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Downright Sexy: Verticality, Implicit Power, and Perceived Physical Attractiveness

Brian P. Meier
Gettysburg College

Sarah G. Dionne
Gettysburg College
Roles

Sarah G. Dionne: Class of 2007

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Abstract
Grounded theory proposes that abstract concepts (e.g., power) are represented by perceptions of vertical space (e.g., up is powerful; down is powerless). We used this theory to examine predictions made by evolutionary psychologists who suggest that desirable males are those who have status and resources (i.e., powerful) while desirable females are those who are youthful and faithful (i.e., powerless). Using vertical position as an implicit cue for power, we found that male participants rated pictures of females as more attractive when their images were presented near the bottom of a computer screen, whereas female participants rated pictures of males as more attractive when their images were presented near the top of a computer screen. Our results support the evolutionary theory of attraction and reveal the social-judgment consequences of grounded theories of cognition.

Keywords
physical attractiveness, power, attraction, gender perception, gender psychology

Disciplines
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Comments
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DOWNRIGHT SEXY: VERTICALITY, IMPLICIT POWER, AND PERCEIVED PHYSICAL ATTRACTIVENESS

Brian P. Meier and Sarah Dionne
Gettysburg College

Grounded theory proposes that abstract concepts (e.g., power) are represented by perceptions of vertical space (e.g., up is powerful; down is powerless). We used this theory to examine predictions made by evolutionary psychologists who suggest that desirable males are those who have status and resources (i.e., powerful) while desirable females are those who are youthful and faithful (i.e., powerless). Using vertical position as an implicit cue for power, we found that male participants rated pictures of females as more attractive when their images were presented near the bottom of a computer screen, whereas female participants rated pictures of males as more attractive when their images were presented near the top of a computer screen. Our results support the evolutionary theory of attraction and reveal the social-judgment consequences of grounded theories of cognition.

Power is typically defined as the ability to impact or influence people (e.g., Keltner, Gruenfield, & Anderson, 2003; Winter, 1973). When people talk about the concept of power, they might use metaphors that tap vertical space (Lakoff & Johnson, 1980, 1999). For example, when a person is perceived as powerful (e.g., in a work environment), he/she is thought of as "higher up" on the corporate ladder, whereas someone less powerful is "on the bottom rung." These metaphors indicate that verticality is a cue to hierarchical differences in people with those in authority typically being represented as "higher" than those without authority (e.g., Giessner & Schubert, 2007; Schwartz, 1981). While it would be difficult to determine the origin of vertical metaphors for power, they likely stem from actual experiences in which a powerful person or animal literally towers over one that is less powerful.

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Correspondence concerning this article should be addressed to Brian P. Meier, Department of Psychology, Gettysburg College, Gettysburg, PA, 17325; E-mail: bmeier@gettysburg.edu.

GROUNDED COGNITION

Metaphors for power and vertical space aide communication, but they also seem to reflect something deeper about our ability to represent knowledge (Lakoff & Johnson, 1980, 1999; also see Gibbs, 2006; Meier & Robinson, 2005). Metaphors may reveal the embodied or grounded nature of concept representation. Proponents of grounded theories assert that cognition, rather than being abstract and amodal, is inherently body based (e.g., Barsalou, 1999, 2008; Niedenthal, Barsalou, Winkielman, & Krauth-Gruber, 2005). In this view, off-line cognition (i.e., cognition that occurs in the absence of environmental input) is dependent upon sensation and perception. For example, thinking about a specific stimulus (e.g., driving a car) in the absence of that stimulus activates the same perceptual circuits used to interact with the stimulus as a physical entity (Barsalou, 2008).

The representation of abstract concepts might function in a similar manner, with metaphors being a manifestation, at least in some cases, of how we embody abstract thought (Barsalou, 2008). In the case of power and vertical space, metaphors do indeed seem to reflect the manner in which we think about power. Schubert (2005) hypothesized that when people think of power differences, they actually think of spatial differences. In one study, he presented participants with two words on a computer screen, one that had a powerful meaning and one that had a powerless meaning (e.g., master-servant, employer-employee). Participants were asked to identify which word belonged to the powerful group and which word belonged to the powerless group. Participants were quicker to judge a word as powerful when it was presented above a powerless word and vice versa (i.e., participants were faster to identify a powerless word when it was presented below a powerful word). Other studies have shown that this representation affects person-related judgments. For example, people believed that strangers (Meier, Hauser, Robinson, Friesen, & Schjeldahl, 2007) and a manager of a hypothetical company (Giessner & Schubert, 2007) were more powerful when these individuals were presented in a high (versus low) area of vertical space. These results (Giessner & Schubert, 2007; Meier et al., 2007; Schubert, 2005) reveal that vertical position is used as a cue for power during stimulus encoding and person perception. In other words, when we think of power, we unwittingly activate perceptions of vertical space, which bias our judgments. This occurrence could have consequences for more socially relevant behavior because it suggests that it should be possible to alter a person's perception of an individual by manipulating the vertical position of that individual. Below, we consider this possibility in the realm of physical attractiveness.

THE EVOLUTIONARY BASIS OF ATTRACTION

What do people find attractive in a potential mate? Although one's culture obviously plays an important role in perceived attractiveness (Wood & Eagly, 2007), Buss (1989, 1994) and others (e.g., Buss, Shackelford, Kirkpatrick, & Larsen, 2001) use evolutionary theory (related to the natural-selection view of Darwin, 1859) to argue that men and women desire mates that will allow them to successfully reproduce healthy offspring. According to Buss's (1989, 1994) research, which involved 10,000 participants in 37 cultures, on average, women reported desiring

men who have access to resources, who have social status, and who are about 3.5 years older, whereas men reported desiring women who appear youthful, are physically attractive, and are faithful. This preference for younger women becomes more exaggerated in older males (Kenrick & Keefe, 1992). Although there was variation across cultures, Buss (1989, 1994) suggests that the sex differences in mate desirability are motivated by people's drive to "pass on" their genes. In other words, the characteristics that both males and females find attractive in a potential mate are associated with reproductive success.

Buss's (1989, 1994) findings can be construed in terms of underlying power differences in what is considered attractive or desirable. Males with resources and status are most desirable. These factors are associated with power (Keltner et al., 2003), and are attractive to females because resources and status offer protection and support (Buss, 1994). On the other hand, females who are younger and faithful or subordinate are most desirable. These factors are associated with a lack of power, and are attractive to males because they signal health and increase the likelihood that the male is the father of the female's offspring (Buss, 1994). Youth is typically seen as a lower status entity in multiple contexts (e.g., economic, seniority), which is a defining determinant of powerlessness (Keltner et al., 2003). In simple terms, powerfulness is associated with status and resources and powerlessness is associated with youth and faithfulness.

Some experimental work has partially supported Buss's (1989, 1994) evolutionary theory of human mating strategies. For example, Greitemeyer (2007) found that when rating the desirability of a partner, men place less emphasis on high socioeconomic status than women; men actually preferred women with low socioeconomic status. Greitemeyer (2007) showed males and females pictures of the opposite sex and gave them a profile of the person in the picture that reflected either a high or low socioeconomic status. The participants were asked to rate the likelihood that they would want either a long-term or short-term relationship with each pictured individual. Greitemeyer (2007) found that women rated the likelihood of a relationship as greater when men were presented as having high socioeconomic status, but the opposite pattern was found for men (i.e., they preferred women with a low socioeconomic status). This effect was stronger for long-term relationships. Conceptually similar results were reported by Townsend and Levy (1990).

THE CURRENT STUDY

We sought to use the vertical representation of power (Giessner & Schubert, 2007; Lakoff & Johnson, 1999; Schubert, 2005) to examine Buss's (1989, 1994) view of desirability. Grounded theory offers the parsimonious prediction that vertical position is an important cue that aides people's conceptualization of the abstract concept of power (powerful is up and powerless is down; Schubert, 2005). Because Buss's (1989, 1994) research suggests that powerful men (those with resources and status) and powerless women (those who are young and faithful) are most desirable, we hypothesized that vertical position will have an opposing effect on male and female ratings of the attractiveness of opposite-sex individuals. Specifically, we predicted that males would rate females as more attractive when their images appear in a low vertical position, whereas females would rate males as more attractive when their images appear in a high vertical position. In order to test our

hypothesis, participants were asked to rate the attractiveness of people in photographs that appeared near the bottom and top of a computer screen.

METHOD

PARTICIPANTS

Participants were 79 Gettysburg College students with a mean age of 19.03 (*SD* = 1.09) years. Of these participants: 29 were male and 50 participants were female; 75 participants identified themselves as Caucasian, two identified themselves as Asian, and two identified themselves as "other."[1]

MATERIALS AND PROCEDURE

Pictures and Pilot-Rating Study. Two hundred pictures (100 males and 100 females) were selected from the 2001 Gettysburg College year book. We wanted to use a set of images that were similar in attractiveness ratings so that our vertical space manipulation would be most powerful. Therefore, we asked ten Gettysburg College students (five males and five females) not involved in the current study to pre-rate the attractiveness of the people in the images. The pictures were presented to raters one at a time at the center of a computer screen. The raters used the mouse and mouse cursor to select a point on a continuous scale (a horizontally placed white bar) that reflected their rating for each image. The scale ranged from "very unattractive" (at pixel 137) to "very attractive" (at pixel 887), which produced a 750-point scale (using a screen resolution of 1024 x 768 pixels on a 19-inch monitor). This rating scale, along with the pictures, was shown on a neutral gray background. There was a 500 ms pause in between each rating, but the rating scale stayed on the screen at all times. We computed the average attractiveness rating for each image, and the average ratings for both male and female images. We then chose 30 male pictures and 30 female pictures that were rated slightly above or below the average attractiveness for use in the current study.

Main Study Procedure. Participants were asked to rate the attractiveness of people in the photographs as they were serially presented on a computer screen. We told participants that we were interested in how they rate the attractiveness of others. We also told them that the location of the images on the screen may vary from trial to trial because we find that this variation forces people to stay focused on the task. Participants rated each picture twice, once in each vertical position. All photographs were shown once before the second repetition began. We told participants that they may see each image more than once, but to simply rate the attractiveness

1. Due to an oversight, we failed to collect data on participants' sexual orientation. However, data from a prior sample of 78 participants (39 males and 39 females) from the same participant pool used in the current study revealed that 100% of the sample reported having a "heterosexual" sexual orientation. Therefore, we believe that the overwhelming majority of the participants in the current study were heterosexual.

of the person in that image on that trial without referring to their first rating of the image.

The pictures randomly appeared one at a time near the top (centered at pixel number 126) or bottom (centered at pixel number 643) of a 19-inch computer screen (using a screen resolution of 1024 x 768 pixels). Pictures were shown at a size of 180 pixels in width by 250 pixels in height. This size and placement required the top or bottom part of each image to be located very near the top (for pictures appearing on top) or bottom (for pictures appearing on the bottom) of the computer screen.

In order to balance picture and location across participants, we created two versions of the task. In one version, in the first repetition, half of the pictures of each sex were shown near the bottom of the screen and the other half of the pictures were shown near the top of the screen. The positions were reversed for the second repetition. In the other version of the task, the pictures appeared in the opposite locations across repetitions. In other words, for example, one picture appeared "up" in the first repetition and then "down" in the second repetition in one version of the task, but that same picture appeared "down" in the first repetition then "up" in the second repetition in the other version of the task.

Participants rated the attractiveness of each image by clicking the left mouse button while the mouse cursor was somewhere on the same continuous scale used in the pilot-rating session (pixel number 137 = very unattractive to pixel number 887 = very attractive). There was a 1000 ms pause in between ratings, but the rating scale stayed on the screen at all times. We predicted that males would rate females as more attractive when placed near the bottom of the screen, but that females would rate males as more attractive when placed near the top of the screen. Such a pattern would be reflected in a three-way interaction among participant sex, picture sex, and picture location.

RESULTS

We computed the average ratings for picture type and picture location for each participant. The means and standard deviations for these variables are shown in the Table 1. We then conducted a 2 (participant sex: male or female) x 2 (picture sex: same or opposite) x 2 (picture location: top or bottom) ANOVA. The main effects of picture sex, participant sex, and picture location, as well as the interaction between picture location and participant sex, were not significant, $Fs < 1.79$. The interaction between participant sex and picture sex was significant, $F(1, 77) = 7.33$, $p = .008$, as females rated same-sex pictures ($M = 319.24$; $SD = 112.35$) as more attractive than opposite-sex pictures ($M = 296.23$; $SD = 108.36$), whereas males rated opposite-sex pictures ($M = 316.39$; $SD = 68.68$) as more attractive than same-sex pictures ($M = 298.21$; $SD = 84.35$). The interaction between picture location and picture sex was also significant, $F(1, 77) = 6.10$, $p = .016$, as location did not appear to affect opposite-sex ratings (bottom $M = 303.23$; $SD = 97.91$; top $M = 304.03$; $SD = 94.52$), but location did appear to affect same-sex ratings (bottom $M = 309.04$; $SD = 103.87$; top $M = 314.01$; $SD = 102.64$).

Most importantly, and as predicted, the three-way interaction among participant sex, picture sex, and picture location was significant, $F(1, 77) = 6.64$, $p = .012$, $\eta_p^2 = .08$. In order to test for our predicted effect, we conducted two followup ANOVAs that examined participant sex and picture location for same-sex and opposite-sex

TABLE 1. Means and Standard Deviations of the Attraction Ratings (1 = Very Unattractive; 750 = Very Attractive)

		Statistic	
Participant Sex	**Variable**	***M***	***SD***
Male	Opposite-Sex Rating – Top	313.61	66.81
	Opposite-Sex Rating – Bottom	319.17	72.36
	Same-Sex Rating – Top	301.33	85.67
	Same-Sex Rating – Bottom	295.08	84.40
Female	Opposite-Sex Rating – Top	298.47	107.64
	Opposite-Sex Rating – Bottom	293.99	109.68
	Same-Sex Rating – Top	321.36	111.47
	Same-Sex Rating – Bottom	317.13	113.67

attractiveness ratings. We first conducted a 2 (participant sex: male or female) x 2 (picture location: top or bottom) ANOVA on the attractiveness ratings of same-sex pictures. The main effect of participant sex and the interaction between participant sex and picture location were not significant, *F*s < 1. The main effect of picture location was significant, $F(1, 77) = 6.85$, $p = .011$, as same-sex images were rated more attractive when they appeared near the top ($M = 314.01$; $SD = 102.64$) rather than near the bottom ($M = 309.04$; $SD = 103.87$) of the screen. It is difficult to make conclusions about this main effect as evolutionary-based theories of desire have little to say about same-sex attraction for heterosexual individuals (e.g., Buss, 1994). However, considering grounded theories and evaluative behavior, one explanation might be that in the context of same-sex pictures, attraction ratings were guided by likeability rather than desire, and it has been shown that valence is represented by perceptions of vertical space such that a higher location is indicative of positivity while a lower location is indicative of negativity (Crawford, Margolies, Drake, & Murphy, 2006; Meier & Robinson, 2004).

We next conducted a 2 (participant sex: male or female) x 2 (picture location: top or bottom) ANOVA on the attractiveness ratings of opposite-sex pictures. The main effects of participant sex and picture location were not significant, *F*s < 1. However, unlike the two-way interaction for same-sex pictures, the two-way interaction for opposite-sex pictures was significant, $F(1, 77) = 5.12$, $p = .027$, $\eta_p^2 = .06$. Although the pair-wise comparisons were not significant at the traditional level, male participants: $F(1, 28) = 1.69$, $p = .205$, $\eta_p^2 = .06$; female participants: $F(1, 49) = 3.79$, $p = .057$, $\eta_p^2 = .07$, as shown in Figure 1, the significant interaction clearly reveals the hypothesized effect that vertical position would have on attractiveness ratings of opposite-sex pictures. That is, males rated females as more attractive when their images appeared near the bottom of the screen, whereas females rated males as more attractive when their images appeared near the top of the screen.

DISCUSSION

Descriptions of vertical space are used in metaphors for power ("a higher status"; Lakoff & Johnson, 1980; 1999). While these metaphors aid communication,

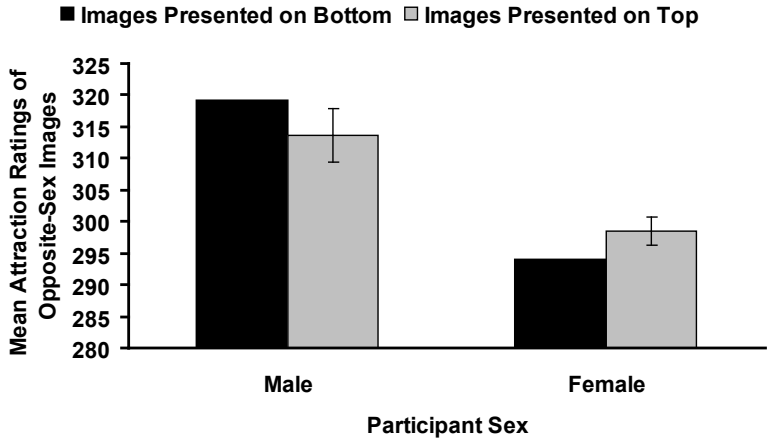

FIGURE 1. Attractiveness Ratings of Opposite-Sex Pictures as a Function of Participant Sex and Picture Location (1 = Very Unattractive; 750 = Very Attractive)

Note. Error bars denote the standard error of the difference between adjacent bars.

they also indicate the deeply perceptual manner in which we conceptualize abstract concepts (Meier & Robinson, 2005; Schubert, 2005). We used this theory of representation in a novel manner by examining Buss's (1989; 1994) evolutionary theory of mate desirability. As predicted, we found that males rated females as more attractive when their images appeared near the bottom of a screen, whereas females rated males as more attractive when their images appeared near the top of a screen. Below, we discuss some implications of these results.

IMPLICATIONS FOR AN EVOLUTIONARY THEORY OF DESIRABILITY

Our results support the evolutionary theory of desirability (Buss, 1989, 1994), and offer a novel manner in which such theories can be experimentally examined. Strong experimental tests of evolutionary theory are impossible (i.e., one cannot randomly assign participants to an "evolutionary pressure" or "no evolutionary pressure" condition), but some predictions made by these theories are amenable to experimental research. In the present case, we used grounded theory (Barsalou, 2008) and research (Giessner & Schubert, 2007; Meier et al., 2007; Schubert, 2005) to design an experimental manipulation that examined desirability and implicit cues of power. While theories of grounded cognition (Barsalou, 1999, 2008) attempt to explain the fundamental processes of human cognition, our results suggest that they can be extended to areas beyond the basic processes of cognition, and can have interesting implications for social interaction.

In addition to the present findings, research can build upon people's reliance on grounded processes by examining other evolutionary-based predictions. For example, based on natural selection pressures, some researchers suggest that males seek sexual intercourse more often than females and desire more sexual partners

than females (Schmitt, 2005). We could examine such a prediction from a grounded perspective. For instance, Lakoff and Johnson (1980, 1999) posit that the abstract concept of love is represented by a physical force (e.g., "there were sparks between them," "he is uncontrollably attracted to her"), which often refers to "sexual desire." If the evolutionary theory of human mating is correct, then males should more strongly represent love in terms of a physical force or spatial distance than females. Studies of the present type could inform such a prediction.

PARTNER PREFERENCE IN THE "REAL WORLD"

In addition to supporting evolutionary theory, our results may also partially explain why in most heterosexual couples, the male is typically taller than the female. While we realize that the average male is taller than the average female, which necessarily forces the male to be taller than the female in the typical heterosexual couple, Gillis and Avis (1980) reported that this effect is particularly strong. They used bank-account applications to examine the height of 720 couples. In all but one couple, the male was taller than the female. While this effect was found in actual couples, Sheppard and Stratham (1989) found that males reported a preference for shorter females, whereas females reported a preference for taller males. A meta-analysis found this pattern to be robust (Pierce, 1996).

Our findings suggest that height might actually be a cue to power and hence attractiveness. In other words, a tall or taller male might be considered powerful while a short or shorter female might be considered powerless. Therefore, one reason why the male-taller norm appears to be a common occurrence in heterosexual couples (Pierce, 1996) might be because males find powerless females (shorter) attractive whereas females find powerful males (taller) attractive. Indeed, some research has shown that taller females are perceived as more powerful (Boyson, Pryor, & Butler, 1999). It is unknown, however, whether the male-as-taller norm occurs because perceived power mediates the link between height and attractiveness. Further research would be necessary to examine such a prediction.

EVOLUTION AND SOCIAL STRUCTURE

While our effects support Buss's theory of mate desirability (1989, 1994), Eagly and Wood (1999) contend that sex differences in mate desirability occur because of the social structure in which males and females are placed (not because of evolutionary pressures). Eagly and Wood (1999) suggest that in the U.S. and in many societies around the world, males typically have more power and resources than females. Because of this social structure, Eagly and Wood (1999) believe that sex differences in mate desirability occur because of the constrained aspect of one's social order.

Our results could potentially support the ideas of Eagly and Wood (1999), but we note that our study did not seek to explicitly contrast evolution and social structure theories, a task that is quite a bit beyond the scope of our article. Indeed, it would be rather difficult, if not impossible to provide definitive evidence for one theory over the other. In our view, it is more likely that evolutionary processes in-

teract with social/cultural processes with one building upon the other (Baumeister, 2005).

CONCLUSION

We used the basic tenets of the theory of grounded cognition to examine predictions made by evolutionary psychologists. Using vertical position as an implicit cue for powerfulness (up) and powerlessness (down), we found that males rated females more attractive when their images appeared in a lower area of vertical space, whereas females rated males as more attractive when their images appeared in a higher area of vertical space. These findings support evolutionary theory, reveal that grounded theory has implications for common social judgments, and illustrate how grounded theory can be used as a tool to examine predictions made by theories outside the realm of basic and fundamental cognitive processes.

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