Variable preferences for sexual dimorphism in stature (SDS): Further evidence for an adjustment in relation to own height

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In contemporary Western populations, some physical characteristics are sexually dimorphic, and it is known that these traits also affect human mate preferences. Height is one such characteristic, and evidence suggests that females prefer taller over shorter males, indeed taller males have been found to have greater reproductive success. However, relative height is also important with 'Sexual Dimorphism in Stature' (SDS) calculated as male height / female height. Pawlowski (2003) showed that people adjust their preferences for SDS in relation to their own height in order to increase their potential pool of partners. The aim of the present study was to replicate Pawlowski's study on a larger pool of participants, and to investigate the universality of the reported preference adjustment within European societies. We present data of 1102 men and women of three countries (Austria, Germany, and the UK) that confirm Pawlowski's original data on a Polish sample. Moreover, the mechanisms of an adjustment of SDS preferences in relation to own height was found in all three countries, suggesting that height dependent partner preference is a genuine feature in Western societies.

Keywords: Sexual Dimorphism; Height; Mate Preference; Humans

1. INTRODUCTION

Numerous studies have shown that mate choice in humans is associated with universal cues (e.g. Buss, 1989; Buss & Barnes, 1986; Buss & Schmitt, 1993). Certain facial and physical characteristics seem to act as honest indicators of health and fertility (see for review Grammer, Fink, Møller, Thornhill, 2003; Rhodes 2006), and it is thought that both sexes have developed some adaptive preferences for such traits in order to maximise their reproductive success (Gangestad & Simpson, 2000). Males can maximise their reproductive success by pursuing youthful, fertile females, while females can maximise their reproductive success by preferring socially dominant, high-status males with access to vital resources (Pawlowski, 2000).

However, this apparent universality of mate preferences can be misleading, as the majority of studies have been conducted within industrialised Western populations. Studies addressing mate preferences in other ethnic groups have indeed begun to demonstrate that such preferences may be context-sensitive, reflecting local environmental conditions (e.g. Sugiyama, 2004). The female preference for tall males was also assumed to be a universal cue, perhaps reflecting perceived status and dominance (Weisfeld & Weisfeld, 2002). Tall men are assumed to be of higher status; and indeed it has been noted that taller political candidates have an advantage over their smaller adversaries (Kassarjian, 1963). Thus, studies of mating preferences have revealed that male stature is a key predictor of female responses to male targets (e.g. Fan, Dai, Liu, & Wu, 2005; Lynn & Shurgot, 1984; Pierce, 1996), though not all show that taller men are the most preferred (Graziano, Brothen, & Berscheid, 1978). Shepperd and Strathman (1989) reported that females expressed a preference for dating males taller than themselves and dating them more frequently, but they did not rate them as more attractive. Shorter females in contrast were preferred more as dates, were dated more frequently, and were also rated as being more attractive than taller females.

However, these subjectively stated preferences do not always provide an accurate picture of actual mate choice or reproductive success. In a sample of over 3000 males, Pawlowski, Dunbar & Lipowicz (2000) found that taller men had greater reproductive success (i.e. they were significantly more likely to have at least one biological child) than shorter males. Kirchengast (2000) examined similar associations in male and female members of a !Kung San population. A significant relation between fertility patterns and body dimensions was found, though these patterns differed between the sexes. In males, tallness was associated with a higher number of surviving children, whereas smaller females had more offspring.

It is well established that humans engage in assortative mating strategies, i.e. individuals select other individuals who share physical, behavioural, social, and psychological similarities (e.g. Botwin, Buss, & Shackelford, 1997; Spuhler, 1982). It is thus perhaps not surprising that women do not focus on absolute height differences between themselves and a potential male partner, but rather the relative height differences between them (Silventoinen, Kaprio, Lahelma, Viken & Rose, 2003). Pawlowski (2003) reasoned that if height matters to both sexes, then the degree of acceptable height difference might be important. He calculated 'Sexual Dimorphism of Stature' (SDS); a ratio score calculated as male height divided by female height. The potential role of SDS in mate preferences was then assessed by providing participants with six male-female pairs (silhouettes) differing in SDS ratio (1.19, 1.14, 1.09, 1.04, 1.0, and 0.96) in a Polish sample. Participants were asked to provide their own height, and then asked to indicate which of the six pairs was the one in which they would like to be one of the partners. Males were more likely to select figures with a ratio of 1.09 or 1.04 (i.e. the male being moderately taller than the female). Females showed close agreement, but also tended to select the figure of SDS = 1.14, where the male was taller

again. In addition, both males and females adjusted their height preferences to reflect their own physique, in this way individuals maximise their pool of potential mating partners.

In this study we set out (i) to replicate Pawlowski's (2003) study by using a larger pool of participants, and (ii) to investigate whether the effect of an adjustment of SDS preferences in relation to own body height can be found in different European countries. If these assumptions were true, it would suggest that height dependent partner preference is a universal trait in humans, at least in Western societies.

2. METHOD

2.1 Participants

Our sample comprised a total of 1191 participants, aged 15 to 84 years (M = 26.11, SD = 9.00) recruited from the populations in Goettingen (Germany, n = 616), Vienna (Austria, n = 336), Preston (UK, n = 139), and Newcastle upon Tyne (UK, n = 100). All were volunteers who were recruited to answer a series of questions concerning mate preferences. Participants who reported bi- (n = 33) or homosexual orientation (n = 20), or those who did not indicate their sexual orientation (n = 6) were excluded from the statistical analysis (see Bogaert, 1997, on height and sexual orientation in women), as were those who returned incomplete questionnaires (age missing, n = 1; body height missing, n = 13; SDS preference missing, n = 16). Thus, our final sample included 1102 heterosexual participants (456 men, 646 women) of three countries (Germany: 286 men, 310 women; Austria: 119 men, 184 women; UK: 51 men, 152 women), with a mean age of 26.34 years (SD = 9.11).

2.2 Materials

Participants were requested to provide the following information: sex (male/female), age (in years), sexual orientation (hetero-/bi-/homosexual), and body height (in cm; see Himes & Roche, 1982 on the reliability of self-reported height). In addition, participants were

asked to indicate their SDS preferences (i.e. "*What figure represents the one where they would most like to be a member of the romantic partnership*.") using frontal-view outlines of six male–female pairs with different degrees of SDS and, if they were in a close relationship, the SDS figure that corresponded to their actual sexual dimorphism in height (see Figure 1). These figures and levels of SDS were chosen according to Pawlowski (2003), who reported a mean SDS of 1.08 for the Polish population, as the German mean SDS was found quite similar with 1.07 (range 0.80 – 1.20, *SD* = 0.07) in a sample of 324 married couples.

3. RESULTS

The range of self-reported body height in men of all three countries (n = 1102) was 155–205 cm with a mean of 181.08 (SD = 7.90) and in women 147–192 cm with a mean of 167.40 (SD = 6.82). Descriptive statistics of body height and age of men and women from each country are reported in Table 1. A one-way ANOVA with body height as the dependent variable, and country and sex of participant as factors revealed a significant main effect of country ($F_{2,1102} = 9.05$, $p < .001$) and sex ($F_{1,1102} = 691.25$, $p < .0001$) but no country * sex interaction. Pair-wise comparisons showed that German men and women were significantly taller compared to same sex conspecifics from Austria and the UK (Germany–Austria, $p < .01$, Germany–UK, $p < .05$), but no significant differences in height were found between Austria and the UK. Males were, on average, taller than women in all three countries ($p < .001$).

Significant age differences between the countries were found with participants from Austria being oldest, followed by the German and UK participants (one-way ANOVA, $F_{2,1102} = 48.10$, $p < .001$; see Table 1). There was, however, no sex difference with regard to age, and also no country * sex interaction.

Table 2 reports percentages of SDS figures chosen by men and women in the three countries, respectively. In all three countries, women more frequently reported a preference for being a member of the romantic partnership with figures where the man was taller. A chi-square test revealed sex differences in these preferences in Germany for the pairs 'B' to 'E' (chi-square = 21.68, d*f* = 5, $p < .001$) such that men less often and women more often than expected chose pair 'B' and pair 'C'; for pairs 'D' and 'E', men more often and women less often gave their preference compared to expectation. Similar sex differences in reported SDS preferences were obtained for figures B and D in Austria (chi-square = 18.57, d*f* = 5, $p < .01$), but were found not to be significant in the UK (chi-square = 8.55, d*f* = 5, $p = .128$). No significant sex differences were found in preferences for pairs A and F in either country.

To check whether choices of SDS differed according to the participants' height, ANOVA analyses were run separately for males and females with the samples of each country, respectively. We did not include those participants in the analysis who reported a preference for pair 'F' (n =11) in order to make the results more readily comparable to those reported by Pawlowski (2003) and to overcome the statistical bias because of the very few preferences for this pair. However, it should be noted that similar results were found when the participants who reported a preference for 'F' were included.

A series of ANOVAs (conducted with body height as dependent variable and SDS preference as factor) to test whether participants in each of the three countries tended to choose their preferred pair, i.e. that represents the one where they would most like to be a member of the romantic partnership, in relation to their own body height. The adjustment of preferences in relation to own height was found to be significant in all three countries, this being true for both, males and females (Germany: men $F_{4,280} = 9.98$, $p < .001$; women $F_{4,304} = 8.62$, $p < .001$; Austria: men $F_{4,113} = 2.50$, $p < .05$; women $F_{4,178} = 11.20$, $p < .001$; UK: men $F_{4,46} = 4.90$, $p < .01$; women $F_{4,140} = 3.99$, $p < .01$) (Fig. 1). Similar results were obtained with

reports of SDS of actual partners as dependent variables, with the exception of British males, which showed no significant effect ($F_{4,25} = .681$, $p = .611$).

A one-way ANOVA with age as the dependent variable and preferred SDS as factor did not reveal significant differences (all $p > .05$) with the exception of those in German women ($F_{4,304} = 7.36$, $p < .001$). However, although the majority of our participants were college students, SDS preferences of older participants could have been quite different. We therefore recalculated the ANOVA models with body height as the dependent variable and SDS preference as a factor, now including the participant's age as a covariate. Height dependent preferences for SDS were found to be significant throughout, this being true for men and women of all three countries. Age was found to be a significant covariate with regard to preferred SDS in Austrian women ($F_{1,177} = 7.38$, $p < .01$) and German men ($F_{1,177} = 12.53$, $p < .01$).

4. DISCUSSION

The present data confirms the results obtained by Pawlowski (2003) with self-reported height, and those obtained on women using measured height (Pawlowski & Jasienska, 2005), i.e. both males and females adjusted their height preferences to reflect their own physique. Moreover, this mechanism seems to be present across countries (at least within Europe), and has been reported now on population samples from four countries (Austria, Germany, Poland, and the UK). It is therefore likely that the preference adjustment in relation to own height, as originally reported, is a genuine effect in Western societies.

Although age covaried with preference for SDS in two of the six analyses conducted, this may reflect the varied age of each sample; Austrian participants were on average the eldest, followed by German and British participants. The research investigated relative rather than absolute height; therefore age could only influence SDS preference if the average height

of one sex increased at a faster rate than the average height of the other sex. We know of no evidence of this and conclude that without further support, the relationship between SDS preference and age reflects the composition of each sample only.

The obtained relationship seems reasonable from an evolutionary point of view and, as Pawlowski (2003) claimed, might be due to the ambition to increase the pool of potential partners. Choosing the most frequent height phenotype in the population and/or to assure higher chances for reproductive success of the children, in view of the association between height and reproductive success (Pawlowski et al., 2000), are plausible biological explanations. However, on the basis of the present data we are not yet able to prove or disprove such associations. Aside from an evolutionary mechanism, it is also possible that women's preferences for high SDS are shaped by some traditional gender roles (see Pierce, 1996). In this view women's preferences for tall men arise from the fact that tallness is usually associated with attributes such as dominance and assertiveness (Melamed, 1992), and such characteristics facilitate access to resources (and therefore indicate status).

Future research could investigate the extent to which these height preferences are influenced by relationship type. For example, men report a preference for physically attractive women as both short and long-term partners (Buss & Barnes, 1986). However, the importance of physical attractiveness may vary according to the type of relationship sought and degree of commitment involved (Buss & Schmitt, 1993). Thus although own body height may influence the height of an ideal partner, the extent to which this influences mating behaviour may be constrained by a number of variables.

Our results also confirm that there is only a very small percentage of the population that prefers to be in the relationship in which the woman is taller than the man (pair 'F'). This is in accord with the report of Gillis and Avis (1980) who studied the male-taller norm in 720

couples and found that the chance of a women being taller than a men was lower (1:720) than expected by probability theory (2:100).

There is considerable evidence that height, particularly in men, is important with regard to the likeability of dating (Cawley, Joyner & Sobal, 2006), the outcomes of social interaction such as approaching partners (Cawley et al., 2006; Sunder, 2005) and marriage (Gray & Wolfe, 1992), the labour market (Harper, 2000), and also reproductive success (Pawlowski et al., 2000). It is therefore likely that there is some kernel of truth with the supposition of a biological basis of height preferences. Body height is probably one of the most obvious physical traits in this regard. It can hardly be faked and is therefore a very simple but also reliable selection criterion. However, tallness is not favourable without limitations, and there is an ongoing discussion whether the extremes in children for example are a cause of concern or not (Sandberg, Bukowski, Fung, Noll, 2004). In males, tallness seems to be strongly associated with the risk of germ cell cancer (Dieckmann & Pichlmeier, 2002), and tall females are more likely to develop breast cancer, probably because of high concentrations of insulin-like growth factors (Hilakivi-Clarke, Forsen, Eriksson, Luoto & Tuomilehto, et al. 2001). One possible explanation of the increased risks of developing cancer in tall men and women is some stabilizing selection on the 'extremes' (see also Nettle, 2002), which could explain the fact that assortative mating for height is nonlinear at the extremes (McManus & Mascie-Taylor, 1984). In consequence, there would be some adaptation of preferences required towards the population mean, which is probably reflected in the much higher numbers of preferences of SDS pairs (C to E) where the male is just slightly taller than the female.

Finally, we recognise that our data only reflects stated mate preferences within industrialized European countries. Studies conducted on other ethnic groups have revealed that height may not be associated with reproductive success in the same manner as in

Western populations (e.g. Kirchengast & Winkler, 1995; Sear, 2006), the environmental context perhaps playing a key role. In conclusion, our results support the hypothesis that in evolution a flexible set of conditional mate preferences emerges, rather than a fixed set of mate selection criteria (Sugiyama, 2005), and this applies also to body height. Further studies addressing SDS preferences in a much wider sample of populations (especially using non-Western, and rural samples) are required to confirm this.

ACKNOWLEDGEMENT

Preparation of this article was supported, in part, by Grant 10960 of the Austrian National Bank awarded to Bernhard Fink. Two anonymous referees provided valuable comments on an earlier version of the manuscript.

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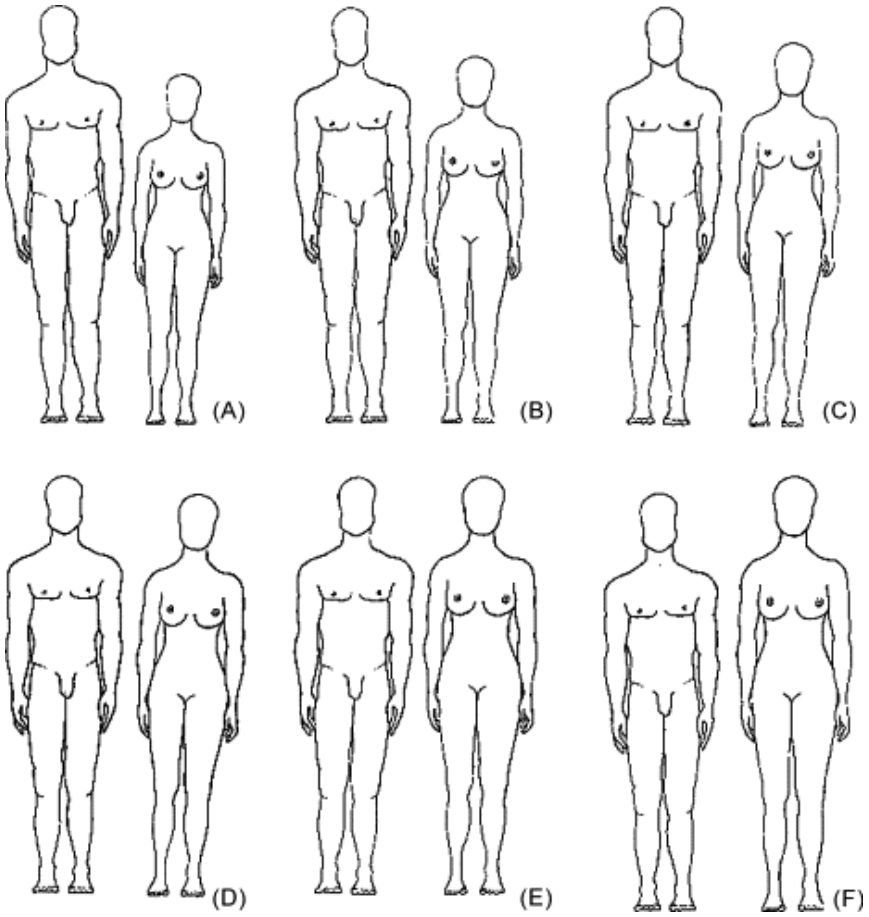

Figure 1. Six pairs of human outlines with different levels of sexual dimorphism in stature (SDS). A = 1.19, B = 1.14, C = 1.09, D = 1.04, E = 1.00, F = 0.96.

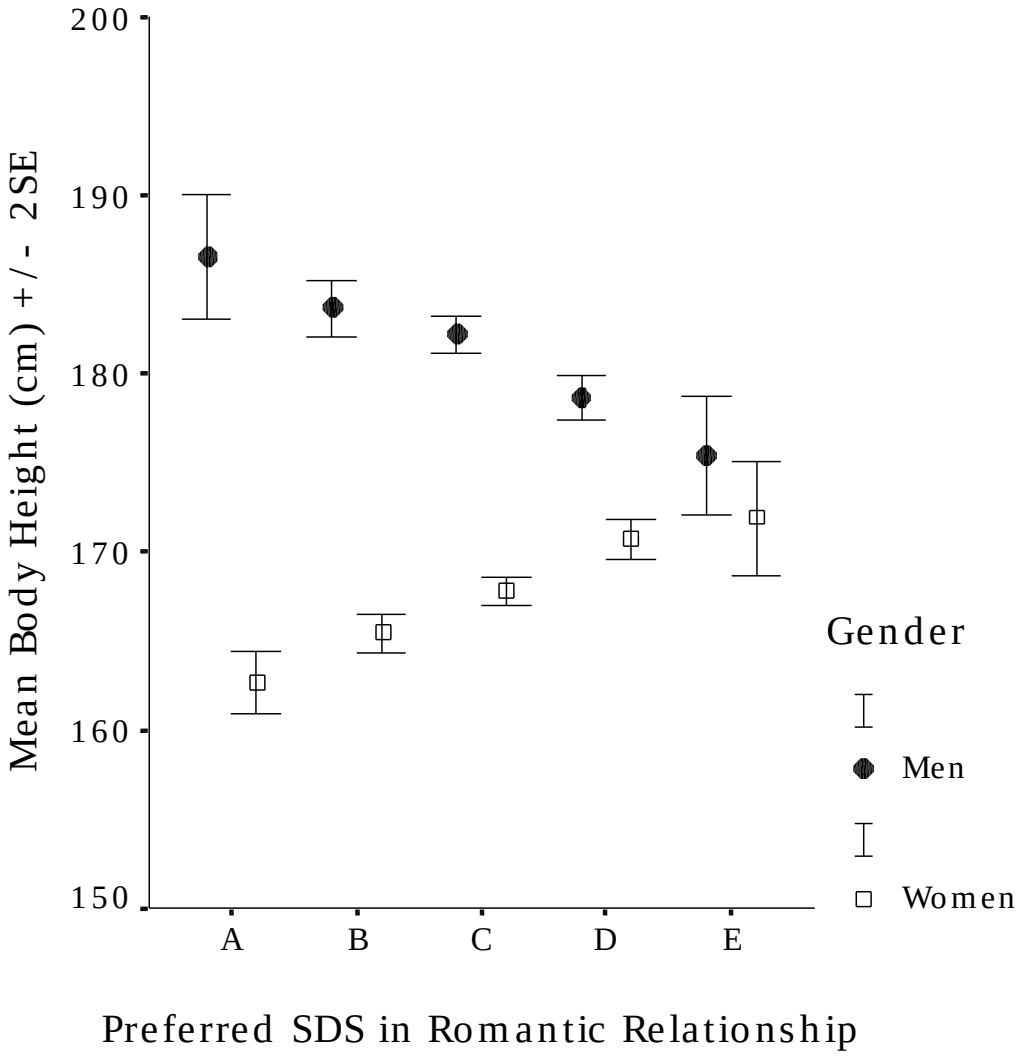

Figure 2. Mean heights (+/- 2 SE) of men and women who preferred to be a partner in each of the five pairs with different SDS (N = 1091).