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Blind men prefer a low waist-to-hip ratio

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Abstract

Previous studies suggest that men in Western societies are attracted to low female waist-to-hip ratios (WHR). Several explanations of this preference rely on the importance of visual input for the development of the preference, including explanations stressing the role of visual media. We report evidence showing that congenitally blind men, without previous visual experience, exhibit a preference for low female WHRs when assessing female body shapes through touch, as do their sighted counterparts. This finding shows that a preference for low WHR can develop in the complete absence of visual input and, hence, that such input is not necessary for the preference to develop. However, the strength of the preference was greater for the sighted than the blind men, suggesting that visual input might play a role in reinforcing the preference. These results have implications for debates concerning the evolutionary and developmental origins of human mate preferences, in particular, regarding the role of visual media in shaping such preferences.

Keywords: Waist-to-hip ratio; Mate preferences; Attractiveness; Congenitally blind

1. Introduction

One feature that appears to influence male mate preferences is female waist-to-hip ratio (WHR). At least in Western countries, it is generally found that men are attracted to females with a relatively low WHR (i.e., an hourglass-shaped body; Singh, 1993). Several explanations for this preference exist. One adaptive explanation is that low female WHR indicated health and fertility over evolutionary history, and as a consequence, selection engineered cognitive adaptations in males that utilize this cue. This hypothesis has received support from studies showing that relatively low WHRs may indeed be associated with health and fertility in females, at least in some populations (for an overview, see Singh & Randall, 2007). Recently, Lassek and Gaulin (2008) have further specified *how* female WHR might relate to fertility. They note that "upper-body fat has negative effects and lower-body fat has positive effects on the supply of long-chain polyunsaturated fatty acids that are essential for neurodevelopment" (p. 26). WHR might therefore serve as a proxy for the ratio of upper-body fat to lower-body fat, with low WHR reflecting a balance in favor of neurodevelopmental resources. Males that preferred low WHR may have had relatively competitive offspring, hence the preference evolved.

Other researchers have advocated less distal explanations. Johnson and Tassinary (2007a, 2007b), for example, have argued that the male preference for low WHRs may be a by-product of a general preference for characteristics matching the target's biological sex. Since women tend to have lower WHRs than men, women with relatively low WHRs display a more "feminine" body shape, making them more attractive. In a similar vein, Gray, Heaney, and Fairhall (2003) have argued that low WHR preferences may be the result of a generic psychological mechanism of enhanced responding to exaggerated features, or "supernormal" stimuli (Eibl-Eibesfeldt, 1970). If men represent a low WHR as "typical" of female bodies, and prototypical features elicit strong responses, this could lead men to prefer female WHRs that are even lower than normally attainable. Some studies suggest that men may indeed have a preference for extreme and unnaturally low WHRs (i.e., 0.50; Gray et al., 2003).

Initially, empirical studies supported the existence of a cross-cultural preference for low WHR, as this preference

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was found among a range of populations, including Caucasians, Hispanics, Indonesians, and Kenyans (e.g., Furnham, McClelland, & Omer, 2003; Furnham, Tan, & McManus, 1997; Henss, 1995; Singh, 1993; Singh & Luis, 1995). However, there is growing evidence that WHR preferences also differ between cultures, especially when comparing Western and non-Western, more isolated populations (Marlowe & Wetsman, 2001; Wetsman & Marlowe, 1999; Yu & Shepard, 1998). Some researchers have explained these cultural differences in terms of context-sensitive adaptation, that is, males might adjust their preferred attributes in females, including WHR, contingent on the specific tradeoffs posed by their local ecology (e.g., Anderson, Crawford, Nadeau, & Lindberg, 1992; Marlowe, Apicella, & Reed, 2005; Marlowe & Wetsman, 2001; Pillsworth, 2008; Sugiyama, 2004). In societies where food shortages are common, for instance, a higher female WHR may be associated with health and reproductive success, and this could lead to a local male preference for high WHRs (Sugiyama, 2004). Such context-sensitive mate preferences can become incorporated into the local cultural norms of a society (Gangestad, Haselton, & Buss, 2006), while cultural transmission processes may in turn reinforce and fine-tune these preferences, including preferences for certain body shapes (e.g., Swami, Einon, & Furnham, 2007; Yu, Proulx, & Shepard, 2008).

While the precise origins of men's low WHR preferences are still debated, several theories postulate a central role for visual input in the development of the preference, either implicitly or explicitly. Consider, for example, the notion that men believe low WHRs are typical of women, and women with low WHRs are therefore more attractive; although it is not always specified where this belief (about the distribution of male and female body types along the WHR dimension) comes from, we believe it is normally assumed to be the result of visual learning. Similarly, the perceptual fluency account supposes that men prefer whatever stimulus (i.e., female body type) the visual system is the most familiar with, presumably as a result of visual experience. Also, if cultural transmission affects the development of WHR preferences, it seems plausible that visual experience would play an important role in this process. Children, for example, may observe that women with low WHRs evoke more favorable responses from their parents and peers, both in the natural environment and in the media (cf. Yu, Proulx, & Shepard, 2008). Notably, some scholars have argued that low WHR preferences are *primarily* shaped by exposure to Western visual media (e.g., Harrison, 2003; Orgel, Urla, & Swedlund, 2005; Yu & Shepard, 1998). To examine the latter hypothesis, Yu and Shepard (1998) studied WHR preferences among men of an indigenous population of Matsigenka (southeast Peru) with little or no exposure to Western media. They found that these men did not display the same WHR preferences as men in Western societies. Yu and Shepard (1998) concluded that the observed cross-cultural *similarities* as found in previous work "only reflected the pervasiveness of Western media" (p. 322).

Given the central role ascribed by all these different theories to visual input in influencing ideals of attractiveness (Scott, Bentley, Tovée, Ahamed, & Magid, 2007; Swami & Furnham, 2008), an important question is whether men's preference for low WHRs also exists *independently* of visual input. To address this issue, we investigated the WHR preferences of congenitally blind men, who never experienced visual input in their lifetimes. In this manner, we can establish whether visual input is a necessary condition for WHR preferences to develop. In general, an exploration of the necessary and sufficient input conditions for a cognitive mechanism to develop may also speak to broader issues concerning the proper developmental conditions yielding reliable adaptation (Barrett, 2007; Sperber, 1994).

If visual input indeed plays a critical role in shaping WHR preferences, as some scholars propose (e.g., Harrison, 2003; Orgel et al., 2005; Yu & Shepard, 1998), then blind men might lack the preference for low WHR. A second possibility is that blind males do have a preference for low WHR, but that this preference is more pronounced in sighted men. This finding would be consistent with the idea that culture, through visual media (e.g., movies, magazines) and other visual input (e.g., observation of peer interactions), reinforces attractiveness preferences that already existed due to other causes. Third, blind men may exhibit a preference for low WHR as strong as their sighted counterparts, which would suggest that visual input (including direct exposure to visual media) does not substantially alter WHR preferences.

2. Methods

2.1. Participants and design

Nineteen men (ranging from 27 to 72 years old, mean age is 46.5, S.D.=14.43) who were blind from birth participated. Two men who reported that they could see vaguely were excluded from data analyses (this did not affect the main results). Thirty-eight men who were not visually impaired also participated. As explained below, these men were randomly assigned to either the sighted or blindfolded condition. In the sighted condition (N=19), age ranged from 23 to 69, mean age 45.4, S.D.=14.90; in the blindfolded condition (N=19), age ranged from 25 to 68, mean age 44.5, S.D.=14.75.

2.2. Procedure and materials

The male experimenter made appointments with the blind men to visit them at their homes (they lived across the Netherlands). The experiment was conducted inside a van that served as a mobile laboratory room. In the van there were two female mannequin dolls with adjustable waist and hip circumferences. The mannequins wore identical tight-

fitting dresses. We adjusted the waist and hip circumferences such that the mannequins differed in WHR: one 0.70, and the other 0.84. We adjusted both the waist and the hip circumferences simultaneously: The mannequin with the 0.70 WHR had a slightly thinner waist, and a slightly wider hip, as compared to the mannequin with the 0.84 WHR. In this manner, the total volume of both bodies was held as similar as possible. If we, for example, had decreased only the waist size of one body to acquire a lower WHR, this body would also have had a lower body volume and, hence, a lower body mass index (BMI). With the current procedure, any effects of WHR could not be attributed to differences in BMI (Tovée & Cornelissen, 1999).

Instead of testing a wide range of WHRs, we focused on blind men's preferences of two WHRs—0.70 and 0.84—that we chose on the basis of previous findings. Our reasons were threefold. First, many studies have shown that, in Western populations, attractiveness ratings generally peak at around 0.70 (it should be noted, however, that this finding is based in part on studies that included 0.70 as the lowest WHR in their stimulus materials, e.g., Singh, 1993; when participants are able to choose from lower WHRs, it is sometimes found that WHRs lower than 0.70 are considered more attractive, e.g., Gray et al., 2003). Second, evidence from over 12,000 women shows that average female WHRs in Western populations range from 0.76 up to 0.84 (Molarius, Seidell, Sans, Tuomilehto, & Kuulasmaa, 1999). Third, in a pilot study, it was established that sighted participants gave higher attractiveness ratings for the mannequin with the lower (0.70) WHR. Importantly, the pilot study also revealed that the bodies with both WHR measures were evaluated fairly positively (i.e., >6.5 on a 10-point scale). This demonstrates that the preference for the lower WHR is not due to negative evaluations of the higher (0.84) WHR, suggesting that this body is not viewed by men as "unreal" and unattractive. Indeed, both ratios fall within the normal range of female WHRs (Molarius et al., 1999).

The blind participants were instructed to feel and touch the waists and hips of the two female mannequin dolls. The order in which they touched the bodies was counterbalanced between participants. After they had inspected each body, the experimenter asked them to rate the attractiveness of the body by giving a grade from 1 to 10, with 10 representing very attractive and 1 very unattractive.

After data collection for the blind participants was completed, we started the data collection for the non-visually handicapped groups. The experimenter placed the mobile laboratory van near shopping centres and ran the experiment again, this time with sighted men. Male passersby that matched the ages of the blind participants were invited to take part in the experiment. Half of the men were given instructions to look at the bodies and rate their attractiveness. The other half of the men was included in a blindfold condition. This condition would ensure that any differences between sighted and blind people were not merely a result of visual versus tactile inspection of the bodies. For the blindfolded men, the procedure was identical to the procedure for the blind participants, i.e., their ratings were based solely on touch. Again, for both groups, the order in which the two bodies were presented was counterbalanced. Ratings were given on a scale from 1 to 10.

3. Results

An analysis of variance was conducted, with the ratings for the two bodies with the different WHRs (0.70 and 0.84) as a within-participants variable, and group (blind, sighted, and blindfolded) and order of rating (first 0.70 versus first 0.84) as between-participants variables. This analysis revealed only a main effect of WHR, $F(2,49)=28.74$, $p<.0001$, $\eta^2_{\text{partial}}=.37$. Replicating previous findings, participants overall preferred a lower WHR, as evidenced by higher ratings for the 0.70 WHR, $M=7.56$, S.D.=0.96, compared to the 0.84 WHR, $M=6.61$, S.D.=1.33. No significant main effects of group, $F(2,49)=2.09$, or order, $F(2,49)=0.11$, were found, nor were there significant interactions of WHR with group, $F(2,49)=1.98$, or WHR with order, $F(2,49)=1.07$, all p's>.14. The three-way interaction between WHR, order, and group was also not significant, $F(2,49)=0.59$, ns (Fig. 1).

Next, paired t tests were conducted within each group. These analyses revealed significant effects of WHR for each group: for the blind group, $t(16)=2.65$, $p<.02$, $d=0.68$; for the sighted group, $t(18)=4.92$, $p<.001$, $d=1.33$; and for the blindfolded group, $t(18)=2.16$, $p<.05$, $d=0.54$. As can be seen, the size of the effect was larger for the sighted group ($d=1.33$) compared to the blindfolded ($d=0.54$) and blind ($d=0.68$) groups.

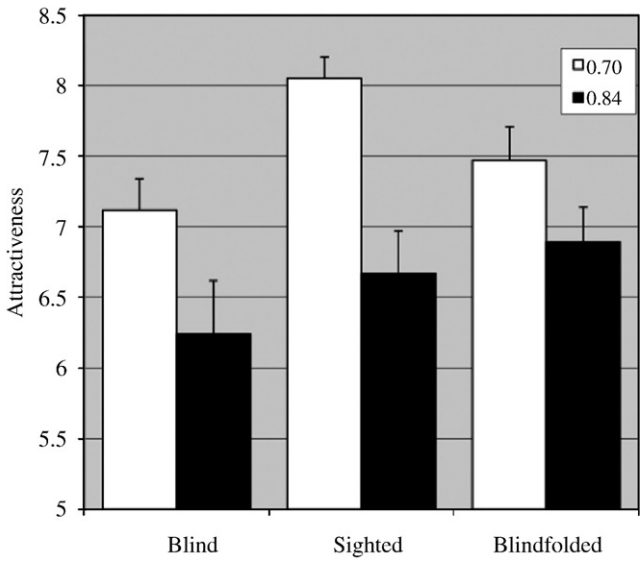

Fig. 1. Average attractiveness ratings and standard error bars for the 0.70 and 0.84 WHRs for each group separately.

4. Discussion

The current study demonstrates that congenitally blind men, like their sighted counterparts, prefer a low female WHR. The current results show that visual input is not a necessary input condition for low WHR preferences to develop, implying that other inputs are sufficient. This finding calls into question the importance of visual input for the development of men's low WHR preference, although it does not refute it (see below). The result does, however, cast doubt on the hypothesis that WHR preferences are *primarily* the product of exposure to visual media (e.g., Harrison, 2003; Yu & Shepard, 1998). Our blind participants' WHR preferences were *certainly* not directly shaped by visual media exposure, but they nonetheless expressed a clear preference for low WHR.

Although both sighted and blind men preferred the lower WHR, the effect was stronger for sighted men who visually inspected the bodies. Statistically, the interaction between group (blind vs. sighted vs. blindfolded)×WHR (0.70 vs. 0.84) was not significant; however, the effect size Cohen's *d* was almost twice as large for the sighted men who were not blindfolded as compared to the blind men. (It is more difficult to interpret the smaller effect size for the blindfolded men, who would normally be able to see, since these men may simply have less experience in making attractiveness judgements based on touch.) As noted in the introduction, a larger effect size for sighted men might indicate that visual cultural input reinforces and fine-tunes pre-existing attractiveness preferences (Swami & Furnham, 2008). In other words, although both blind and sighted men exhibit a preference for low WHR, our results suggest that visual input may have strengthened this preference among sighted men.

What factors cause blind men to develop a preference for low WHRs? We mention several possibilities. First, it is possible that blind men may be verbally informed about what is generally and culturally considered attractive by sighted people (e.g., "Hour-glassed shaped women are attractive"), including their peers, parents, and siblings (cf. Yu, Proulx, & Shepard, 2008). To explain the current findings, such verbal information would have to elicit the development of a preference for one of two WHRs that *both* are hourglass-shaped (e.g., "The more hour-glass shaped, the more attractive").

Second, blind men's low WHR preferences may stem from more generic psychological mechanisms (Gray et al., 2003; Johnson & Tassinary, 2007a, 2007b). Blind men may have implicit or explicit knowledge – acquired via tactile experience, or through verbal transmission—that females generally have lower WHRs compared to males. In line with Johnson and Tassinary's model (see the Introduction), when evaluating two *female* bodies that vary in their WHR, the lower WHR better matches the target's known biological sex, and this body may therefore be perceived as more attractive. This explanation requires that blind men know that women generally have lower WHRs than men. Whether blind men indeed have such knowledge should be addressed in future research. A different albeit related explanation is that prototypical stimuli are perceived as more attractive because they are processed more fluently—that is, the stimulus is categorized more rapidly (Reber, Winkielman, & Schwarz, 1998; Winkielman, Halberstadt, Fazendeiro, & Catty, 2006). Blind as well as sighted men may find it easier to categorize the body with the lower WHR as a female body and subsequently rate this body more attractive.

Third, our findings are also consistent with the hypothesis that men's WHR preferences reflect intrinsic factors, such as an evolved predisposition. Matsumoto and Willingham (2009) recently made a similar argument with respect to facial expressions. In their work, blind people were compared with a non-visually handicapped group, in order to assess the extent to which emotional facial expressions require visual input to develop normally. The results showed that sighted and congenitally blind athletes did not display reliable differences in their facial expressions in response to victory or defeat. This finding shows that visual learning is not a prerequisite for developing the ability to generate these facial expressions. The authors concluded that the source of these facial expressions might be an intrinsic neurobiological response provided by evolutionary history. A similar argument could be made with respect to the present findings, consistent with the hypothesis that low WHR preferences have evolved as a consequence of adaptive benefits (Singh, 1993). We note that this explanation is compatible with the existence of (adaptive or non-adaptive) cultural variation, as even intrinsic neurobiological systems may be modifiable by experience.

Finally, we wish to briefly discuss some limitations of the current research. First, ideally we had examined preferences of blind and sighted men for a larger number of WHRs, ranging from 0.60 to 1.00. However, this was not feasible for practical reasons, and so we chose to leverage existing empirical findings in choosing our WHR measures. Second, the role of WHR in attractiveness judgements, *independently* of hip size, waist size, and weight, has been questioned in previous studies (Tassinary & Hansen, 1998; Tovée & Cornelissen, 1999; but see Henss, 2000; Streeter & McBurney, 2003). The present work did not systematically manipulate these variables. Instead, we simultaneously adjusted both the waist and the hip of the models such that (1) the total volume of the body, as a proxy for BMI, was held constant, and (2) the difference between the 0.70 and 0.84 WHRs was not confounded *only* with waist size, or *only* with hip size. Nevertheless, the present findings should be considered in light of previous research suggesting that weight, waist size, hip size, WHR (and other body features like shoulder width; Donohoe, von Hippel, & Brooks, 2009) all contribute to attractiveness ratings of women in an integrative manner (Donohoe et al., 2009).

To conclude, by demonstrating that congenitally blind men have a similar (but seemingly not as strong) preference for low female WHRs as non-visually handicapped men do,

the present research provides interesting insights into the role of visual input in shaping WHR preferences (and attractiveness norms more generally). Although the next challenge will be to determine what causal factors do determine blind males' WHR preferences, our findings support the conclusion that visual input during ontogeny – including exposure to visual media—is not a necessary condition for low WHR preferences to develop.

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