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## On a pedestal: High heels and the perceived attractiveness and evolutionary fitness of women

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### ABSTRACT

We analyzed the responses of 448 participants who completed questions on attractiveness and other evolutionary fitness related traits, and long- and short-term mating potential, of a woman in either high heeled or flat shoes. We hypothesized that the woman in high heels would be rated as more attractive and evolutionarily fit by both men and women, and preferred for short-term mating by men. The hypothesis was partially supported. The woman in high heels was perceived as being more sexually attractive, physically attractive, feminine, and of a higher status. Additionally, women rated women as having a higher status regardless of the shoe, than men, while men rated women as having higher short- and long-term mating potential, than women did, regardless of the shoe. We discuss the implications of these findings.

### 1. Introduction

One of the most consistent fashion trends over the past three centuries is that it is stylish for women to wear high heeled shoes. High heeled shoes were not originally the domain of women, as they are thought to have originated in Western Asia prior to the 16th century in association with Persian men's military dress and equestrianism (Semmelhack, 2015). European culture was influenced by this trend, with men and women wearing heightened heels by mid-17th century in France and England. They remained present in men's fashion in the form of shoes for rock-stars and entertainers (e.g., Elton John), and in the boots worn by cowboys and motorcyclists. With these exceptions aside, in the 18th century, high heels became worn primarily by women; part of the Enlightenment redefined fashion as being frivolous and feminine, leading to men choosing flat shoes instead (see Semmelhack, 2015, for a historical review).

Contemporary high heels are a shoe solely for adult women (Morris et al., 2013) and are often equated with women's attractiveness, men's interest in women, and an important part of female gender identity (Barnish et al., 2018). They are part of modern views of women's normative sexual behavior (Small, 2014). According to the American Podiatric Medical Association's (APMA; 2014) survey on 1000 adults in the USA, approximately half (49%) of all women wear them and 71% of

wearers experience pain, consistent with Barnish et al. (2018). About half of those surveyed wear heels over 3" in height, although very few report wearing them more than rarely or weekly. A Thai study of teachers found that wearing shoes with heels of just two inches or higher resulted in two times greater risk of developing repetitive strain injuries (Chaiklieng & Suggaravetsiri, 2012), and discomfort increases with heel height (Hong et al., 2005).

Why do women wear high heels in light of the pain and damage they may cause? One of the main reasons is that wearers experience an increase in perceived attractiveness. Self-rated attractiveness in women is correlated with interest in high heeled shoes, and younger women in particular express interest in them (Watkins & Leitch, 2020). That is, women who are attractive use high heeled shoes to augment rather than compensate for perceived attractiveness (Watkins & Leitch, 2020). They may also serve to signal, subtly, women's interest in engaging in a sexual relationship, since sexual desire is linked with inclination to purchase high heel shoes (Watkins & Leitch, 2020). It is not just a matter of women's self-perception, though, as Prokop (2020) also found that men perceive women in high heels to be more sexually receptive than those in flat shoes.

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### 1.1. High heels and changes in curvature

Morris et al. (2013) found that men perceived a woman's walk as much more attractive and feminine when she was wearing high heels. High heels exaggerate the wearer's hip rotation, as well as bosom, buttocks, and body contours (Morris et al., 2013). They change a woman's gait in a way that causes smaller, more frequent steps, greater pelvic rotation and an increased pelvic tilt (Morris et al., 2013).

Lewis et al. (2017) extended these findings by showing that a woman wearing heels had a lumbar curvature closer to the theoretical optimum of 45.5 degrees. Though these heels only increased the lumbar curvature by approximately 2 degrees, the wearers were perceived as more attractive. Thus, Lewis et al. (2017) contend that the changes in evaluations of attractiveness are not due to the heel itself, but rather seeing a woman's altered lumbar curvature. These results have only been partly supported in more recent work. Meskó et al. (2021) utilized dynamic stimuli (i.e., videos of a woman walking to the camera wearing high heels vs flat shoes) rather than static photographs. Their findings differed from those of Lewis et al. (2017) in that wearing high heels increased attractiveness ratings of models, regardless of whether the heels increased or decreased the difference from the theoretically optimal lumbar curve.

### 1.2. Mating success and heel height

With respect to mating success in conjunction with heel height, it is critical to note that preference for high heels (in a forced choice paradigm) was connected to sexual desire. Watkins and Leitch (2020) found that in women, dyadic sexual desire (but not solitary sexual desire) did predict their inclination to buy a higher heeled shoe. Theoretically, this increased desire in women wearing high heels may correlate with improved mating success. Further, Watkins and Leitch (2020) found no evidence that competitive attitudes toward other women predicted heel preferences, indicating that the goal is not to out-do potential mating rivals but instead is related to sexual desire.

Longer legs are associated with better health (see for a review, Gunnell et al., 2005) and attractiveness (Cloud & Perilloux, 2014; Frederick et al., 2010; Sorokowski et al., 2011; Swami et al., 2006), and heels accentuate that length. Moreover, longer legs are associated with greater reproductive success for women but not men, indicating that it is connected to men's mate preferences for partners (Fielding et al., 2008). Thus, high heels, by increasing perceived leg length, may lead to increased mating (and overall reproductive) success.

### 1.3. Costly signaling by wearing high heeled shoes

In addition to high heels improving women's self-perceived attractiveness (Watkins & Leitch, 2020), and men's perceptions of sexual receptivity (Prokop, 2020), high heels may also serve as an important signal about the wearer's health. Wearing high heels may be a way for one to engage in costly signaling of mate value. High heels lead to pain and negative health consequences and thus are costly to the wearers. These costs are offset by benefits increasing the wearer's attractiveness to potential mates. Along these lines, Saad (2011) suggests a functional view of consumers purchasing goods, such that the wearers are advertising their worth to onlookers. We suggest that wearing high heels is another part of that process (see also Watkins & Leitch, 2020). Hence, high heels may be seen as a costly signal, leading to potential increases in the wearer's mate value.

A second potential benefit that offsets costs is that one may be seen as a more formidable mating rival by other women when wearing high heels, given men generally perceive women wearing high heels as sexually receptive (Prokop, 2020). However, Watkins and Leitch (2020) report that priming women for motives involving intrasexual competition did not correspond with changes in interest in high heels. We suggest here that the effect could be more subtle, whereby women view

those wearing high heels as more dominant, sexually and physically more attractive, more feminine, and having higher status than women in flat shoes, but do not necessarily perceive themselves as competing. Women's mating competition is notoriously subtle (see Fisher, 2013, *in press*), and changes in evaluations of these other characteristics in potential rivals may capture competitiveness more accurately. These subtle changes in perception indicate one's awareness about potential mating rivals, which aligns well with past work that has established that women negatively view those who are dressed in a sexy or promiscuous manner (Vaillancourt & Sharma, 2011).

### 1.4. Heel height and status

High heels are typically more expensive than flat shoes, some costing well over a million US dollars due to being covered in diamonds, rubies, emeralds, or other gems (<https://www.expensive-world.com/most-expensive-high-heels/>). A Google search for "expensive flat shoes" revealed prices that are well below those of high heels, with the most expensive shoes costing around a thousand US dollars. High heels may therefore be tied to status, and further, the lack of comfort could be an indicator of status in itself. Women who can afford these shoes and wear them without being hobbled (indicating jobs or status without manual labor) must possess higher status.

Even status of the local mating environment is strongly related to heel height. Galak et al. (2016) studied relocation (i.e., moving to new areas) and report that based on 16,236 shoes sale transactions over 5 years, women conform to local norms about heel height when moving to relatively higher status environments, but are mostly unaffected by lower status locations. They suggest the fashion norms of the wealthy trickle down to less wealthy consumers.

In sum, wearing high heels may be a mating strategy that women use to increase attention from potential mates (Morris et al., 2013; Prokop, 2020). Wearing high heels may also be a part of intrasexual mating competition. That is, women who wear high heels may be seen as dressing sexily by rivals, given high heels are associated with sexiness. Women negatively view those who are dressed in a sexy or promiscuous manner (Vaillancourt & Sharma, 2011) which is part of women's intrasexual mating competition (Fisher, *in press*).

## 2. Current study

The focus of the present research was to determine how high heels affect evaluation of women's attractiveness, as well as traits related to evolutionary fitness and relationship preferences (see Mogilski et al., 2014; Wade et al., 2019). Therefore, in terms of evolutionary fitness, we expect women who wear high heels will be perceived as being more physically attractive, sexually attractive, dominant, warm, enthusiastic, trustworthy, nurturing, feminine, socially competent, affectionate, friendly, healthy, intelligent, successful, and of higher status. They will also be considered as having high overall mate potential, short term-mate potential, long-term mate potential, and parenting ability. As well, we predict that women who wear high heels will be seen as less strong and masculine.

Succinctly, we hypothesize that, based on previous findings (Lewis et al., 2017; Morris et al., 2013; Prokop & Švancárová, 2020) women in high heels would be rated as more feminine, physically and sexually attractive, evolutionarily fit, and preferred for both short-term and long-term relationships.

## 3. Method

### 3.1. Participants

The sample included 448 individuals at a private university in the Northeastern US, (131 males (29.2%), 258 females (57.6%) and 2 transgender individuals (female to male; 0.4%)). The average age of the

participants was 20.69 ( $SD = 5.74$ ). Most ( $n = 329$ ) participants described their racial group as White (73.4%), 13 as Black (2.9%), 32 as Asian (7.1%), 8 as Hispanic (1.8%), 1 as Native American (0.2%), and 8 as other (1.8%). A total of 69.4% had been in a sexual relationship, 55.8% were currently single, 26.2% described themselves as currently being in a relationship, 17.9% have not and were not currently, and 4.7% were unsure. Most ( $n = 327$ ) participants (73%) were heterosexual, 7 were gay or lesbian (1.6%), 15 were bisexual but mostly attracted to women (3.3%), 21 were bisexual but mostly attracted to men (4.7%), and 20 were bisexual with no preference (4.5%). A total of 143 participants (55.4) were currently on some form of birth control medication while 113 (43.8%) were not. Birth control usage was included since prior research shows that hormonal birth control usage affects women's behavior (Welling et al., 2012) and reactions to others (see Geary et al., 2001; Wade & Fowler, 2006).

### 3.2. Measures and procedures

After providing informed consent, participants answered demographic questions. Then they were told they would see a silhouette of a woman and be asked to rate the woman on a series of questions. They were then randomly presented with a silhouette of a woman wearing either high heeled shoes or flat shoes (see Fig. 1). The silhouettes were from the website, "How high heels affect your body" (<https://www.thehealthinstitute.com/news-room/health-blog/how-high-heels-affect-your-body>). Next, participants received the following instruction:

Please answer the following questions according to what you think the woman whose silhouette you saw is like.

Participants rated the woman on the following randomly presented items (1 = not very to 7 = very much scale) from prior research (Mogilski et al., 2014; Wade, 2000, 2003; Wade et al., 2019): physical attractiveness, sexual attractiveness, dominance, strength, warmth, enthusiasm, trustworthiness, nurturance, masculinity, femininity, social competence, affectionateness, friendliness, overall good mate potential, short-term mate potential, long-term mate potential, parenting ability (good parent), health, intelligence, success, and status.

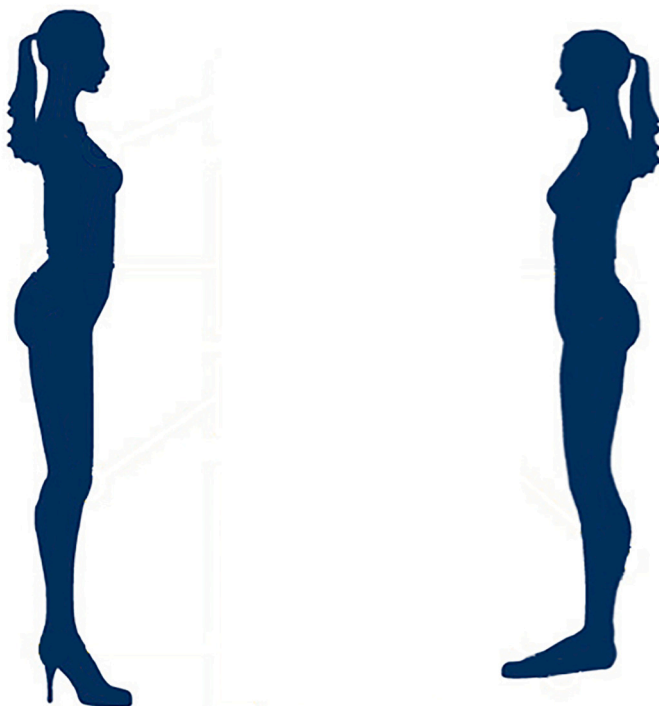


Fig. 1. Stimulus images.

## 4. Results

Multiple 2 (shoe)  $\times$  2 (sex of participant) MANOVAs were computed. The first MANOVA revealed a significant effect for shoes,  $F(20, 252) = 2.44, p < .001, \eta^2 = 0.16$ , on physical attractiveness,  $F(1, 275) = 11.92, p < .001, \eta^2 = 0.040$ ; sexual attractiveness,  $F(1, 275) = 6.72, p < .01, \eta^2 = 0.024$ ; femininity,  $F(1, 275) = 28.66, p < .001, \eta^2 = 0.10$ ; masculinity,  $F(1, 275) = 8.49, p < .004, \eta^2 = 0.03$ ; and status  $F(1, 275) = 6.96, p < .009, \eta^2 = 0.03$ . That is, the silhouette of the woman wearing high heels was rated as significantly more physically attractive, sexually attractive, feminine, of higher status, and less masculine by both men and women (see Table 1).

A significant effect for sex of participant also occurred,  $F(20, 252) = 4.65, p < .001, \eta^2 = 0.27$  on status,  $F(1, 275) = 5.43, p < .002, \eta^2 = 0.02$ ; short-term mate potential,  $F(1, 275) = 41.49, p < .001, \eta^2 = 0.15$ ; and long-term mate potential,  $F(1, 275) = 42.02, p < .001, \eta^2 = 0.13$ , see Table 2. Compared to men, women rated the women as having more status regardless of which shoes they were wearing. Compared to women, men rated the women as having higher short-term and long-term mate potential regardless of which shoes they were wearing. There were no significant interaction effects.

Additional MANOVAs across sexual relationship experience, current relationship status, sexual orientation, birth control usage (for women), and race by shoe type revealed no significant effects.

## 5. Discussion

Similar to Morris et al. (2013), our findings indicate that the silhouettes with high heels were rated as more attractive both physically and sexually than the silhouette in flat shoes. The silhouette with heels was rated as more feminine and as less masculine, which aligns well with Morris et al. (2013) where the females wearing flat shoes were more likely to be identified as males. Further, this finding supports the idea of high heel shoes as a predominantly female accessory.

Morris et al. (2013) and Smith and Helms (1999) suggest women may wear high heeled shoes to inflate their femininity, consequently becoming increasingly attractive to men. This increase in perceived attractiveness might be due to the shift in the wearer's lumbar curve (Lewis et al., 2017; but see also Meskó et al., 2021). The silhouettes in

Table 1

Mean perceived physical attractiveness, sexual attractiveness, femininity, masculinity, status and other ratings as a function of shoes worn.

	Shoes	
	Heels	Flats
	Mean (Std.)	Mean (Std.)
Physical attractiveness	<b>5.30 (1.233)</b>	<b>4.82 (1.201)</b>
Sexual attractiveness	<b>4.99 (1.553)</b>	<b>4.56 (1.386)</b>
Femininity	<b>5.86 (0.963)</b>	<b>5.11 (1.110)</b>
Masculinity	<b>1.99 (1.077)</b>	<b>2.53 (1.224)</b>
Status	<b>5.28 (1.142)</b>	<b>4.88 (1.128)</b>
Intelligence	4.54(1.13)	4.55(1.07)
Friendly	4.37(1.22)	4.43(1.15)
Enthusiastic	4.35(1.32)	4.15(1.18)
Trustworthy	4.04(1.22)	4.29(1.11)
Successful	4.93(1.17)	4.74(0.99)
Good parent	4.55(1.24)	4.58(0.98)
Good mate	4.64(1.20)	4.75(1.10)
Healthy	5.39(1.16)	5.28(1.16)
Dominant	4.00(1.43)	3.65(1.37)
Affectionate	4.24(1.15)	4.24(0.97)
Socially competent	5.07(1.29)	4.90(1.06)
Age	3.20(0.97)	3.37(0.94)
Nurturant	4.18(1.27)	4.28(1.04)
Short term mate	3.45(2.06)	3.43(1.83)
Long term mate	3.37(2.00)	3.32(1.82)

Note: higher numbers mean higher ratings, standard deviations are in parentheses, means in bold are significantly different.

**Table 2**

Mean short-term mate potential, long-term mate potential, status and other ratings as a function of sex of participant.

	Participants	
	Male	Female
	Mean (Std.)	Mean (Std.)
Short-term mate	<b>4.50 (1.440)</b>	<b>2.92 (1.966)</b>
Long-term mate	<b>4.33 (1.446)</b>	<b>2.86 (1.942)</b>
Status	<b>4.83 (1.164)</b>	<b>5.23 (1.125)</b>
Intelligence	4.43(1.08)	4.60(1.07)
Physically attractive	4.91(1.17)	5.17(1.27)
Sexually attractive	4.87(1.25)	4.76(1.60)
Friendly	4.41(1.08)	4.39(1.23)
Enthusiastic	4.18(1.24)	4.30(1.28)
Trustworthy	4.10(1.22)	4.18(1.16)
Successful	4.69(1.01)	4.92(1.13)
Good parent	4.60(1.06)	4.55(1.17)
Good mate	4.70(1.14)	4.68(1.17)
Healthy	5.37(1.08)	5.34(1.20)
Masculine	2.41(1.25)	2.15(1.13)
Feminine	5.30(1.05)	5.64(1.10)
Dominant	3.59(1.43)	3.97(1.39)
Affectionate	4.21(0.98)	4.26(1.12)
Socially competent	4.89(1.14)	5.04(1.22)
Age	3.36(0.99)	3.24(0.94)
Nurturant	4.18(1.12)	4.24(1.20)

Note: higher numbers mean higher ratings, standard deviations are in parentheses, means in **bold** are significantly different.

our study show that the woman in high heels has a more defined bosom and buttocks area and more overall shape in her back structure. Future work could use dynamic images of these silhouettes, or further, silhouettes that vary in their curvature, to more precisely determine the role of this variable.

Women wearing high heels were not rated as more (or less) dominant, strong, warm, enthusiastic, trustworthy, nurturing, socially competent, healthy, intelligent, affectionate, friendly, or successful. These findings indicate that high heels do not signal any personality traits, or cues to health or intelligence. Unlike other types of sexualization (like sexy or revealing clothing), there does not appear to be any objectification or assumptions regarding women's personalities. Sexualized women are perceived to be less mentally capable (Heflick et al., 2011), less competent (Glick et al., 2005; Gurung & Chrouser, 2007) and less deserving of moral status (Loughnan et al., 2010). These decreases were not found in the current study, which leads us to conclude that high heels are not sexualized as compared to other forms of sexy or revealing clothing.

That is, although research on sexualization and objectification has focused on piercing, tattoo, and clothing choices (Dijkstra et al., 2000; Stillman & Maner, 2009; Swami & Furnham, 2007), in this study, while high heels indicate femininity and increase attractiveness, objectification (rating the women as less: intelligent, socially competent, or trustworthy) did not occur. Participants did not find the woman in heels as less competent or warm. Women have been found to dehumanize and separate themselves from sexualized women (Vaes et al., 2011), which appears to be related to intrasexual competition, including negative perceptions of women who are seen as more attractive (Agthe et al., 2011). However, in this study women do not view the woman in heels as less than human, in fact, they view her as having more status. These findings may be setting high heels apart from other forms of fashion by increasing a woman's attractiveness without objectifying her, or objectifying her less than other forms of clothing which warrants more research. Moreover, while both sexes did not objectify the woman in heels, women rated her as higher in status, even though she is rated as more attractive. A possible reason for this perception may lie in differences in how clothes signal status. That is, piercings, tattoos, and revealing clothing may trigger perceptions of lower status, while high heels, which may cost a considerable amount of money and signal

avoidance of manual work, do not. This possibility needs to be the topic of further study.

Women rated both the woman in high heels and flat shoes as having more status than men. While not predicted, we speculate that this finding could be linked to recent social movements for female empowerment and gender equality. This result is intriguing in light of Galak et al. (2016) who document that the local socioeconomic environment influences conformity to local norms regarding heel height. Given that there was no information about the local context provided in the stimuli, it falls to future research to see if adding information such as mean household income, for example, would influence evaluations about status in conjunction with heel height. Last, it could be that women were simply 'being nice' and saying that the women had high status, given Morris et al. (2013) say women may, in general, be more generous with their judgements of others than men. This intersection of attractiveness, objectification, and status needs to be examined further in future research.

Men rated the silhouettes as having higher short-term and long-term mate potential regardless of which shoes they were wearing, as compared to women. It is curious that the current study did therefore not replicate the findings of Prokop and Švancárová (2020) who found high heels were linked to positive evaluation for a short-term, but not long-term, relationship. A possible explanation for this discrepancy may be that men did not have both of the silhouettes to compare to each other, and instead, simply rated only one silhouette. Thus, they could have thought that the stimulus was attractive, but if they had been shown both silhouettes, perhaps they would rate the one with high heels as a better short-term mate and the one with flat shoes as a better long-term mate. However, using a repeated measures design where participants are exposed to both silhouettes wearing high heeled and flat shoes could introduce demand characteristics which would undermine the validity of the findings. Nevertheless, this possibility warrants further attention, particularly when wearing high heels has become synonymous with short-term sexual relationships in pornography (Stoller, 1991), or even art that criticizes how pornography depicts women (Jones, 1999), and may be perceived by men as signaling sexual receptivity (Prokop, 2020).

A limitation of this study is that we used silhouettes rather than real photographs of women. This method is used throughout the literature (e.g., Prokop, 2020). The use of such images enable tight controls, meaning that only the heel height and change in posture are seen and participants are not influenced by other factors. However, it may have lessened the ecological validity of the findings and hence, future research should replicate this study using images of real women.

Along a similar vein, we are unable to tease apart whether wearing high heels results in a more desirable body shape, or if it is an honest signal related to being able to withstand the associated health hazards and financial costs. While wearing high heels changes women's height and lumbar curvature in noticeable ways, they are also associated with women signaling their ability to cope with the costs of wearing high heels vs flat shoes. Separating these two issues falls to future research.

Another limitation is the sample of participants were WEIRD (Western, Educated, Industrialized, Rich, Democratic), and it remains to be seen if women wearing high heeled shoes are preferred outside of these cultures. Similar ratings may not occur for individuals in cultures where high heels are not practical due to the terrain or due to the actions women must complete as part of their daily life. However, status can be culturally specific, and by using a WEIRD sample, this study may have tapped into the effect of status on objectification not previously seen in other research. Alternatively, it is possible that similar results may occur in other cultures because wearing high heels accentuates the structural characteristics and dimensions of women's bodies which men are biologically motivated and environmentally conditioned to pay attention to when assessing women as possible mates. These findings (with this WEIRD sample) should be compared to other cultures in the future for precisely this purpose; to examine the role of culturally specific status on sexualization and objectification.

While women's fashion constantly evolves, this research aligns well with previous research that men perceive women in high heels as more attractive than those in flat shoes. This study provides evidence that men perceive women in high heels not only as more physically and sexually attractive, but also as more feminine and less masculine. It also highlights the potential role of status in hindering objectification, at least in the case of high heels.

### Credit authorship contribution statement

**T Joel Wade:** Conceptualization, Methodology, Data Analysis, Writing, Editing. **Rebecca Burch:** Conceptualization, Methodology, Data Analysis, Writing, Editing. **Maryanne Fisher:** Conceptualization, Methodology, Data Analysis, Writing, Editing. **Haley Casper:** Data Collection, Data Analysis, Writing, Editing.

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