigating how self-perceived mating success relates to male use of sexual deception and sexual coercion.

It should be noted that the results of the χ^2 and log linear analyses presented in this study are based on partially non-independent data points, thereby violating one of the requirements of these tests. Although it is unlikely that the lack of independence of data is responsible for the relationships observed in this study, it should be kept in mind that these findings should be replicated using larger samples and independent data points. More generally, a

replication of the relationship between self-perceived mating success and mating tactic selection in other samples (e.g., non-students, non-Western societies) would be necessary to validate the model proposed here.

CONCLUSIONS

In his classic paper Trivers (1972) reminded us that "psychology might well benefit from attempting to view human sexual plasticity as an adaptation to permit the individual to choose the mixed strategy best suited to local conditions and his own attributes" (p. 146). It is only recently that psychological investigations have used evolutionary models to proposed hypotheses as to the nature and origins of sex differences. More complex models involving more interacting features of mating effort are now being proposed to explain more intricate individual differences (Kenrick et al. 1990). The accumulation of observations pertaining to intra-sex variations in mating preferences and behaviors will certainly further the development of evolutionary models of high predictive and explanatory value.

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