Sex differences in morphological predictors of sexual behavior
Shoulder to hip and waist to hip ratios

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Abstract

Differences exist between males and females in fat distribution, skeletal morphology, muscle mass, and body shape. We investigated sex differences in shoulder to hip ratios (SHR) and waist to hip ratios (WHR), and their relationships to different features of sexual behavior. Males with high SHR and females with low WHR reported sexual intercourse at an earlier age, more sexual partners, more extra-pair copulations (EPC), and having engaged in more instances of intercourse with people who were involved in another relationship (i.e., having themselves been EPC partners). The predictive value of these morphological features was highly sex-specific. © 2003 Elsevier Science Inc. All rights reserved.

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1. Introduction

There is growing evidence that individual differences in digit ratios (Robinson & Manning, 2000) and fluctuating asymmetry (Thornhill & Gangestad, 1994) are correlated with differences in sexual behavior. Other morphological features show variance not only among individuals, but are sexually dimorphic. One such trait is the waist to hip ratio (WHR), the circumference of the waist relative to the hips. WHR is an indicator of a

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female's hormonal profile and reproductive status and is linked to such things as age, fecundity, and the capacity to sustain pregnancy and nurse a child (Singh, 1993). Another sexually dimorphic feature is shoulder to hip ratio (SHR), the circumference of the shoulders relative to the hips. Broad shoulders and narrow hips tend to be a masculine trait related to testosterone (Kasperk et al., 1997).

In the present study, we examined WHR and SHR and their relationship to different aspects of sexual behavior in males and females.

2. Methods

Undergraduate students (56 females and 60 males) from the State University of New York at Albany participated in this study, which was approved by the University Institutional Review Board. Mean age was 19.6 years (S.D. = 2.8), range 18–44. Subjects were not informed about the purpose of the study.

Subjects first completed an anonymous questionnaire concerning their sexual history. Two subjects reported being homosexual, three had children, and four were married; each of these subgroups was too small for separate analyses.

Circumference of the shoulders, waist, and hips was measured to the nearest 0.5 cm with an anthropometric fiberglass body measuring tape by someone who was blind to the questionnaire responses. Waist circumference was measured at the level of the umbilicus as the smallest girth between the rib cage and iliac crest. Hip circumference was defined as the greatest distance around the hips and buttocks, a measure of the largest girth between the waist and thigh. Shoulder circumference was taken at the greatest width of the shoulder blades, while the subject stood with arms relaxed to the sides. Two subjects who had broken bones associated with these traits were excluded. None indicated being pregnant. Each trait was measured twice and remeasurement reliability was high: shoulders ($r = .998$), waist ($r = .998$), and hips ($r = .996$).

3. Results

Male SHRs ($M = 1.18 \pm 0.071$, range 1.03–1.40) significantly ($t = 10.41$, $P < .01$) exceeded female SHRs ($M = 1.03 \pm 0.066$, range 0.90–1.22). Here and subsequently, M signifies mean ± standard deviation.

Male SHR was negatively correlated with reported ages of first masturbation and first sexual intercourse, and positively correlated with reported numbers of sex partners, EPC partners, and persons for whom one had been an EPC partner (Table 1). Female SHR was not significantly correlated with any sexual behavior measure (Table 2).

Male WHRs ($M = 0.86 \pm 0.058$, range 0.73–1.03) significantly ($t = 8.44$, $P < .01$) exceeded female WHRs ($M = 0.77 \pm 0.049$, range 0.69–0.87).

Female WHR was positively correlated with reported age of first sexual intercourse, and negatively correlated with reported numbers of sex partners, EPC partners, and persons for

Table 1
Pearson correlations (sample size) among SHR, WHR and various self-report measures of sexual behavior in males

Males	SHR	WHR	Age of first masturbation	Age of first sex	Number of sex partners	Number of EPC partners
WHR	.245 (59)					
Age of first masturbation	− .370** (57)	− .227 (57)				
Age of first sex	− .281* (50)	− .317* (50)	.275 (48)			
Number of sex partners	.463** (59)	.314* (59)	− .206 (57)	− .369** (50)		
Number of EPC partners	.260* (59)	.193 (59)	− .134 (57)	− .325* (50)	.849** (59)	
Number of times an EPC partner	.349** (59)	.152 (59)	− .206 (57)	− .382** (50)	.804** (59)	.909** (59)

  * $P < .05$ (two-tailed).
  ** $P < .01$ (two-tailed).

whom one had been an EPC partner (Table 2). For males, WHR was negatively correlated with reported age of first sex and positively correlated with reported number of sex partners.

For males, the most attractive WHR is 0.9 (Singh, 1995). Therefore, we also considered the entire range of WHR by assigning standard deviations in both directions in increments of 0.05. The closer the male WHR was to 0.9, the earlier the reported ages of first masturbation ($r = .383$, $n = 57$, $P < .01$) and first sex ($r = .362$, $n = 50$, $P < .01$). For males with WHR greater than 0.9, age of first masturbation and WHR were positively correlated ($r = .595$, $n = 13$, $P < .05$). For those with WHR below 0.9, age of first sex and WHR were negatively correlated ($r = − .393$, $n = 38$, $P < .05$).

Females who were involved in committed relationships had lower ($t = 2.60$, $P < .05$) WHRs (mean $= 0.755 \pm 0.008$) than those who were not ($M = 0.788 \pm 0.009$); no such difference was

Table 2
Pearson correlations (sample size) among SHR, WHR and various self-report measures of sexual behavior in females

Females	SHR	WHR	Age of first masturbation	Age of first sex	Number of sex partners	Number of EPC partners
WHR	− .107 (55)					
Age of first masturbation	.050 (37)	− .075 (37)				
Age of first sex	− .080 (44)	.400** (44)	.358* (32)			
Number of sex partners	− .055 (55)	− .401** (55)	− .069 (38)	− .535** (45)		
Number of EPC partners	− .140 (55)	− .296* (55)	− .159 (38)	− .358* (45)	.789** (56)	
Number of times an EPC partner	− .186 (55)	− .369** (55)	.086 (38)	− .179 (45)	.582** (56)	.414** (56)

  * $P < .05$ (two-tailed).
  ** $P < .01$ (two-tailed).

found in males. Males who reported EPCs had higher ($t=3.53$, $P<.01$) SHRs ($M=1.21\pm0.015$) than those who did not ($M=1.14\pm0.010$) and higher ($t=2.06$, $P<.05$) WHRs than those who did not ($M=0.844\pm0.009$). Females who reported an EPC had lower ($t=2.82$, $P<.01$) WHRs ($M=0.750\pm0.009$) than those who did not ($M=0.785\pm0.009$). No effects of SHR were found in females. Males who reported having been an EPC partner had higher ($t=3.72$, $P<.01$) SHRs ($M=1.23\pm0.025$) than those who did not ($M=1.15\pm0.008$), while females who reported such encounters had lower ($t=2.66$, $P<.01$) WHRs ($M=0.743\pm0.011$) than those who did not ($M=0.781\pm0.008$).

Interitem correlations among questions are presented in Tables 1 and 2.

4. Discussion

We found striking differences between males and females in features of the shoulders, waist, and hips that predict different dimensions of sexual behavior. Since high SHR in men is linked to androgen, while female fertility is related to WHR, these features may be important parameters of mate choice. In fact, both SHR and WHR influence judgements of attractiveness (Dijkstra & Buunk, 2001; Singh, 1993).

Female WHR conveys information about hormonal profile, reproductive maturity, fecundity, and health (Singh, 1993). Moreover, a narrow waist is a cue that a woman is not currently pregnant, and wide hips are correlated with underlying pelvic skeletal morphology that would be conducive to delivering infants. Females in our sample with low WHR reported sex at earlier ages, more sex partners, more EPCs, and more times having been EPC partners. These findings extend those of Mikach and Bailey (1999) who found that women with low WHRs have more casual sex.

The effects of WHR for males were more modest and in the opposite direction: men with low WHR reported later first sex and fewer partners. Perhaps, WHR affects women's mate value more because it is a better indicator of female reproductive status. Weight scaled by height (body mass index or BMI) is also an important feature of female attractiveness (Tovée & Cornelissen, 2001). Although WHR and BMI covary, there is little consensus as to which may be a more specific cue to fertility and pubertal status.

SHR accounted for more variance in male sexual behavior than WHR, with high SHR men reporting earlier masturbation and sex, more partners, more EPCs, and more frequently having been EPC partners. Unlike WHR, SHR was unrelated to all measures in females.

For women, WHRs of 0.67–0.80 are perceived as most attractive and healthy, with an ideal around 0.7 (Singh, 1993). For males, the attractive range is typically 0.85–0.95, with an ideal of 0.9 (Singh, 1995). Low WHR in males is rated as less attractive, and is linked to several diseases associated with reduced testosterone and elevated estrogen production (Singh, 1993). At the other extreme, high male WHR may be indicative of fetal abnormalities and growth retardation (Singh, 1995). When analyzing the male data, we considered deviations in both directions. The closer WHR was to the ideal for males, the earlier the reported ages of first masturbation and first sex, and departures from 0.9 in either direction were associated with later onset of sexual behaviors. A similar analysis of bidirectional

deviations was not conducted for females, since, unlike the males, none of the women in our sample had WHRs below the range of attractive values.

There were correlations for both males and females between reporting having an EPC and being an EPC partner, but the association for males was much more pronounced ($r = .91$ vs. $r = .41$). If males with higher SHRs both have more EPCs and are chosen as EPC partners more often, it would appear that women use SHR (or some correlate thereof) in their assessment of mate quality.

Sex differences exist not only in the bodily features used to evaluate potential mates, but also in the evaluation of same sex rivals. Dijkstra and Buunk (2001) found that rivals with a relatively low WHR evoked more jealousy in women than in men, whereas rivals with relatively high SHR evoked more jealousy in men than in women.

The high correlations for males ($r = .85$) and females ($r = .79$) between reported numbers of sex partners and EPC partners may bear on questions of both paternity and abandonment in the face of infidelity. Throughout recent human history, males have often placed a premium on female virginity for a marital partner (e.g., Ford & Beach, 1951). This is commonly thought to be an expression of a paternal assurance strategy, i.e., sexually inexperienced females are assumed to represent a lower risk of cuckoldry. But the question remains: does promiscuity predict infidelity? Our data are consistent with those of Essock-Vitale and McGuire (1985) in suggesting that a substantial proportion of the variance in infidelity can be accounted for in terms of number of sex partners, but this conclusion is compromised by the fact that the number of sex partners is confounded with the number of EPC partners. To correct for this, we subtracted reported EPC partners from total reported sex partners for each respondent to create an estimate of promiscuity apart from EPCs. The resultant number (reported non-EPC sex partners) was still highly correlated with number of EPC partners (females: $r = .67$, $n = 56$, $P < .01$; males: $r = .50$, $n = 59$, $P < .01$), suggesting that promiscuity is in fact a good predictor of infidelity. Indeed, promiscuity among females accounted for almost twice as much variance in infidelity ($r^2 = .45$) as it did for males ($r^2 = .25$).

In conclusion, both SHR and WHR seem to be important, sex-specific predictors of sexual behavior. For all the behaviors except masturbation, the question remains whether SHR and WHR makes the person more attractive, or these ratios reflect hormone levels that influence behavior, or both. Extensive research has examined the impact of WHR in females on mate selection, but more attention needs to be paid to the behavioral implications of SHR in males as an important morphological feature.

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