

*Research Article*

# The Best Men Are (Not Always) Already Taken

Female Preference for Single Versus Attached Males Depends on Conception Risk

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**ABSTRACT**— *Because men of higher genetic quality tend to be poorer partners and parents than men of lower genetic quality, women may profit from securing a stable investment from the latter, while obtaining good genes via extrapair mating with the former. Only if conception occurs, however, do the evolutionary benefits of such a strategy overcome its costs. Accordingly, we predicted that (a) partnered women should prefer attached men, because such men are more likely than single men to have pair-bonding qualities, and hence to be good replacement partners, and (b) this inclination should reverse when fertility rises, because attached men are less available for impromptu sex than single men. In this study, 208 women rated the attractiveness of men described as single or attached. As predicted, partnered women favored attached men at the low-fertility phases of the menstrual cycle, but preferred single men (if masculine, i.e., advertising good genetic quality) when conception risk was high.*

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Women with a partner should prefer attached men when conception risk is low, and single men when conception risk is high. We make this provocative statement on the basis of evolutionary theories of human mating, and report here two studies that tested, first, the assumptions on which these predictions are based and, second, the predictions themselves.

The starting point of our argument is the well-established fact that, across a variety of species, including *Homo sapiens*, males of high genetic quality are less inclined to invest in mates and provide paternal care than are males of low genetic quality (Gangestad & Simpson, 2000). In response, females appear to have evolved a dual mating strategy: They prefer males who are more willing to take care of them and of their offspring as long-term partners, but at the same time seek genetically superior males as extrapair, short-term sexual mates (e.g., Smith, 1984).

The expectation that human females ought to value males who exhibit indicators of prosocial behavior and likely investment in future offspring is supported by evidence that, in the context of long-term mating, women generally prefer “feminine” male faces, presumably because of their association with positive personality traits such as cooperation, loyalty, kindness, and willingness to provide parental care (Penton-Voak et al., 1999; Perrett et al., 1998). Current commitment to a woman is an honest signal of the social-emotional qualities required for pair bonding, qualities that unattached men may or may not have. Of these social-emotional qualities, the social facet is primarily expressed by being in a relationship, and the emotional one by being in love with one’s partner. In this respect, men who are described as engaged, married, or in love should be a better catch than men who are not.

Still, a preference for attached men confers not only benefits but also costs—because, although these men are more likely than unattached men to possess the attributes that make a good long-term future partner, they are also less likely to actually become one’s partner within a short time span. The negative weight of this shortcoming must critically depend on whether a woman is already in a romantic relationship. Partnered women can afford to wait; indeed, the courtship period can be modeled as a mechanism for holding partners before full commitment, thereby allowing individuals to swap to better partners whenever these become available (Simão & Todd, 2002). For partnered women, the

higher mate value of attached men is not offset by their current lower availability for a long-term relationship; therefore, women with a partner ought to prefer attached men.

Our predictions cannot, however, be complete until we consider the other side of dual mating, which concerns partnered women only: the search for extrapair sexual mates. Female adultery is punished severely in virtually every society, sometimes with violence and even death. Extrapair mating is risky, and not necessarily efficient either, because good genes can be transmitted to offspring only if copulation is in fact followed by conception. Accordingly, encounters with eligible sexual mates can be evolutionarily rewarded only if they take place during the fertile phase of a woman's menstrual cycle. Indeed, at the time of ovulation, extrapair copulations are overrepresented and associated with higher female sperm retention (Baker & Bellis, 1995); the frequency of fantasies about men other than one's partner rises at this time as well (Gangestad, Thornhill, & Garver, 2002).

How good are the chances of finding the right sex partner at the right moment? A woman's fertile phase is restricted to a small window (6 days) within her monthly cycle, the onset of this window is highly unpredictable (Wilcox, Dunson, & Baird, 2000), and the cycle itself recurs for only a limited number of years. Ancestral women had later menarche and a shorter life span compared with modern women, and therefore must have had even fewer years of fertility. Most of those years would have been spent in repeated pregnancies (some of which would have turned out to be unfruitful because of high infant mortality) and long periods of lactation. It has been argued that a woman might have had only as few as a dozen ovulatory episodes in her lifetime (Pillsworth, Haselton, & Buss, 2004).

The rarity of opportunities for conception and the costs of infidelity render the timing of extrapair sex of crucial importance. When conception is likely, a partnered woman must find a mate who not only carries good genes, but also is available for sex right away—before her fertile window closes. In this light, attached men are less eligible than single men in at least three respects: their need, occasion, and interest. Whereas it is obvious that attached men have less need and occasion than single men, the contention that attached men are less interested is supported by the observations that (a) many men choose long-term mating as their primary sexual strategy (Gangestad & Simpson, 2000),

(b) even those men who practice extrapair sex do not usually do so indiscriminately (Buss & Schmitt, 1993), and (c) positive assortative mating with respect to mate quality (e.g., Kalick & Hamilton, 1986) implies that higher-quality men tend to be paired with higher-quality women. High-quality attached men may therefore be particularly unwilling to serve as lovers of women with low mate value. Yet the women who seek (i.e., benefit from) extrapair mating are indeed the women whose primary partners are of lower quality, and who are thus likely to have poor mate value themselves (see Pillsworth & Haselton, 2006).

From this line of reasoning, we derive the prediction that the preference for attached versus unattached men, in women with a partner, will be crucially influenced by conception risk. More specifically, we predict that partnered women will prefer attached men when conception risk is low, and single men when conception risk is high. Among single women, the two conflicting patterns of male appeal (being attached and thus romantically competent, being single and thus romantically available) are likely to have different relative values for different women, but present fertility status should be largely irrelevant—because it is in the evolutionary interest of single women to seek a long-term, investing mate, rather than a short-term sex partner (Buss & Schmitt, 1993).

The preference for good-genes markers, such as facial masculinity, has been shown to increase significantly (a) when conception is more probable and (b) in the context of short-term rather than long-term mating (e.g., DeBruine et al., 2006). There is widespread consensus that masculinity is an honest signal of genetic quality, because only men with strong immune systems can withstand the immunosuppressant effects of the high levels of testosterone required to develop masculine features. We argue that when fertility rises, partnered women will switch preference from attached to single men because the latter are more accessible as short-term sex partners. On this basis, we make the additional prediction that this switch should happen preferentially, or uniquely, when the men in question exhibit good-genes markers, that is, if they look masculine rather than feminine.

In the two experiments reported in this article, we sought to validate our assumptions and to test our predictions.

## **PREPARATORY STUDY: PERCEIVED QUALITIES OF SINGLE AND ATTACHED MEN**

In this preliminary study, we sought to validate the three assumptions on which our predictions are based: that relative to attached men, single men are perceived as (a) more immediately available for a sexual encounter, (b) more immediately available as potential long-term partners, and (c) less likely to possess the attributes of a good long-term partner.

### **Method**

Twenty-six nonpregnant women, 12 with and 14 without a partner (median age = 22 years, range = 19–33 years) volunteered to participate in the study. They were all students at the University of Padua, and were recruited and tested individually. Data from 7 additional participants were discarded because at the end of the experiment these women reported using hormonal contraceptives.

Twelve color photographs of faces of physically pleasant men in their prime were scanned from fashion magazines and used as stimuli. With the help of two additional female judges, we selected the men so as to cover different degrees of masculinity and different degrees of attractiveness, to ensure that all participants would find at least some of the men approachable. Each picture was printed (10 × 15 cm in size) on paper and inserted into a separate clear cover sheet. Each participant viewed the pictures in a different random order.

In the literature on mate choice (e.g., Buss & Schmitt, 1993), male attractiveness is routinely assessed in two separate contexts, long-term relationships (such as marriage) and short-term relationships (such as a one-night stand or an affair within a long-term relationship). However, an informal survey conducted prior to this study showed that asking questions in these terms (e.g., "which man would you prefer for a one-night stand?") made partnered women defensive; we therefore decided to refer generically to "attractiveness," thereby avoiding explicit references to infidelity. Accordingly, in the first part of the experiment, participants were asked to judge whether each face was (a) more attractive than average and (b) more masculine than average. In the second part of

the experiment, there were no pictures; participants were asked to consider (in turn and in random order) a man who is single, a man who has a girlfriend, a man who is married, and a man who is in love. For each of these men, they were asked to answer the following questions, using a scale from 1 to 10: "How likely is it that this person has the qualities to be a good partner for a stable, long-term relationship?" "How easy would it be to have a sexual encounter with this person, today?" "How easy would it be to acquire this person as a partner for a stable, long-term relationship, today?" The order of these questions was randomized between subjects.

## Results

"Yes" and "no" answers to the questions in the first part of the experiment were scored as "1" and "0," respectively. The 12 faces were uniformly distributed on both the attractiveness (range = .08–.88) and masculinity (range = .04–1.00) dimensions.

We averaged the ratings for a married man, a man with a girlfriend, and a man in love to form a composite score for "attached" men. For each participant and each question, we computed the advantage of single men (the rating given to the single man minus the mean rating given to attached men). Relative to attached men, single men were considered more immediately available for a sexual encounter, more immediately available as long-term partners, and less likely to possess the attributes of a good long-term partner. The one-sample  $t$  tests were all significant both overall,  $t(25) = 8.38$ ,  $t(25) = 9.22$ , and  $t(25) = -4.16$ , respectively, all  $ps < .0001$ ,  $p_{repS} > .99$ , and separately for partnered and unpartnered women (throughout this article, all tests are two-tailed).

For each participant and each question, we also compared the ratings obtained for the three categories of attached men (married, with a girlfriend, and in love). Men with a girlfriend were regarded as more immediately available both as long-term partners and for an impromptu sexual encounter, relative to either married men or men in love (all  $ps < .05$ ,  $p_{repS} > .88$ ); ratings for the latter two categories did not differ significantly. Men in love were regarded as more likely to possess the attributes of a good long-term partner relative to either married men or men with a girlfriend (both  $ps < .02$ ,  $p_{repS} > .93$ ); ratings for the latter two categories did not differ significantly. Therefore, if we consider the three complementary aspects of our argument together (being a good partner, being

available as a partner, being available for sex), men with a girlfriend ranked first, men in love ranked in the middle, and married men ranked last.

## **MAIN STUDY: ATTRACTIVENESS OF MEN DESCRIBED AS SINGLE OR ATTACHED**

Our main study was designed to test the predictions based on the assumptions that we validated in the preparatory study, namely, that women with a partner will prefer attached men during the less fertile days of their cycle and single men during the more fertile days of their cycle. On the basis of previous literature and theory, we also predicted that the high-fertility preference for single men will be strongest for men whose faces are more masculine than average. Additionally, after obtaining the results of the preparatory study, we predicted that the effect will tend to be strongest when the attached man is described as having a girlfriend, and weakest when he is described as married.

### **Method**

#### *Participants*

Participants were 220 nonpregnant women, 110 with and 110 without a partner. They were all students at the University of Padua, and were recruited and tested individually. Data from 12 participants were discarded from the analyses because at the end of the experiment these women reported using hormonal contraceptives (10) or not being heterosexual (2). (Unlike the question about having a partner, the latter two questions were asked at the end of the experiment, because at the start they might have seemed intrusive.) Thus, the final sample consisted of 208 women (median age = 21.6 years, range = 18–35 years).

Each woman's menstrual-cycle day was standardized by dividing the number of days since the first day of her last menstrual period by the reported typical cycle length and multiplying the quotient by 28. On the basis of this 28-day standardized cycle, the women were divided into a high-conception-risk group (Days 8–20,  $n = 97$ ) and a low-conception-risk group (Days 1–7 and 21–28,  $n = 101$ ). This subdivision resulted from applying the formula that, when only the onset of previous menstruation is known, has

been shown to predict pregnancy probability across the menstrual cycle most accurately, that is, the average midcycle rule (Lamprecht & Grummer-Strawn, 1996). Alternative splits, such as between high-estrogen (Days 12–21) and low-estrogen (Days 1–11 and 22–28) groups (Fisher (2004), did not alter the results. Data from 10 women who were on standardized days between 29 and 35, and therefore likely to be experiencing an abnormal menstrual cycle, were excluded.

### *Stimuli*

The stimuli were the male faces used in the preparatory study. The photographs were presented in an album, in a different random order for each participant. Each photo was accompanied by one of four possible labels: “this person is single,” “this person is in love,” “this person has a girlfriend,” and “this person is married.” Although the photographs were the same for all participants, four versions of the album were prepared so that each photo was paired (between subjects) with all four descriptions.

### *Procedure*

The four album versions were presented to four groups of 55 participants each (in the final sample, these groups included 52, 52, 54, and 50 women). Participants were asked to imagine being at a party (with their partner, if they had one) and seeing the man portrayed in each photograph. They had to rate his attractiveness on an 11-point scale (0 = *not at all attractive*, 10 = *very attractive*). Before giving each rating, participants read aloud the description that accompanied the photograph. There was no time limit. At the end, participants completed a questionnaire that asked for basic demographic information and menstrual-cycle information, and also included several items concerning their current relationship, if they were romantically involved.

## **Results**

Table 1 presents the mean attractiveness ratings for all experimental conditions and groups. For our first analysis, as in the preparatory study, we created a composite measure by averaging the attractiveness ratings for the married men, men with a girlfriend, and men in love. We ran an overall repeated measures analysis of variance

(ANOVA) with a within-subjects factor of man's availability (single, attached) and between-subjects factors of participant's conception risk (low, high) and partnership status (partnered, unpartnered).

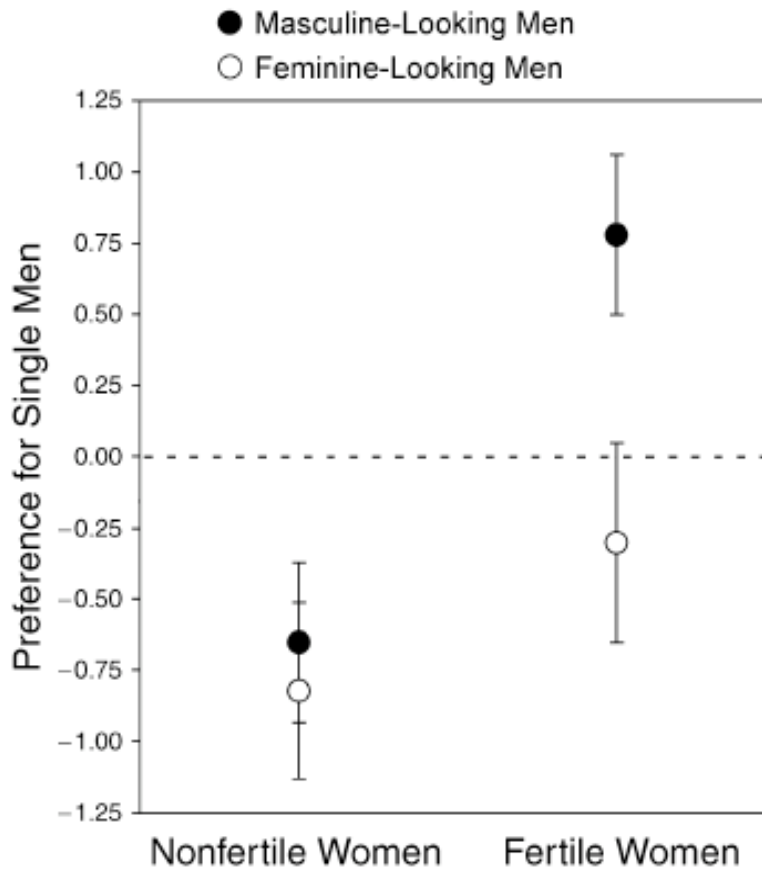
**TABLE 1**  
*Mean Attractiveness Ratings of Male Faces by Female Participants*

| Category of men           | Partnered women |            | Unpartnered women |            |
|---------------------------|-----------------|------------|-------------------|------------|
|                           | Fertile         | Nonfertile | Fertile           | Nonfertile |
| <b>Masculine</b>          |                 |            |                   |            |
| Single                    | 5.99            | 5.17       | 6.38              | 6.16       |
| Married                   | 5.63            | 5.34       | 6.66              | 6.46       |
| In love                   | 5.34            | 5.72       | 6.18              | 6.16       |
| With a girlfriend         | 5.43            | 5.65       | 5.90              | 6.32       |
| <b>Feminine</b>           |                 |            |                   |            |
| Single                    | 4.26            | 3.91       | 4.59              | 4.83       |
| Married                   | 4.33            | 4.36       | 4.85              | 4.93       |
| In love                   | 4.76            | 4.23       | 4.54              | 4.42       |
| With a girlfriend         | 3.57            | 4.86       | 4.84              | 5.03       |
| <b>All men</b>            |                 |            |                   |            |
| Single                    | 5.37            | 4.67       | 5.50              | 5.63       |
| Attached                  | 4.87            | 5.08       | 5.56              | 5.63       |
| Preference for single men | 0.50            | -0.41      | -0.05             | 0.00       |

**Note.** The last row shows the average preference for single men (for each participant, this preference was computed as the mean rating given to single men minus the mean rating given to attached men).

Across conditions, male faces were rated as more attractive by women without a partner ( $M = 5.6$ ) than by women with a partner ( $M = 5.0$ ),  $F(1, 194) = 10.10$ ,  $p = .002$ ,  $p_{rep} = .98$ . More interestingly, man's availability and participant's conception risk did not have significant main effects (both  $F$ s  $< 1$ ), but were involved in a significant triple interaction with participant's partnership status,  $F(1, 194) = 7.16$ ,  $p = .008$ ,  $p_{rep} = .96$ . As separate ANOVAs revealed, this significant interaction was due to the fact that man's availability and participant's conception risk interacted significantly for partnered women,

$F(1, 98) = 11.19, p = .001, p_{\text{rep}} = .99$ , but not for unpartnered ones,  $F(1, 96) < 1$ . For each participant, we computed the preference for single men (the mean rating given to single men minus the mean rating given to attached men). This preference was unrelated to conception risk in unpartnered women, Pearson  $r = -.02, p > .8, p_{\text{rep}} < .28, n = 98$ , being essentially zero whether they were fertile or nonfertile (both one-sample  $t$ s  $< 1$ ). However, in women with a partner, the preference for single men increased significantly with conception risk, Pearson  $r = .32, p = .001, p_{\text{rep}} = .99, n = 100$  (effect size  $d = 0.70$ ). More specifically, nonfertile women favored men described as attached, one-sample  $t(49) = -2.28, p = .03, p_{\text{rep}} = .91$ , but fertile women were more attracted to men described as single,  $t(49) = 2.45, p = .02, p_{\text{rep}} = .93$ .

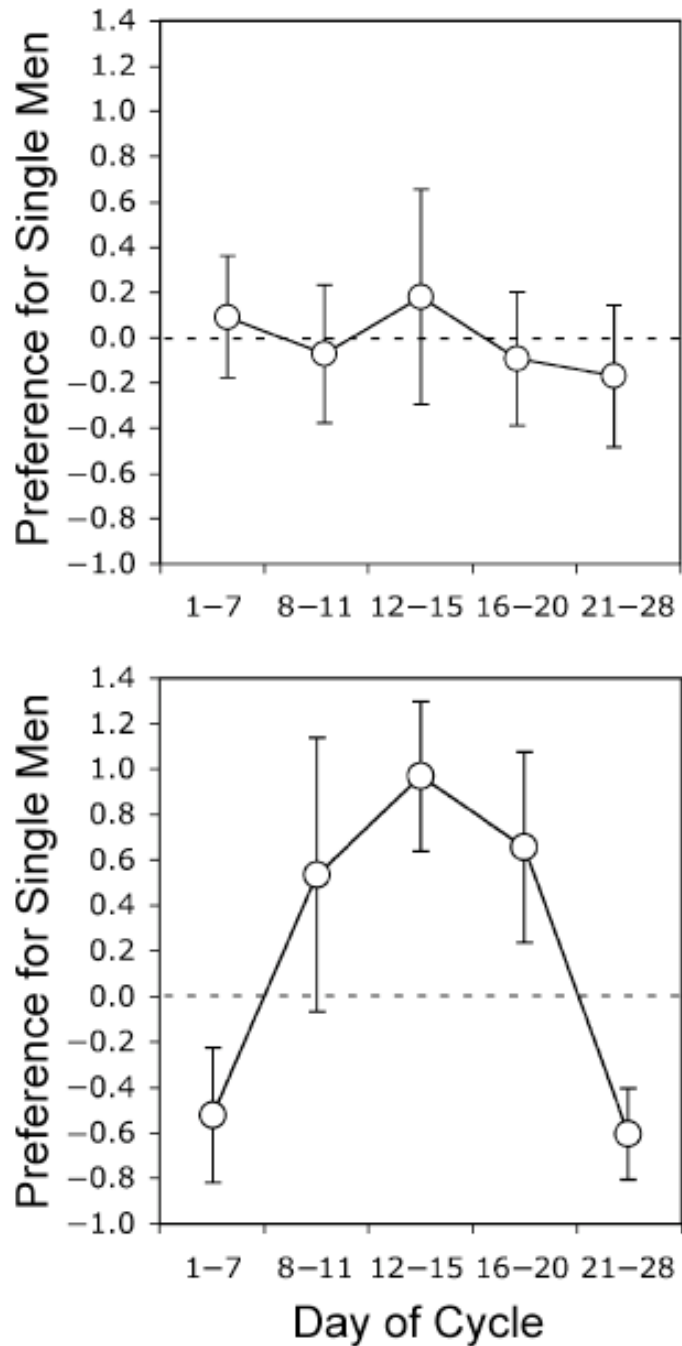


**Fig. 1.** Mean preference for single (vs. attached) men among nonfertile and fertile women with partners. Positive values indicate a preference for single men, and negative values indicate a preference for attached men. Error bars correspond to 1 SEM.

One corollary of our hypothesis that fertile women switch their preference toward single men because such men are more accessible for short-term sex is that this turnaround should, especially or uniquely, apply to men who look more masculine than average, because masculinity is a proxy for immunological competence. To test this prediction, we divided the men into two groups, the *masculine* group (the 5 men who had been rated as more masculine than average in the preparatory study, mean rating = .85) and the *feminine* group (the 7 men who had been rated as less masculine than average, mean rating = .22). Fertile women with partners preferred single men to attached men only when the men were masculine, one-sample  $t(34) = 2.82, p = .008, p_{\text{rep}} = .96$ , and not when they were feminine,  $t(49) < |1|$  (see Fig. 1).

Finally, for each participant, we computed the preference for men described as single relative to each specific category of attached men (married, with a girlfriend, and in love). In unpartnered women, these preferences were all unrelated to conception risk, all  $r$ s  $< |.08|$ , all  $p$ s  $> .4$ ,  $p_{\text{rep}}\text{s} < .57$ . In partnered women, preferences for single men over men with a girlfriend, men in love, and married men all increased with conception risk; the correlations were, respectively,  $r = .40, p < .0001, p_{\text{rep}} > .99$  (effect size  $d = 0.86$ , a large effect in Cohen's, 1988, terms);  $r = .24, p = .02, p_{\text{rep}} = .93$  (effect size  $d = 0.49$ , a medium effect); and  $r = .17, p = .09, p_{\text{rep}} = .83$  (effect size  $d = 0.33$ , a small effect). As predicted, the preference reversal was strongest when the attached man was portrayed as simply having a girlfriend, and weakest when he was portrayed as married. Figure 2 shows the change in preference for single men over men with a girlfriend across the menstrual cycle.

All women with partners felt committed (mean commitment was 4.2 on a scale from 1 to 5) and happy with their relationships (mean relationship quality was 8.1 on a scale from 1 to 10). At the time of measurement, the women had been in their relationships for 21 months on average. Mean commitment, relationship quality, and duration of relationship did not differ significantly between fertile and nonfertile women (all  $t$ s  $< |1|$ ).



**Fig. 2.** Mean preference for single men (relative to men with a girlfriend) as a function of day in the menstrual cycle, for women without (top panel) and with (bottom panel) partners. High-fertility days run from Day 8 to Day 20 (three middle points), with a peak on Days 12 through 15 (corresponding to the central point). Positive values indicate a preference for single men, and negative values indicate a preference for men with a girlfriend. Error bars correspond to 1 *SEM*.

## GENERAL DISCUSSION

We predicted and found that women with a partner are more attracted to attached than to single men when conception risk is low, but that this preference reverses strikingly among fertile women. The critical dependence of the effect on conception risk can explain why the only work that experimentally explored the issue of female preferences for attached men (Uller & Johansson, 2003) found no effect. The research we report here suggests that there may have been at least two separate reasons for the null finding. First, in that study, women interacted with two men who signaled their single or attached status via a wedding ring, but our results show that any preference for attached men is reduced if the men are perceived as married, rather than as temporarily attached. Second, and most important, although the participants' relationship status was controlled, their fertility status was not. If about half the partnered participants were in either the first or last week of their cycles, and the other half in the middle two weeks (as, on the basis of chance alone, was very likely the case), the opposite preferences for single and attached men would have canceled each other out, resulting in a net null effect.

A potential alternative explanation for the positive correlation between conception risk and attraction to single men is that a woman should be especially wary of mating with men who may not economically invest in her children, such as men who are in exclusive relationships with other women. Indeed, females rate increased risk of raising a baby on one's own as one of the most significant costs of "mate poaching" (Davies, Shackelford, & Goetz, 2006). However, this account would predict a correlation only (or mainly) for unpartnered women and not for partnered women, who already have a potentially investing "father" on their side.

Our results suggest that the preference for single men during fertile days occurs only for men whose faces look masculine, supporting our conjecture that such an adjustment may have evolved to increase the chances of securing a high-quality sexual partner. Men offering superior genes do not materialize at will; and when they do, they tend to be already pair-bonded and thus less accessible than men with poorer genes. As the saying goes, the best men are already taken. Those who are still on the market might well have a commitment problem, and caution should be exercised before "purchase." The same

caution, however, does not pay back in a short-term mating context. In other words, partnered women would do well to be suspicious of masculine single men as replacement partners, because there could be a good reason why these men are single; yet maintaining a disinclination for masculine single men when shopping for genes (rather than for a new long-term partner) may prove self-defeating, or at least it would have in humans' evolutionary history.

Scarcity of suitable mates must have been a concrete problem within Pleistocene mating networks, which ranged between 175 and 475 individuals of both sexes, less than half of reproductive age (Wobst, 1974). Even assuming an equal sex ratio (rather than, more realistically, a ratio unbalanced in favor of females), the total number of males ages 20 through 45 in a network of average size would have been about 50, and of course only a small percentage of these would have had high mate value. Thus, our finding of a significant interaction between women's fertility and men's relationship status in partnered women's preferences may be explained by two contingencies. First, in these women, interest for men advertising immunocompetence peaks at ovulation, temporarily replacing interest for men advertising family qualities. Second, immunocompetent men are more available as sexual mates if they are not pair-bonded.

Evolved cognitive adaptations are typically (a) context dependent and (b) stimulus-class dependent. The evolutionary psychology of human mating suggests that the female search for "casual" sex pays dividends (a) only to fertile women with partners and (b) only if the male recipient is chosen with care. In practice, within a short time frame, a suitable sex partner must be singled out, seduced, and lured into a private situation in which consummation can occur. This requires precious and irreversible investment of time and energy into an individual male, who may, at any point of the pursuit, turn out to be uninterested. Ancestral women who, all else being equal, preferred to allocate their time and energy to an unattached man rather than to an attached one would have been more likely than others to succeed, and to transmit such a preference to their daughters.

In humans' evolutionary past, the switch in preference from less to more sexually accessible men associated with each ovulatory episode would have been highly adaptive. Our data are consistent with the idea that, although the length of a woman's reproductive lifetime and the extent of the potential mating network have expanded considerably over

the past 50,000 years, this unconscious strategy guides women's mating choices still.

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