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Variable preferences for sexual dimorphism in height as a strategy for increasing the pool of potential partners in humans

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Human mate preferences are known to be related to a number of morphological traits. Those relating to female waist-to-hip ratio or body mass index and to male height appear to be distinctive mate-choice criteria and are known to be related to reproductive success. In addition to absolute height, a possibly important mate-choice criterion may be relative height, i.e. the extent of sexual dimorphism in stature (SDS = male height/female height) between oneself and a potential partner. Here, I demonstrate that people adjust their preferences for SDS in relation to their own height in order to increase the potential pool of partners. This causes nonlinearity in assortative mating in relation to height and shows that in relation to intrapopulational SDS both men and women are responsible for stabilizing selection.

Keywords: sexual dimorphism in stature; height; preferences; assortative mating; stabilizing selection

1. INTRODUCTION

Human mate preferences are known to be related to the morphological traits of a potential partner (Barber 1995). In addition to facial attractiveness, female waist-to-hip ratio (Singh 1993*a*,*b*; Furnham *et al.* 1997; Henss 2000) and body mass index (Tovée *et al.* 1999) appear to be important mate-choice criteria, which might be related to reproductive success (Zaadstra *et al.* 1993; Wass *et al.* 1997). An often-remarked-upon male morphological trait on the mate market is stature (Lynn & Shurgot 1984; Pierce 1996; Pawłowski & Kozieł 2002). Females prefer taller men who, not surprisingly, also have higher reproductive success (Pawłowski *et al.* 2000; Mueller & Mazur 2001; Nettle 2002*a*). Height, though to a somewhat lesser extent, was also found to be a significant female trait. For instance, female height correlates negatively with the response rate to self-advertising (Pawłowski & Kozieł 2002) and, when excluding the extreme lower end of the height range, with female reproductive success (Nettle 2002*b*).

If on the human mate-market height matters for both sexes, one should expect that a possibly important criterion in choosing a partner might be not only the partner's height itself but also the degree of acceptable sexual dimorphism in stature (SDS = male height/female height) between the subject and his/her partner. Studies on SDS have concentrated mainly on the causes of interpopulation variation in SDS (Alexander *et al.* 1979; Gray & Wolfe 1980; Holden & Mace 1999; Guegan *et al.* 2000) or on assortative mating in height (Spuhler 1982; McManus & Mascie-Taylor 1984). Hitherto, no one (at least to my knowledge) has studied how human SDS preferences may vary in relation to one's own stature and to the mean level of SDS among potential heterosexual partners. The purpose of this study is to see whether a preferred potential partner's height depends on one's own height. Answering this question may allow us to assess how sexual selection acts on SDS within a population, thus shedding new light on the debate between two contrasting perspectives on the determination of human mate preferences: (i) that which posits innate 'hardwiring'; versus (ii) that which posits behavioural plasticity caused mainly by environmental factors. Furthermore, it could explain why assortative mating for height is nonlinear and answer the question (asked by McManus & Mascie-Taylor 1984) of which of the sexes is in fact responsible for this selection process. An evolutionary reason for a psychological mechanism leading to preferences for some specific difference in height between partners will be suggested.

2. MATERIAL AND METHODS

Subjects completed an anonymous questionnaire, which included both personal questions and frontal-view outlines of six male–female pairs with different degrees of SDS (A = 1.19, B = 1.14, C = 1.09, D = 1.04, E = 1.0, F = 0.96; see figure 1). They then self-reported their age and height and were asked to indicate which of the six pairs was the one in which they would like to be one of the partners. All subjects (363 women (age range of 19–50 years) and 161 men (age range of 19–49 years)) who took part were either full- or part-time students at one of the two universities in Wrocław (either the main University or the Technical University), Poland. Questionnaires were distributed and collected at the end of student classes. The first group was studied in November 2001 and the last in April 2002. Only heterosexual subjects who revealed their age and height were included in the analyses. Although measured stature would be better than self-reported stature, a few studies have shown that the latter proves to be a very good approximation of real height. Self-reported statures are highly correlated with measured statures (correlation coefficient r has values of 0.84–0.97) (Himes & Roche 1982). In addition, this correlation is very high (*ca.* 0.9) for people younger than 50 years and older than 15 years (Himes & Faricy 2001) usually with only a small but systematic error, which therefore does not affect the comparative analysis (Palta *et al.* 1982).

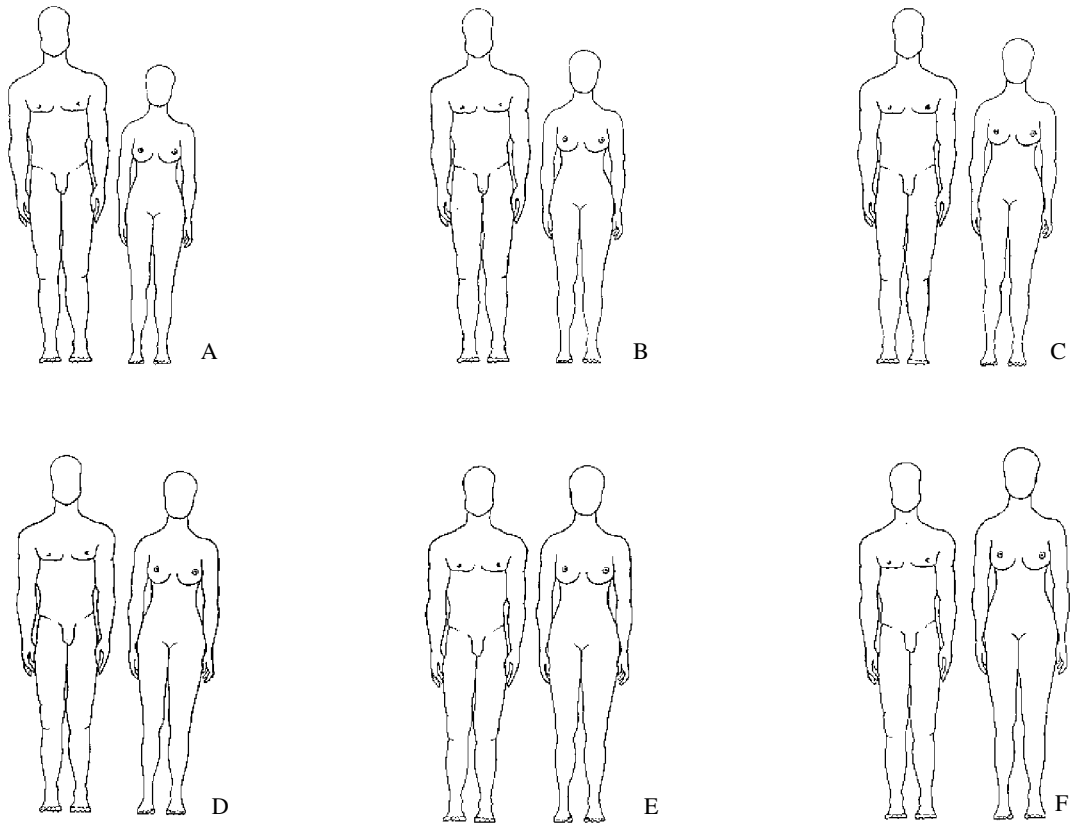

Figure 1. Six pairs of human outlines with different levels of sexual dimorphism in size (A = 1.19, B = 1.14, C = 1.09, D = 1.04, E = 1.0, F = 0.96).

The levels of SDS in the presented pairs were chosen on the basis of the range of mean SDS (1.04–1.10) in different human populations (Alexander *et al.* 1979). However, for European societies with socially imposed monogamy SDS is between 1.07 and 1.10 (Alexander *et al.* 1979; Guegan *et al.* 2000). The mean SDS for the Polish population is between 1.08 and 1.09 (Guegan *et al.* 2000), which appears to be the same as the mean SDS for the studied sample (1.081). The pair 'C' in figure 1 represents the mean SDS in the Polish population, while 'A' and 'B' represent SDS higher than the mean, and 'D'–'F' represent SDS lower than the mean. We used relatively large increments (0.04–0.05) between consecutive pairs to ensure easy detection of differences in consecutive SDS and to avoid too many random choices. Only eight men (out of 161) and only six women (out of 363) indicated at least two pairs (but no more than four pairs) in which they would like to be one of the partners. In such cases, their first preference was chosen as the most preferred choice.

To check whether choices of SDS differ in relation to the subject's height, ANOVA analyses were run separately for both sexes. All analyses were carried out using STATISTICA 5.5 A PL (StatSoft 2000).

3. RESULTS

The mean age and height for the studied subjects were, respectively, 25.1 years (s.d. = 6.9 years) and 166.5 cm (s.d. = 5.9 cm) for women, and 24.9 years (s.d. = 5.9 years) and 180.0 cm (s.d. = 6.2 cm) for men (similar to the data collected in 1998 by Krzyżanowska (2002) for male students from Wrocław: mean of 180.5 cm). The ranges for height were within three standard deviations of the mean for both women (150–182 cm) and men (164–198 cm). This assured me that in further analysis there was no bias resulting from any abnormal height, e.g. related to pathological effects.

None of the men chose the 'F' pair, six men (3.7%) chose 'E', 56 men (34.8%) chose 'D', 61 (37.9%) chose 'C', 22 (13.7%) chose 'B', 11 (6.8%) chose 'A' and for five men (3.1%) there was no difference between the pairs, they accepted all possibilities equally. None of the 363 women who revealed their age and height chose the 'F' pair, nine women (2.5%) chose 'E', 79 women (21.8%) chose 'D', 160 (44.1%) chose 'C', 87 (24.0%) chose 'B', 21 (5.8%) chose 'A' and for six women (1.7%) there was no difference. In one case, the answer was 'I do not know'.

The analyses for males and females were run without the data for subjects who had made no choice, i.e. were indiscriminate in relation to the six presented pairs. The subjects tended to choose their preferred pair, i.e. the one in which they would most like to be one of the partners, in relation to their own height, this being true for both females (ANOVA $F_{4,351} = 15.28$; $p < 0.0001$) and males (ANOVA $F_{4,151} = 3.75$; $p < 0.01$) (figure 2). The mean heights for those who chose the pair representing the mean SDS in the population (180.4 cm for men and 167 cm for women) were almost equal to the mean heights for the two sexes in the studied group.

4. DISCUSSION

The results indicate that both males and females adjust their preferences for the difference in height between part-

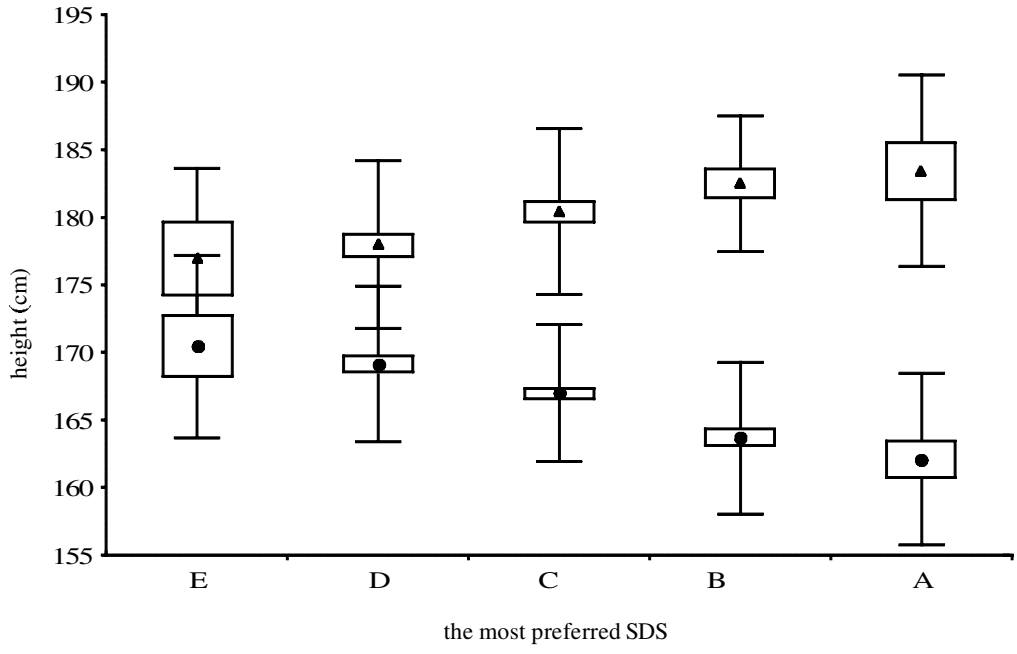

Figure 2. Mean heights of men and women who preferred to be a partner in each of the five pairs with different SDS. Circles, mean for women; triangles, mean for men; rectangles, mean ± s.e.; vertical bars, s.d.

ners to reflect their own physique. This means that there is no 'blind' and therefore evolutionarily 'hardwired' preference for being in a sexual relationship in which SDS is species or group specific. There would be few advantages to such an adaptation. First, where somebody is relatively tall or short, preferring the mean SDS would mean having potentially fewer partners to choose from. For instance, if a man of height 190 cm wanted to be in partnership with a woman so as to meet the mean population SDS (1.08), he would have to prefer women of height *ca*. 176 cm. As the population mean height for women is less than 167 cm, such a preference would mean that he would have a rather restricted pool of potential partners. Thus, tall men and short women should prefer a higher difference in height between partners, whereas short men and tall women should prefer a lower SDS. This allows them all to increase the pool of potential partners and therefore their chances on the mate market. Second, relatively taller men (Pawłowski *et al.* 2000; Nettle 2002*a*), and relatively shorter women (Nettle 2002*b*) have higher reproductive success, and thus both sexes, irrespective of their own size, should aim for this characteristic in the opposite sex rather than the group-specific SDS. Third, considering that an offspring's adult height correlates with mid-parental height (Tanner *et al.* 1970; Susanne 1975; Luo *et al.* 1998), such a strategy would also optimize the chances for both their male and their female offspring in the future mate market. Short height in sons and tall height in daughters are handicaps on the mate market (Pawłowski & Kozieł 2002). One might reasonably expect that tall women should prefer relatively short men and short men should prefer relatively taller women (e.g. the 'F' pair). However, this was not the case—no subject chose the 'F' pair, in which the female is slightly taller than the male.

I postulate the presence of a psychological mechanism for SDS preference that tries to strike a balance between: (i) increasing one's chances of getting a partner by preferring members of the opposite sex whose height comes closest to the population mean for that sex; and (ii) finding a partner whose difference in stature from oneself approximates to the mean population SDS. This can be confirmed by the fact that the 'C' pair had the highest hit rate, and by the relatively low differences in the mean heights of subjects in relation to the chosen SDS. For instance, if the females that chose 'B' (SDS = 1.14) did so only on the basis of the maximal increase of the potential pool of partners, in a population in which the mean height of men is 180 cm one should expect the mean height of such women to be *ca*. 158 cm (180/158 = 1.14), but it was 163.7 cm.

The mechanism proposed here would lead to stabilizing selection on intrapopulation SDS and would explain why assortative mating for height is nonlinear at the extremes of height (McManus & Mascie-Taylor 1984). In addition, these results indicate that both sexes are responsible for the selection process, which answers the question first raised by McManus and Mascie-Taylor nearly two decades ago.

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