

## **Masculine Somatotype and Hirsuteness as Determinants of Sexual Attractiveness to Women**

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*Received November 21, 2001; revisions received August 23, 2002, and October 1, 2002; accepted October 1, 2002*

Five questionnaire studies asked women to rate the attractiveness of outline drawings of male figures that varied in somatotype, body proportions, symmetry, and in distribution of trunk hair. In Study 1, back-posed figures of mesomorphic (muscular) somatotypes were rated as most attractive, followed by average, ectomorphic (slim), and endomorphic (heavily built) figures by both British and Sri Lankan women. In Study 2, computer morphing of somatotypes to produce an intergraded series resulted in a graded response in terms of perceived attractiveness which mirrored the findings of Study 1. In Study 3, back-posed figures were manipulated in order to change waist-to-hip ratios (WHR) and waist-to-shoulder ratios (WSR). A WHR of 0.8–0.9 and a WSR of 0.6 were rated as most attractive and these effects were more pronounced when modeling mesomorphic figures. In Study 4, symmetric figures of a mesomorphic somatotype were rated as less attractive than a normal (asymmetric) version of the same man. Study 5 showed that presence of trunk hair had a marked, positive effect upon women's ratings of attractiveness for both mesomorphic and endomorphic male figures. Women also judged figures with trunk hair as being older and they consistently rated endomorphic figures as being older than mesomorphs. These results are consistent with effects of sexual selection upon visual signals that advertise health, physical prowess, age, and underlying endocrine condition in the human male.

**KEY WORDS:** somatotype; human male; sexual attractiveness; sexual selection; evolution.

### **INTRODUCTION**

There are numerous physical differences between men and women, some of which may result from effects of sexual selection for traits which improve attractiveness to the opposite sex and which enhance reproductive success. A number of studies have focused upon feminine traits, such as the waist-to-hip ratio (Singh & Young,

1995). A low waist-to-hip ratio (0.7) and a curvaceous shape may be preferred because it provides a signal of optimal fat distribution and reproductive health. However, there is evidence that weight scaled for height (the body mass index) is also a determinant of sexual attractiveness in women (Tovée, Maisey, Emery, & Cornelissen, 1999). Facial cues that influence sexual attractiveness, and effects of sexual dimorphism (Perret et al., 1998) and fluctuating asymmetry (Penton-Voak et al., 2001) upon facial attractiveness in human beings, have also been studied. However, much remains to be learned about the physical traits that affect masculine sexual attractiveness and how such traits may differ between cultures. For example, tall men have greater reproductive success (Mueller & Mazur, 2001; Pawlowski, Dunbar, & Lipowicz, 2000), a deep voice is rated as more attractive by some women (Collins, 2000), as is a muscular torso with a broad chest and narrow waist (Lynch & Zellner, 1999; Maisey, Vale, Cornelissen,

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& Tovée, 1999; Mealey, 1997; Schultze, Knussmann, & Christiansen, 1991).

The current study was undertaken in order to investigate in greater depth whether overall masculine physique (somatotype) (Sheldon & Tucker, 1940), bodily symmetry, or hirsuteness might have consistent effects upon men's attractiveness to women. These questions were explored by asking women to rate the attractiveness of outline drawings of male figures that varied in somatotype, bodily proportions, symmetry, and hirsuteness. Possible cross-cultural differences in women's assessments of masculine physique and attractiveness were also examined by collecting data in England and Sri Lanka.

## METHOD

### Stimuli

Outline drawings were made from photographs in Sheldon and Tucker (1940) and Sheldon, Dupertuis, and McDermott (1954) showing back-posed and front-posed men (aged 21 years) that differed in physique. All figures were the same height, were posed in the same way, and their faces were obscured to avoid judgements based upon facial differences. In five studies, women were asked to rate outline drawings of the male figures, which varied in somatotype, body proportions, symmetry, and in distribution of body hair. Women rated each drawing for attractiveness using a 6-point scale (where 0 = unattractive, 1 = slightly attractive, 2 = mildly attractive, 3 = moderately attractive, 4 = very attractive, and 5 = extremely attractive). Simple questionnaires, showing male figures along with a checkbox scoring scheme, allowed respondents to express how attractive they found each physique. In all cases, questionnaires were given out by hand and respondents were instructed not to confer or dwell on their responses.

Respondents were asked to provide details of their age (whether under 20 years, 21–30 years, 31–40 years, 41–50 years, or over 50 years of age); however, no other demographic details were recorded. A total of 685 women participated in the studies below. The majority of respondents were university students and most (59.9%) were aged between 21 and 30 years of age, with 25.5% being under 20 years old, 4.2% 31–40, 7.2% 40–50, and 3.2% over 50 years.

Study 1 examined women's preferences for four back-posed male figures differing in somatotype, (endomorph, ectomorph, mesomorph, and average). This study also examined possible cross-cultural differences in female preferences. A total of 162 British women and 113 Sri Lankan women participated. In Sri Lanka, ques-

tionnaires were provided in Sinhala and Tamil as well as English. The respondents in Britain were primarily members of the University of Cambridge. Sri Lankan questionnaires were also primarily issued to students at Peradeniya University and Colombo University.

Study 2 examined 190 British women's ratings of attractiveness for back-posed male figures in which somatotypes had been morphed using a computer program. The nine figures intergraded between endomorphic and mesomorphic and then ectomorphic along a continuum in which each adjacent figure varied by 25% from its neighbor. The nine figures were arranged randomly on the questionnaire. During the morphing process, some changes in head shape occurred but these were removed so that each figure had exactly the same head.

In Study 3, endomorphic and mesomorphic back-posed male figures were manipulated in order to change waist-to-hip ratios (WHR) or waist-to-shoulder ratios (WSR). British women ( $n = 333$ ) were asked to rate the attractiveness of figures that varied in WHR from 0.7 to 1.0 or in WSR from 0.5 to 0.85.

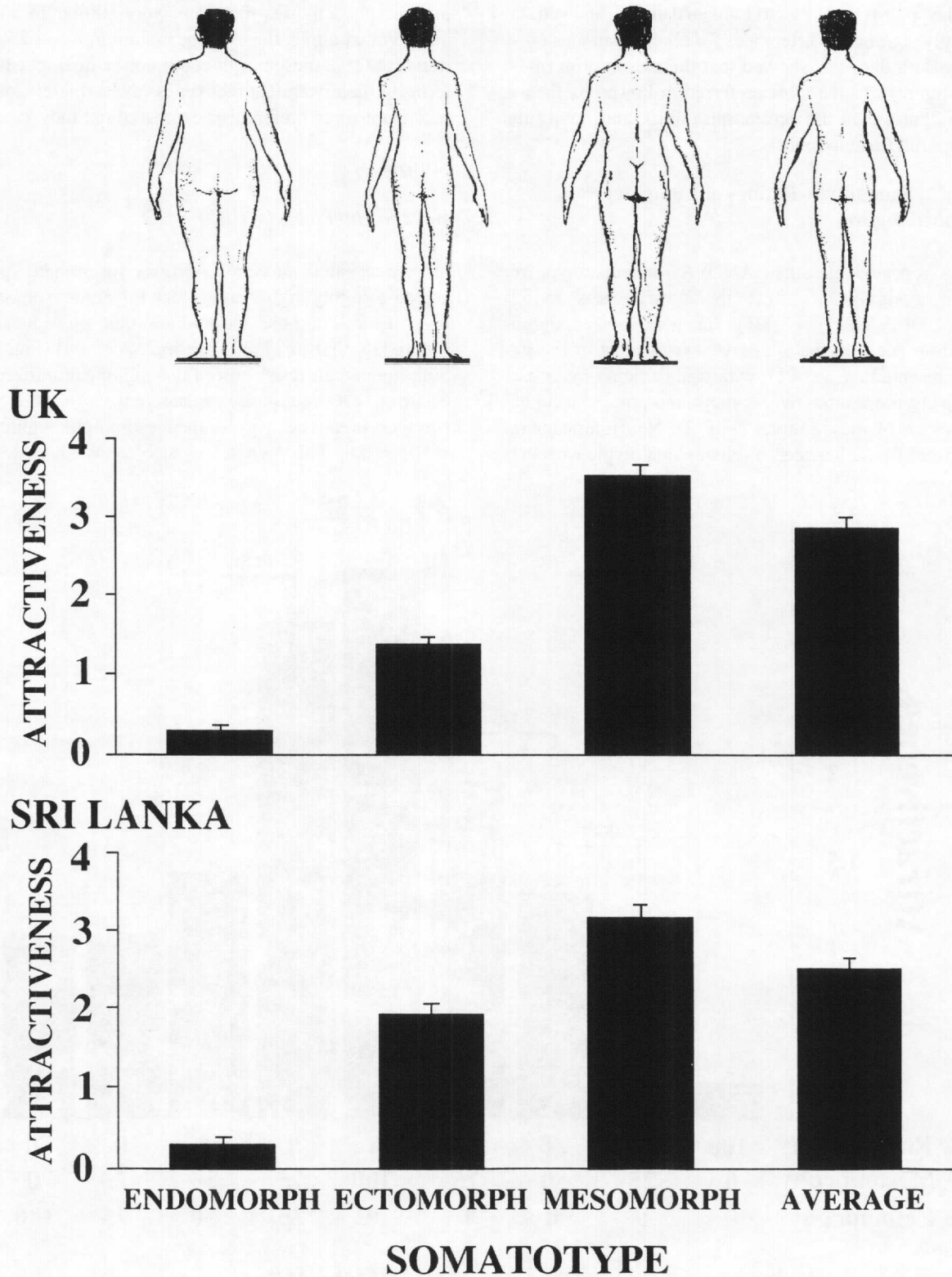
In Study 4, we asked 277 women in Cambridge to rate three back-posed mesomorphic figures for attractiveness (an asymmetric, normal figure, a 100% symmetrical figure consisting of a mirrored image of the left side of the body, and a right–right 100% symmetrical mirrored image).

In Study 5, outline drawings of front-posed endomorphic and mesomorphic male figures were made from photographs. Four images were then produced showing the somatotypes with and without hair on the chest and abdomen. The amount of hair was controlled for so that the endomorph and mesomorph possessed equal amounts. Respondents ( $n = 277$ ) were asked to score each figure's attractiveness. In addition, each participant was required to judge whether they thought the figures differed in age. If a difference was perceived, the respondent was subsequently asked to rank the four figures in terms of their perceived age from youngest to oldest. The actual age of the male figures was controlled for by using drawings made from photographs of 21-year-old men only (Sheldon et al., 1954).

## RESULTS

### Study 1: Somatotype Ratings – United Kingdom and Sri Lanka

A 2 (Culture)  $\times$  4 (Somatotype) analysis of variance (ANOVA) revealed a main effect for Somatotype ( $F[3, 275] = 183.1, p < .001$ ). For the United Kingdom sample, post hoc pair tests showed statistically significant differences for all comparisons,  $p < .001$  (Fig. 1).



**Fig. 1.** Women's mean ratings (+SEM) for sexual attractiveness of outline drawings of male figures of four different somatotypes (endomorph, ectomorph, mesomorph, and average body build). For each sample, all paired comparisons are statistically significant ( $p < .001$ ).

Post-hoc pair-tests of the Sri Lankan data also showed statistically significant differences for all comparisons ( $p < .001$ ). Both data sets showed that the mesomorph (muscular figure) was the most preferred, followed by the average figure, then the ectomorph (slim), and finally the endomorph (heavily built).

### Study 2: Somatotype Ratings of Computer Morphed Figures

A repeated measures ANOVA for somatotype revealed a significant effect for attractiveness ratings ( $F[8, 190] = 82.7, p < .001$ ). Pair tests showed significant differences in the attractiveness of most of the figures presented ( $p < .001$ ), with figures being rated progressively more attractive as they incorporated a higher percentage of mesomorphy (Fig. 2). Nonsignificant results were found between original somatotypic extremes

and morphed figures that were very similar in appearance. For example, the extreme endomorph and 75% endomorph/25% mesomorph could not be distinguished in terms of their overall attractiveness. Nevertheless, overall results mirrored preferences expressed in Study 1.

### Study 3

#### Waist-to-Hip Ratios (WHR)

A repeated measures ANOVA for somatotype revealed a highly significant effect for attractiveness ratings in mesomorphic and endomorphic physiques, that differed in WHR,  $F(7, 333) = 46.2, p < .001$  (Fig. 3(a)). Subsequent pair tests showed that significant differences occurred between most somatotypes ( $p < .001$ ). The strongest preference was for the mesomorphic figure with  $WHR = 0.8$ , with high scores also for  $WHR = 0.9$  and

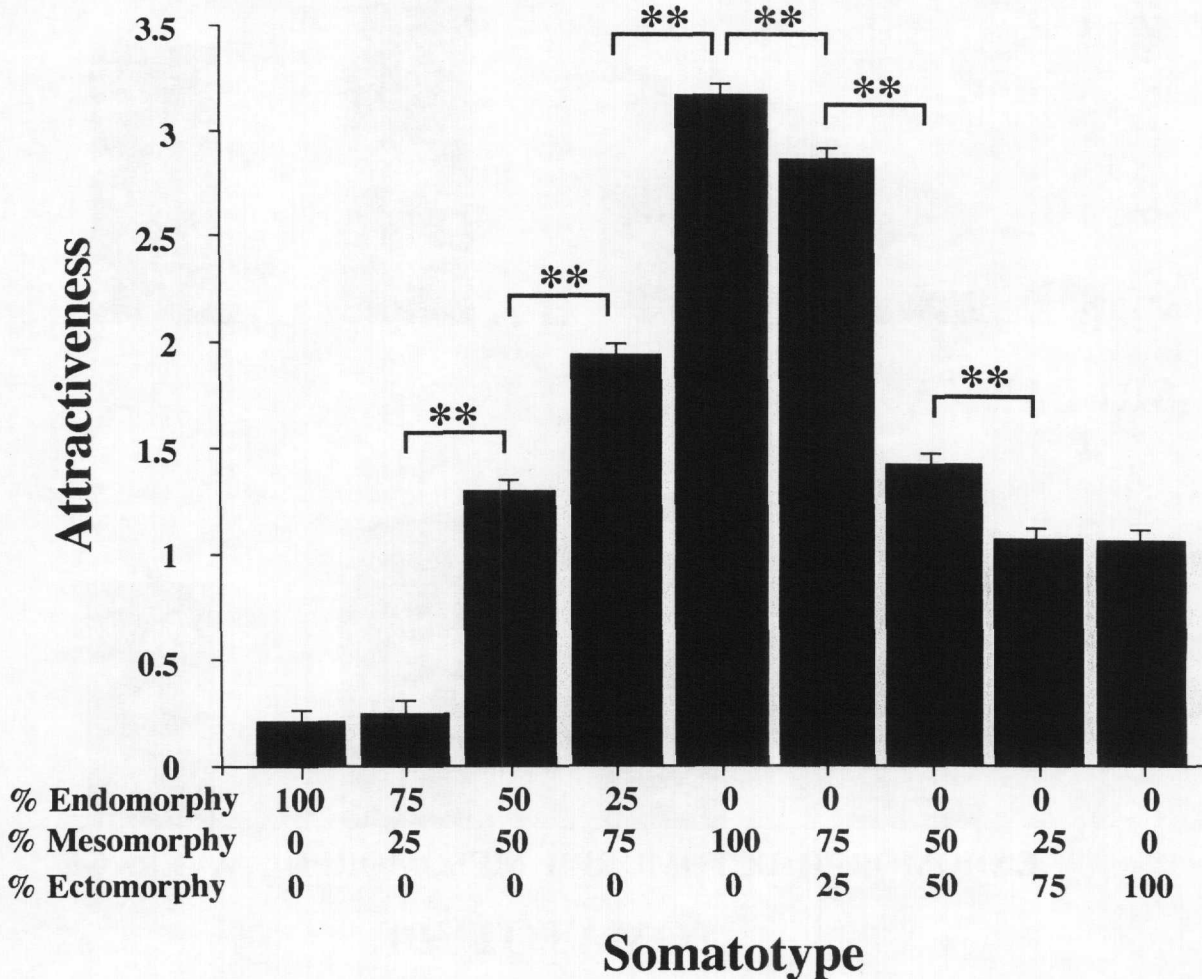


Fig. 2. Women's ratings for sexual attractiveness of computer-generated outline drawings of male figures that combine varying degrees of endomorphy, mesomorphy, and ectomorphy. Data are mean (+SEM) scores for 190 British women (\*\*  $p < .001$ ).

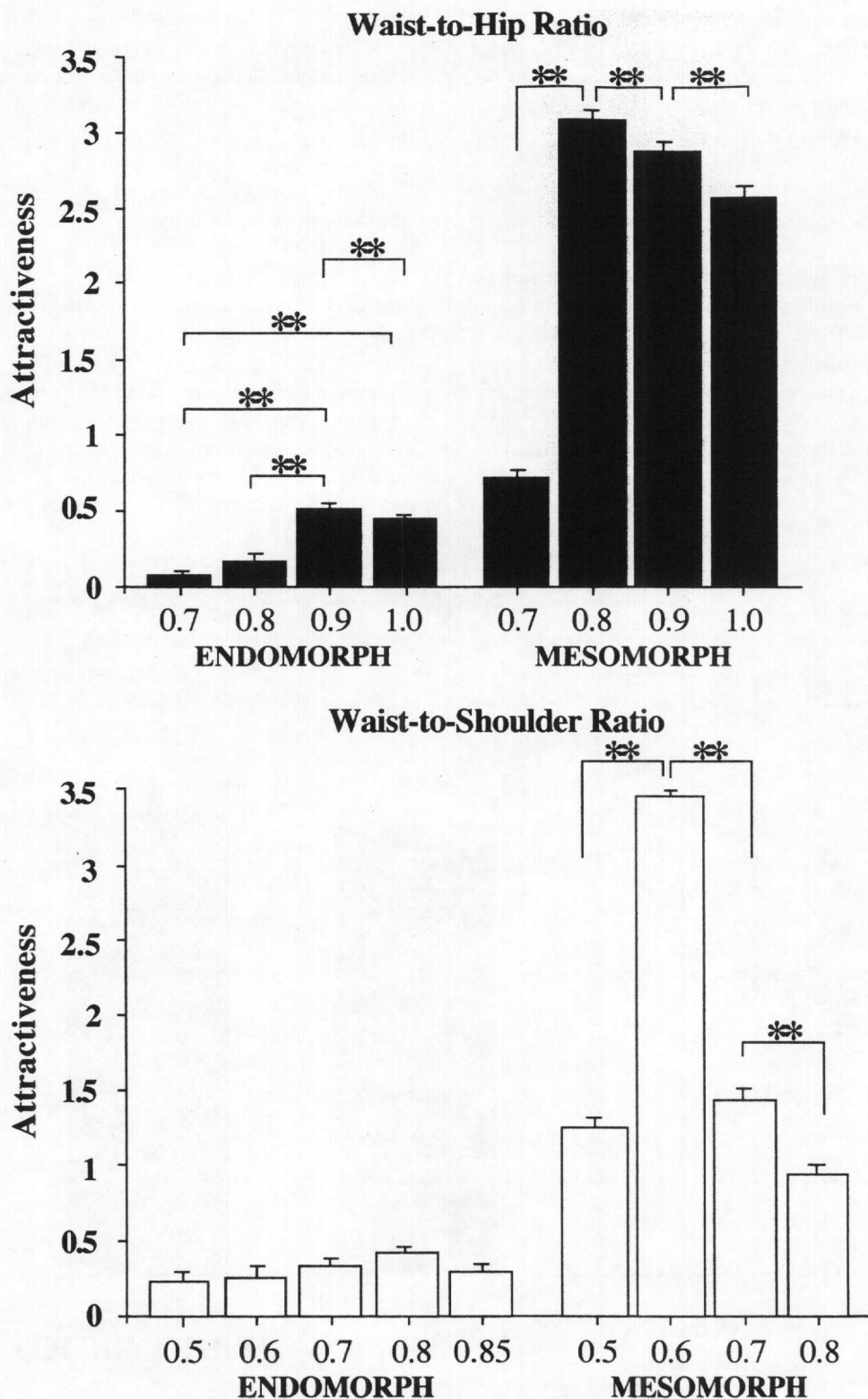


Fig. 3. Women's preferences for back-posed outline drawings of endomorphic or mesomorphic male figures that vary in (upper) waist-to-hip ratio or (lower) waist-to-shoulder ratios. Data are mean (+SEM) scores for 333 British women (\*\* $p < .001$ ).

1.0 (all three measures are within the normal WHR for males). The mesomorphic figure with WHR of 0.7 was found to be the least attractive (which was within the female range). Further, attractiveness of endomorphic figures improved when WHR = 0.9 or 1.0, but scores were very much lower than for the mesomorph.

#### Waist-to-Shoulder Ratios (WSR)

A further repeated measures ANOVA for somatotype revealed a significant effect for attractiveness ratings of physiques that differed in WSR, ( $F[8, 333] = 77.6, p < .001$ ). Post hoc pair tests showed significant differences ( $p < .01$ ) among the mesomorphic figures, but no significant differences between the endomorphic figures (Fig. 3(b)). Again, the mesomorphic somatotype was pre-

ferred, with higher scores being recorded for a WSR of 0.6. In direct contrast, altering WSR in endomorphic figures had very little effect upon attractiveness (the only trend observed was a slight preference for WSR = 0.8).

#### Study 4: Ratings of Symmetrical and Asymmetrical Figures

A repeated measures ANOVA for somatotype revealed a significant effect for attractiveness ratings of symmetrical and asymmetrical mesomorphic male physiques ( $F[2, 277] = 4.2, p < .001$ ). The asymmetrical (nonmanipulated) figure was found to be markedly more attractive than either the left-left or right-right mirrored symmetrical somatotypes,  $p < .001$  (Fig. 4).

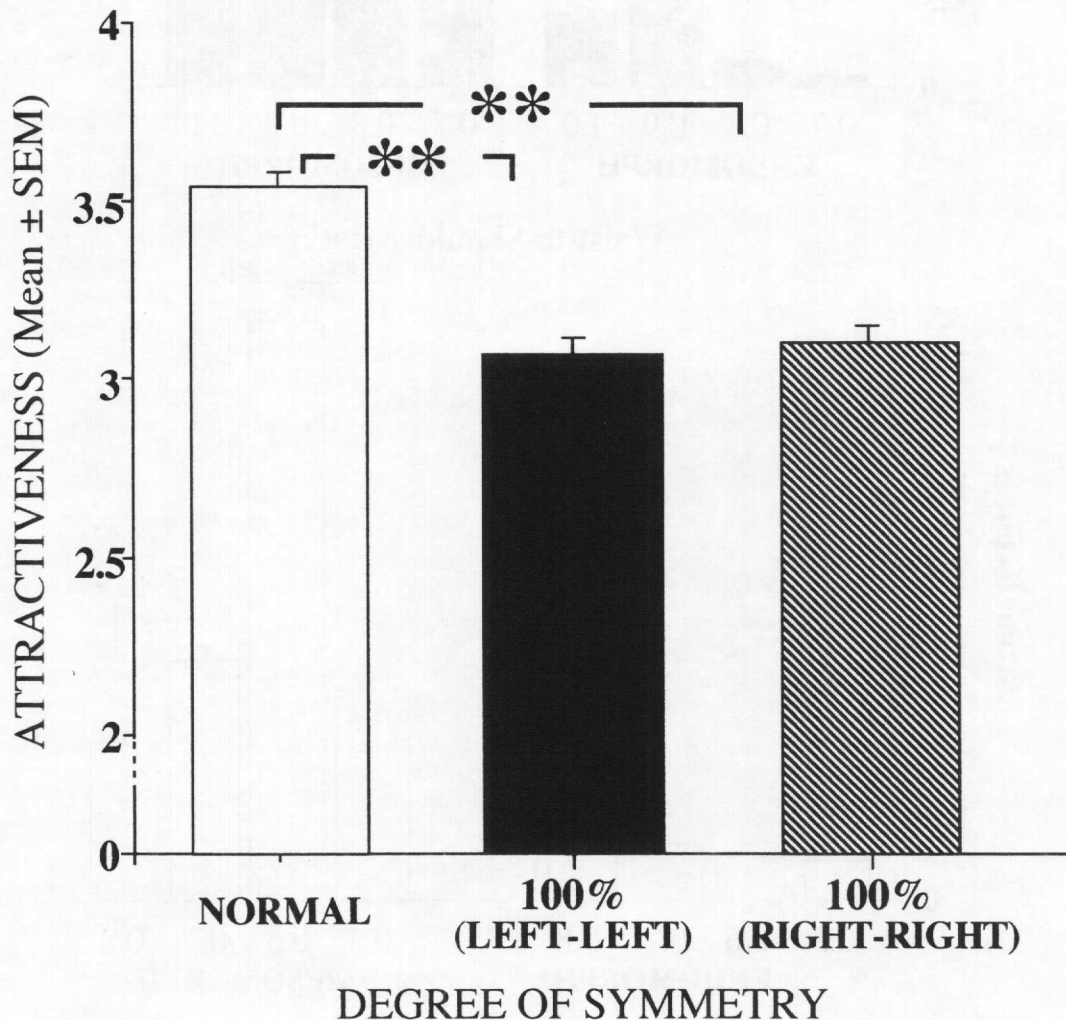


Fig. 4. Women's preferences for outline drawings of a mesomorphic male somatotype that is either natural (i.e., asymmetric) or perfectly symmetrical. Data are mean (+SEM) scores for 277 British women (\*\* $p < .001$ ).

**Study 5: Ratings of Hirsute and Hairless Figures**

A repeated measures ANOVA for somatotype revealed a highly significant effect for attractiveness ratings for hirsute and hairless men ( $F[3, 277] = 32.6, p < .001$ ). Pair tests showed scores for all four figures differed significantly from one another ( $p < .001$ ). Both somatotypes were rated as more attractive if body hair was present, with the mesomorph again scoring the highest (Fig. 5).

A further repeated measures ANOVA revealed that respondent's perceptions of the respective figures' ages varied at a significant level ( $F[3, 277] = 54.1, p < .001$ ). Post hoc pair tests showed significant differences among all four figures. Somatotypes with body hair were deemed to be significantly older than those that had none ( $p < .001$ ). Further, the endomorphic figures were rated as being older than the mesomorphs, in both hirsute and hairless figures ( $p < .001$ ).

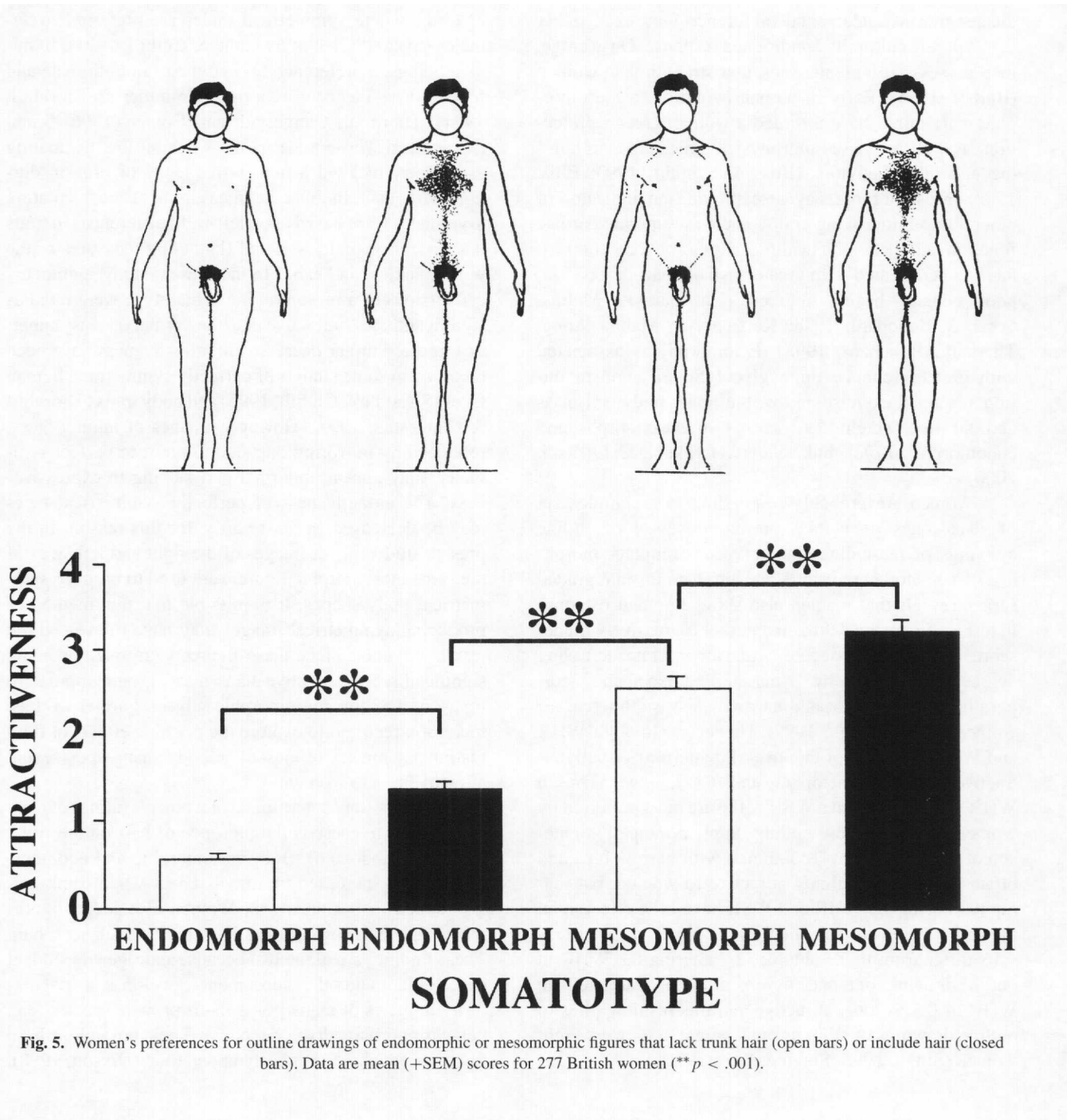


Fig. 5. Women's preferences for outline drawings of endomorphic or mesomorphic figures that lack trunk hair (open bars) or include hair (closed bars). Data are mean (+SEM) scores for 277 British women (\*\* $p < .001$ ).



## DISCUSSION

These studies showed that women express consistent preferences for certain features of masculine somatotype and secondary sexual development. Back-posed figures of mesomorphic (muscular) men were rated as most attractive, followed by figures of average, then ectomorphic (i.e., slim), and endomorphic (i.e., heavily built) men. The consistent ordering of preferences by women from two markedly different cultures (U.K. and Sri Lanka) indicates that a fundamental preference may exist rather than a purely culturally conditioned response. On average, men possess 80% greater muscular strength than women (Barber, 1995). Early in human evolution, a mesomorphic male might have afforded a woman greater protection, as well as possessing physical advantages in hunting and other activities (Buss & Schmitt, 1993; Ellis, 1992). Mesomorphy may also provide an indicator of other fitness-improving traits, such as superior cardiac function and metabolic health. Endomorphy, by contrast, has been correlated with greater risk of heart disease and poor general health in men (Katzmarzyk, Malina, Song, & Bouchard, 1998; Katzmarzyk, Malina, Song, Theriault, Bouchard, 1998). Ectomorphy is associated with greater reliance upon glycolytic metabolism during sustained exercise and with a lower body cell mass and fat free weight than occurs in mesomorphs and endomorphs (Bolonchuk, Siders, Lykken, & Lukaski, 2000).

Women are probably responding to a complex set of visual cues when they rate attractiveness of outline drawings of masculine somatotypes. Computer morphing of somatotypes, in order to produce an intergraded series, reveals that women also show a graded response in terms of perceived attractiveness. Progressively higher scores are given to those figures that incorporate increasing degrees of mesomorphy. A masculine torso shape incorporating a broad chest and narrow waist is attractive for women (Maisey et al., 1999). However, although WHR and WSR form part of this overall pattern of visually attractive cues, other factors must also be involved. Thus, a WHR of 0.8 or 0.9 and a WSR of 0.6 are most preferred by women, but again these findings apply principally to mesomorphs. Muscularity, combined with narrow hips and broad shoulders, is highly attractive to women, but manipulations of the WHR and WSR have little effect upon the attractiveness of an endomorphic physique. These results differ from those obtained by altering the WHR in outline drawings of female figures, since men rate a female WHR of 0.7 as most attractive and this result applies to outline drawings of slim, normal weight, and overweight women (Singh, 1993; Singh & Luis, 1995).

Considerable interest has focused upon the possible effects of fluctuating asymmetry upon mate choice in animals. Fluctuating asymmetries are small developmental perturbations in morphological traits that would ideally be bilaterally symmetrical (Van Valen, 1962). Low fluctuating asymmetry could signal superior mate quality, therefore, as a reflection of an individual's ability to cope with an array of environmental stresses during development (Møller & Hoglund, 1991; Parsons, 1992). Positive evidence for this hypothesis derives from some studies of birds, where symmetrical males are preferred by females (Swaddle, 1996; Swaddle & Cuthill, 1994). In human beings, a preference for symmetry in both male and female faces has been reported (Grammer & Thornhill, 1994). Thornhill, Gangestad, and Comer (1996) found that women whose male partners exhibit low fluctuating asymmetry recalled a higher frequency of orgasm during intercourse. In this case, measurements of fluctuating asymmetry were based upon left-right differences in traits that are not sexually selected (including measures of the wrists, ankles, and ears). In the present study, symmetrical versions of a mesomorphic somatotype were rated as significantly less attractive than the normal (i.e., asymmetric) figure. Similar decreases in attractiveness have been recorded in some studies of perfectly symmetrical human faces (Swaddle & Cuthill, 1995) and body traits (Thornhill & Gangestad, 1994). However, images of human faces, produced by mirroring one side to produce perfect symmetry, may appear abnormal and lacking in expressiveness. The attractiveness of perfectly symmetrical faces may be decreased, at least partly, for this reason. In the present study, mirror images of the right and left sides of the same mesomorphic figure were used to produce symmetrical body shapes. It is possible that this method of producing symmetrical images may have influenced the results obtained, since these figures were rated as being significantly less attractive than a normal (unmanipulated) image of the same mesomorphic subject. Further work is, therefore, required to explore the possible effects of fluctuating asymmetry of masculine body shape upon sexual attractiveness to women.

An important determinant of women's ratings of masculine attractiveness is the presence of hair on the trunk (chest and abdomen). Both mesomorphic and endomorphic figures increased in attractiveness when trunk hair was added to the drawings. Women also judge figures with trunk hair to be older than those which lack hair. These findings are of interest because androgen dependent capes of hair and other adornments develop at sexual maturity in males of many polygynous primate species (e.g. geladas and hamadryas baboons). Their possible role in female mate choice is poorly understood (Dixon, 1998).

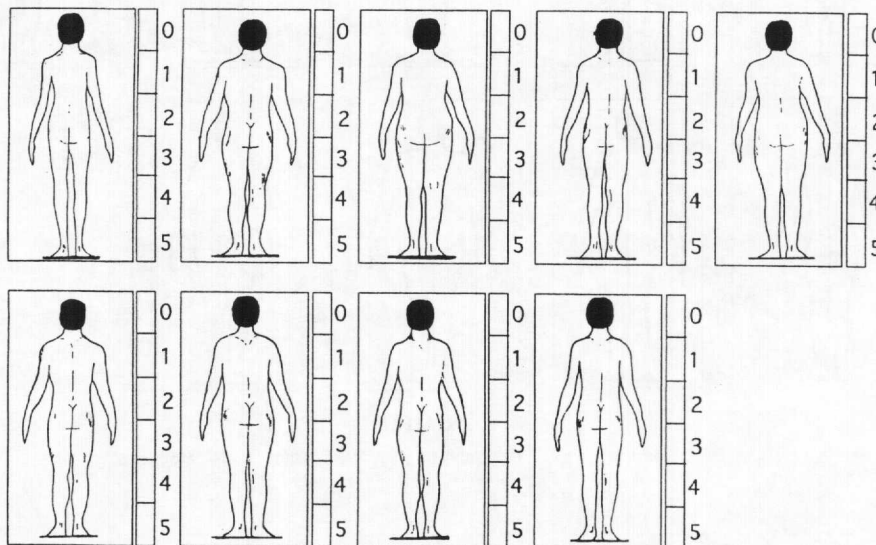


The current results indicate that, at least for a U.K. sample of women, masculine trunk hair is sexually attractive, indicative of greater age, and therefore perhaps a signal of sexual maturity.

**APPENDIX**

Stimuli and questionnaires used in Study 2 (Computer morphed images), Study 3 (A. Waist-to-hip ratios; B. Waist-to-shoulder ratios), and Study 4 (symmetrical

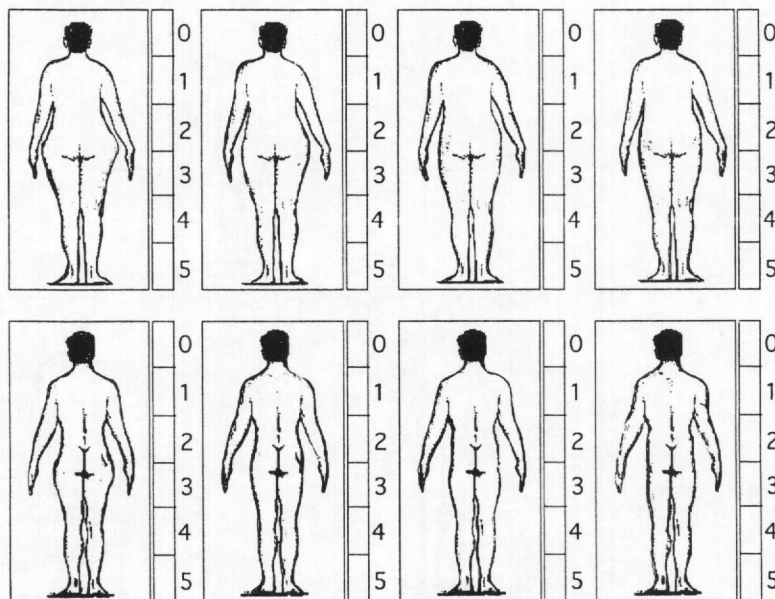
**Study 2 (Computer morphed images)**



**Scoring**

0 = Unattractive 1= Only slightly 2= Mildly 3= Moderately  
4= Very attractive 5= Extremely attractive

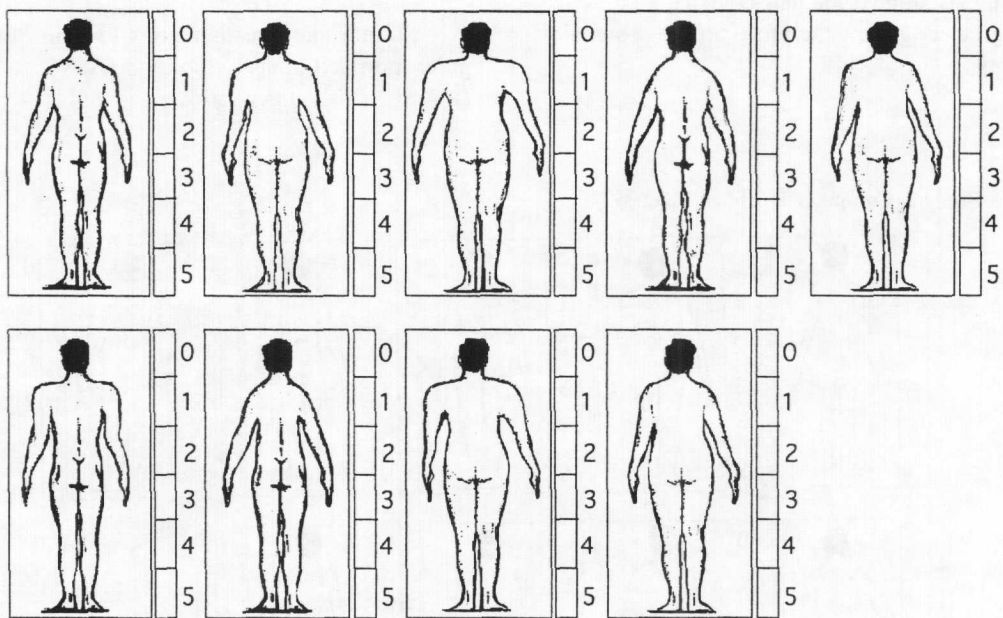
**Study 3A (Waist-to-hip ratios)**



**Scoring**

0 = Unattractive 1= Only slightly 2= Mildly 3= Moderately  
4= Very attractive 5= Extremely attractive

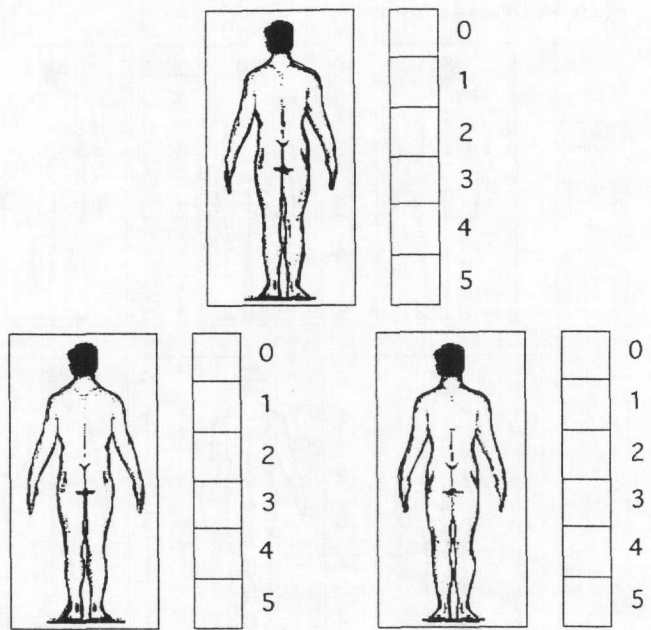
Study 3B (Waist-to-shoulder ratios)



Scoring

0 = Unattractive 1= Only slightly 2= Mildly 3= Moderately  
4= Very attractive 5= Extremely attractive

Study 4 (Symmetrical and asymmetrical figures)



Scoring

0 = Unattractive 1= Only slightly 2= Mildly 3= Moderately  
4= Very attractive 5= Extremely attractive

and asymmetrical figures) are given below. (Stimuli used for Studies 1 and 5 were included in the main text.)

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