Picture Power: Gender Versus Body Language in Perceived Status

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ORIGINAL PAPER

Picture Power: Gender Versus Body Language in Perceived Status

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Abstract Power hierarchies in interaction are maintained due to a variety of cues including gender and body language and can keep competent individuals from being re- AQ1 garded as high status. The present study primed participants with an image consisting of two components—gender (man or woman) and body pose (dominant or submissive)—and then asked participants to classify written target words as either dominant or submissive. In response to these target words, we measured accuracy (% incorrect) and classification speed (RT), in addition to event-related potentials (ERP), from 23 participants. Although we did not find ERP differences in the predicted N400 component, error rate and RT measures indicated that regardless of the gender of the prime, dominant poses facilitated identification of dominant words. Interestingly, whereas female submissive posing facilitated classification of submissive target words, male submissive posing did not. These results support the idea that women can use counter-stereotypical nonverbal displays, dominant poses, to change how they are initially perceived in terms of power. Interestingly, men may be more limited in the success of their counter-stereotypical, submissive, posing. Potential underlying mechanisms are discussed.

Keywords Gender · Power · Pose · Body language · Dominance

Introduction

Within 1–5 min of three strangers meeting, a power hierarchy has already emerged among them (Fisek and Ofshe 1970). This streamlines interactions; instead of jockeying for high power positions, individuals are slotted into different positions based on their personal

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power as perceived by the group. It is well known that there are a number of cues that people use to determine this hierarchy (e.g., gender and nonverbal displays), but it is not clear which variable takes precedence when two or more conflict. For instance, if a white man enacts submissive body language, will he be perceived as powerful (based on his gender and racial group identities) or powerless (based on his individual-specific body language)? The present study investigates which power cue is stronger—gender or body language—in priming power attributions.

When status cues compete either, one will have more of an impact or they will cancel each other out. The interplay between rank and gender has been well studied (e.g., Dovidio et al. 1988; Henley 1995), but which takes precedence—gender or body pose—has received less attention. Gender compared to body language has been researched using only indirect descriptions of a man (Aguinis et al. 1998) and a woman (Aguinis and Henley 2001) in separate studies that artificially inflate the importance of nonverbal displays by explicitly drawing participants' attention to them through a written story. To our knowledge, ecologically valid visual displays of gender and body pose have not been compared to determine which cue is more meaningful during actual perception. The present study undertakes this endeavor.

The Vertical Dimensions

Perceptions of who is, or who should be, in charge organize social interactions (Fisek and Ofshe 1970). Relationships of this nature are part of the "vertical dimensions," which include particular social contexts, such as who emerges as the leader in a group project (Buss 2004; Henley 1995; Maricchiolo et al. 2011), and broad cultural patterns, such as which sub-group receives the most resources (Ho et al. 2012). The vertical dimensions contrast with the "horizontal dimensions," which encapsulate egalitarian relationships among peers, such as friendships (Hall et al. 2005).

A vertical hierarchy can be a manifestation of disparity in dominance, competence, power, or status. Though these concepts differ, they have not always been consistently distinguished in the literature (Carney et al. 2010; Fiske et al. 2006; Foschi 2000; Hall 1998). For example, dominance has been defined as behavior seeking to control others through subtle or explicit threats (Hall et al. 2005; Ridgeway 1987) and also as an individualized personality trait (Carney et al. 2005; Hall et al. 2005; Henley 1995; Ho et al. 2012; Mazur et al. 1980). Despite the nuances between dominance, competence, power, and status, all four terms represent the upper hierarchical term in their respective vertical relationships (i.e., dominant is to submissive as competent is to incompetent). Therefore, to account for the inconsistent definitions of specific terms, the present study follows precedence in collapsing them into one conceptual category termed V, referring to the vertical dimensions broadly (Hall et al. 2005; Henley 1995). One's V is based on different types of cues, including gender.

Gender

Social Role Theory distinguishes between sex, which is biologically determined due to chromosomal, hormonal, and phenotypical differences that are relatively immutable, and gender, which is understood as a socially constructed role (Eagly 1987; Henley 1995). It proposes that inner dispositions are inferred from external behavior; thereby gender roles also encompass internal characteristics and traits (Eagly 1987; Eagly et al. 2000).

Role Congruity Theory is an extension of Social Role Theory, and it explains women's continued underrepresentation in leadership positions (Catalyst 2013; Center for American Women and Politics 2013) as a perceived incompatibility between the traits associated with women and those associated with leaders. Research confirms that women are associated with being communal, while men and political and businesses leaders more generally are associated with being agentic (Cejka and Eagly 1999; Glick and Fiske 1996; Koenig et al. 2011; Powell and Butterfield 1989; Rosenwasser and Dean 1989; Rudman et al. 2012; Sczesny 2003; Sczesny et al. 2006). These trait associations connect women with low V and men with high V. Research also confirms how easily gendered associations can be primed (White et al. 2009). For instance, Banaji and Hardin (1996) primed participants with gender-related (e.g., doctor) and neutral words and then presented gendered and neutral pronouns. They found that participants formed an expectation for gendered pronouns based on the corresponding gendered primes even when the task did not explicitly ask about gender.

Role Congruity Theory helps to explain why women and men occupy different positions on the vertical hierarchies by suggesting that women's ascribed traits are seen as incompatible with high V positions. Men and women are so frequently associated with high V and low V respectively, that gender itself becomes a heuristic cue for V status. Another cue that can signify V status is body language.

Embodied V

People with different V status also display different patterns of body language. This overlaps with gender, with men displaying high V body language and women low V body language (Aries 1996; Hall 1990), but also emerges in other V relationships (Hall et al. 2005). One key finding is that high V individuals tend to take up more space (Hall et al. 2005; Henley 1995). For instance, in Hai, Khairullah and Coulmas's (1982) iconic study, researchers used a naturalistic setting and observed who used the shared armrest on airplanes and found that even when controlling for relative body size, men were 75 % more likely to use the armrest. Similarly, Hall et al. (2005) conducted a meta-analysis summarizing studies that examined the actual nonverbal differences between groups based on their V status, defined *not* in terms of gender but rather by rank. They found that across studies, regardless of specific V dimension definitions (i.e., power, dominance, or competence) consistent differences emerged in broad bodily posture, with people high in V displaying more openness (keeping limbs open instead of crossed) and expansiveness (taking up more space).

The above V differences in body language *production* mirror differences in body language *perception* as well. Displays of gestural and postural cues high in V, lead to the perception and attribution of high V (Aguinis and Henley 2001; Henley 1995; Maricchiolo et al. 2011; Ridgeway 1987). Perceived differences in nonverbal displays of people along the V dimensions are augmented compared to actual differences. Hall et al. (2005) found that across studies, perceivers connect high V with more bodily openness and expansiveness, and fewer self-adaptors. Schmid Mast and Hall (2004) presented pictures of two actual professional colleagues interacting, and had one cohort of participants rate each individual's rank in isolation and another cohort do so relative to the pictured individual's partner. By correlating these ratings to coded nonverbal displays, they found that participants in both cohorts used pictured individuals' nonverbal displays to make V status ratings at remarkably accurate rates, compared to other characteristics inferred from body language [such as personality traits (Gifford and Hine 1994)]. Therefore, not only do

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people with different V statuses produce distinct nonverbal displays, but also perceivers use that body language to make V attributions.

It is clear that the vertical dimensions organize social interaction. Nonverbal displays are one of the ways that individuals high in V, regardless of its source (gender, race, status, etc.), assert and maintain their hierarchal position (Henley 1995). DePaulo (1992) argues that nonverbal displays can serve self-presentational purposes, and under certain conditions, allow people to manipulate how others perceive them. Recent interdisciplinary evidence from neuroscience extends these behavioral findings by indicating the importance of social cues to semantic understanding at very early stages of processing.

Neurological Underpinnings

Early models of communication privileged the semantic meaning of a sentence, based on grammatical rules (syntax) and vocabulary, over pragmatics, which are based on social contexts, including those mediated by V hierarchies (Chomsky 1957). These models proposed that semantic information is processed first, followed by pragmatics. More recent neuroimaging linguistic studies indicate that pragmatic contextual cues are integrated into language processing earlier than previously thought (Leuthold et al. 2012; Tesink et al. 2009; van Berkum 2008).

One tool that has been applied to many social neuroscience questions because of its high temporal sensitivity is electroencephalogram (EEG) data, which are recorded from the scalp and measure continuous electrical activity in the brain. These data can be segmented to particular time points, such as a given stimulus presentation, and averaged to create event-related potentials (ERPs). Characteristic ERPs have been identified with particular brain processes. A negativity beginning around 300 ms and peaking around 500 ms post-stimulus onset (N400) indexes semantic integration. Violations of semantic congruity (e.g., “He took a sip from the transmitter) elicit larger N400s (Key et al. 2005; Kutas and Federmeier 2000; Kutas and Hillyard 1980).

Van Berkum et al. (2008) created violations based only on subtle social information and still found larger N400s. The sentences themselves reflected perfect semantic congruity but were incongruous with the speaker’s social roles based on vocal cues about his or her gender, class, or age. For instance, in the sentence, “I have a large tattoo on my back,” larger N400s were elicited to the word “tattoo” when the sentence was read in an upper-class accent as opposed to a lower-class accent. The importance of pragmatics to semantic processing has been extended to single word pairs, removing words from any syntactic structure (Bentin et al. 1985). White et al. (2009) primed participants with either “woman” or “man” and then presented participants with a gender-associated target word. They found larger N400s for incongruous pairings.

This research elevates the importance of pragmatic information, including gender (White et al. 2009) and body cues (de Gelder 2006; de Gelder et al. 2010; Stekelenburg and de Gelder 2004; van Heijnsbergen et al. 2007), to language processing and communication more broadly. Such socially relevant cues impact basic semantic processing as early as 300 ms after word presentation. It also establishes the use of temporally sensitive neuroscience methodologies, such as ERPs, to the study of socially relevant cues through priming paradigms. This is a powerful tool in that it can uncover neural differences even in the absence of differences in behavioral outcomes. Furthermore, when there are complementary behavioral differences, ERPs can give insight into the specific mechanisms (e.g., specific high-level cognitive processing) underlying those behaviors.

The Present Study

V cues are often confounded. High power nonverbal displays are traditionally associated with men, and low power nonverbal displays with women (Hall 1990). However, these connections are no longer thought to be necessary or absolute (Hall et al. 2005). From the perspective of Social Role Theory (Eagly 1987) it is possible that body language can be used by *both* men and women to change how they are perceived (DePaulo 1992). Which cue is more important—gender of body pose—then becomes an important question both theoretically and practically. Women and men still fill very different roles in society (Eagly 1987), with women having difficulty achieving equal representation in high power roles (Catalyst 2013; Center for American Women and Politics 2013). Body language may provide one way to achieve that goal by changing how individual women are perceived.

The present study draws on the established association between gender and V status (Eagly and Karau 2002; Henley 1995), and on that between embodied presentations and V status (Schmid Mast and Hall 2004), to understand which cue is more important and whether this differs for men and women. To answer this question, we use behavioral indexes. We also collect ERPs, taking advantage of the relatively recent application of the established N400 component to socially meaningful cues and body language (de Gelder et al. 2010; White et al. 2009), to test for difficulty with semantic processing as one potential causal mechanism. Participants were shown pictures that provided the dual prime of gender and body pose. They were then presented with high V words or low V words and asked to rapidly classify the word as either dominant or submissive. The degree to which the gender and pose information in the primes influenced the participants' classification was measured by their error rates, reaction times (RT), and brain response—larger N400s indicating difficulty with semantic processing caused by incongruity with previous semantic context.

Using this paradigm, we predict that our findings will conceptually replicate the associations already established in the literature between: (1) men and high V and women and low V (e.g., Rudman et al. 2012), (2) more open body language and high V and more closed body language and low V (e.g., Hall et al. 2005) and (3) men and high V posing and women and low V posing (e.g., Hall 1998). For example, we predict that men followed by high V words, high V poses followed by high V words, and men in high V poses will all be easier to process than their respective incongruous counterparts (as manifested by fewer errors, quicker RTs, and smaller N400s).

Secondly, and critically, this study will then add to the literature by investigating how gender and pose interact. When body pose and gender do not align with stereotypical expectations, we have two-fold predictions. If gender matters more, correctly categorizing target words will be easier (fewer errors, quicker RTs, and smaller N400s) when gender is congruent with the target words regardless of the pose. For example, men in low V and high V poses will equally facilitate identification of high V words. Such a pattern would indicate that participants utilized the gender prime more than the pose prime in forming their expectations and would support the conception that gender roles are prioritized as social organizers (Eagly 1987; van Berkum et al. 2008). If pose matters more, we predict the opposite pattern; that is, men in high V poses will facilitate identification of high V words more than men in low V poses. This would support the conception that individual V displays enacted by the whole body cut through gender stereotypes and provide more socially meaningful information about an individual's V status (de Gelder 2006; DePaulo 1992).

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Method

Ethics Statement

This experiment was reviewed and approved by the university's Institutional Review Board (IRB). All participants read and signed an informed consent form before the study and a debriefing form afterwards, both of which were also approved by the IRB.

Participants

Twenty-three undergraduates (17 women, 20 white, all right-handed as self-reported) between the ages of 18 and 21 participated for research course credit or on a volunteer basis. All participants were native English speakers and had normal (or corrected to normal) vision. One participant was discarded from the ERP analysis due to excessive artifacts in brain wave data.

Sample size was chosen a priori to be between 20 and 25 participants based on previous work with similar methodologies in the neuroscience (e.g., White et al. 2009) and cognitive traditions (e.g., van den Stock et al. 2007). Power analyses bolstered the suitability of this range. A priori power analyses conducted using the program G-star power (Faul et al. 2007) with an effect size of $\eta_p^2 = 0.26$[1]—determined to be a large effect size and thus theoretically significant (Murphy et al. 2009)—indicated that 16 participants were needed to reach a power of 0.95.

Materials

The video stimuli were comprised of a prime image with two components, pose (high V or low V) and gender (male or female), followed by a target word (high V or low V). The 8 V poses were enacted by 6 individuals, leading to 48 distinct images. Each image was then paired with either a high V or low V word, generating 96 distinct trials. The words were cycled such that a given word was not paired more than once with a given pose or more than once with a given individual, thereby participants could not develop any association between a particular pose and a particular word, or a particular individual and a particular word.

A trial consisted of 200 ms of a gray screen with a white '+' focus point, 100 ms of a blank gray screen, 200 ms of a gray screen with the prime image (Hinzman and Kelly 2013; Meeren et al. 2005; van den Stock et al. 2007), 100 ms of a blank gray screen, 200 ms of a gray screen with the target word written in white, and then 1100 ms of a blank gray screen (White et al. 2009). Inter-trial stimulus interval varied from 1500 to 2000 ms. All videos were made using iMovie and ERP recording time locked to target word onset using an in-house tagging program called TagMovies.

Pose Prime

For the pose component of the prime, five high V and five corresponding low V poses were extracted and generated from the nonverbal literature (Buss 2004; Carli et al. 1995; Carney et al. 2010; de Lemus et al. 2012; Hall et al. 2005; Henley 1995; Ridgeway 1987; Tiedens and Fragale 2003; Yang 2010). High V poses displayed more bodily openness, more bodily

1FL01 [1] This effect size was computed from the alternate statistic $f^2 = 0.35$ in the program G-star power.

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expansiveness, and fewer self-adaptors. These features were chosen for their consistent representation in actual and perceived differences in body language along the V dimension (Hall et al. 2005) and for their applicability to static, facial-expression-controlled representations. In a preliminary study, four participants (not included in the present sample) rated these poses enacted by both men and women on a seven-point Likert scale. Order effects were controlled for by varying order of pose type presentation and gender presentation. One low V standing pose was rated as relatively higher in V. Though it was still viewed as more submissive than its high V counterpart, it was rated higher in V than neutral.[2] Therefore, this pose and its high V counterpart were discarded, leaving a total of eight poses (See Fig. 1 for low V poses and Fig. 2 for high V poses).

Gender Prime

The gender component of the prime was provided by the gender of the model pictured, which aligned with their sex according to typical patterns to ensure that gender was a meaningful prime. The stimuli were all white and heterosexual-identifying, as race and sexual orientation intersect with V attributions in complex ways beyond the scope of the present study (Lyons et al. 2014; Moore and Porter 1988; Parker and Ogilvie 1996). All models wore black t-shirts and dark colored jeans with no jewelry to standardize the formality of dress, which has also been linked to V status attributions (Schmid Mast and Hall 2004). Six distinct models provided the stimuli and two additional models were used for practice trials only. Though this introduced variability, it ensured that the findings would be generalizable beyond a given individual and prevented participants from growing accustomed to a given model as an exception who violates gender norms (van Berkum et al. 2008).

Real models were used, as opposed to computer-generated images, to ensure greater generalizability to actual human interactions. One limitation of this is that body size varied according to typical sexed patterns: the men tended to be larger. The pictures were cropped relative to the body, rather than having larger bodies fill the frame more. However, this meant that the men's pictures tended to be larger. Relative body size in the images was controlled for by matching the size of the chair in all seated poses across individuals. For the standing pose, which did not include a chair, the size of the face was matched to that AQ2 individual's face in a seated poses to ensure consistency. Therefore, visual body size differences were only representative of individual variability that reflected typical gender differences. Models' heights were representative of the averages for white men and women (Visscher 2008; see Table 1).

Since facial expression can connote V status (Hess et al. 2004), facial expression was controlled for. The face of individuals in a neutral pose was digitally transposed onto all poses for that individual using Photoshop. Therefore facial expression did not differ across pose conditions. Since research shows that when facial expression and body language conflict, perception is biased towards the body, we can be confident that the incongruous neutral face did not override the V body cues (Meeren et al. 2005; van den Stock et al. 2007); though it is important to note that this research concerns emotional body expression rather than V body expression. If there were any gendered V differences in resting facial expression because of gender differences in facial composition and micro-facial expression

[2] With one being low V, four being neutral, and seven being high V, low V poses were rated respectively: 2.38, 1.50, 2.50, *4.38*, and 3.38. The italicized score is what caused that pose and its high V counterpart to be discarded. High V poses were rated respectively: 5.13, 5.38, 6.50, 5.88, 6.25.

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Fig. 1 Each low V pose enacted by a sample of women compared to men is here depicted. Notice that the men's pictures tend to be larger; pictures were scaled relative to body size and this difference reflects the average difference in men and women's height

(Hess et al. 2004; Keating 2011), rather than being a confounding variable, this would simply be an additional component of typical gender presentation.

Finally, attractiveness data was collected to ensure that any effect of the gender prime was not actually an attractiveness effect (Poling 1978). Following the experimental task, participants rated the models in neutral poses on attractiveness using a seven-point Likert-type scale; 13 participants received a scale where seven represented "most attractive," and 10 participants received an inverted scale. Order of model presentation was randomized using a random numbers generator in the statistical package R, and was distinct for each participant. Results are discussed below.

Target Words

Target words were extracted from the published operational definitions of the vertical dimension (denoted as dominance, competence, power, or high status) in the relevant literature (Carney et al. 2010; Fiske et al. 2006; Hall et al. 2005; Ridgeway 1987) and converted into their adjective forms. In a preliminary study, 31 unique participants rated 35 words on their association with dominance and submissiveness using a seven-point Likert-type scale with seven representing "dominant" for half of the words, and the inverse for the other half. The eight high V and eight low V words that were most consistently rated according to expectations were used for the target word stimuli (see Table 2 for words and ratings).

Procedure

Participants came into the lab and were brought into a soundproofed room where they sat 0.5 m from a computer monitor. First, participants were fitted with a 128-electrode Geodesic ERP net.[3] Next, the experimenter explained that they would see an image flashed on the screen followed by a word. The experimenter explained that the task was to identify the target word as either typically associated with dominance or with submissiveness using a hand-held keypad with one button labeled "DOM" for dominance and one labeled "SUB" for submissiveness. Participants were asked to answer according to their intuitive response, as they only had a couple seconds to respond.

A computer recorded their responses and RTs. Participants were instructed that though their task only concerned the word, they should still attend to the image. Superficial compliance was monitored through video surveillance during the task. Because this study

3FL01 [3] The EEG was sampled at 250 Hz using a band-pass filler of 0.1–30 Hz, and impedances were kept below 40 kΩ (the Geonet system uses high-impedance amplifiers). The ERPs were vertex referenced for recording and linked-mastoid referenced for analysis and presentation. Following re-referencing, the brain waves were baseline corrected to a 100-ms prestimulus window. Eye artifacts during data collection were monitored with four EOG electrodes, with voltage shifts above 70 μV marked as bad (for more on the EOG algorithm, see Gratton et al. 1983; Miller et al. 1988). Non-EOG channels were marked as bad if there were shifts within the electrode of greater than 200 μV for any single trial. If over 20 % of the channels were bad for a trial, the whole trial was rejected. Considering all of the participants, 8.31 % ($SD = 6.79$ %) of the trials were rejected; after removing one participant for excessive artifacts (26.34 %), 7.49 % ($SD = 5.67$ %) of the trials were rejected.

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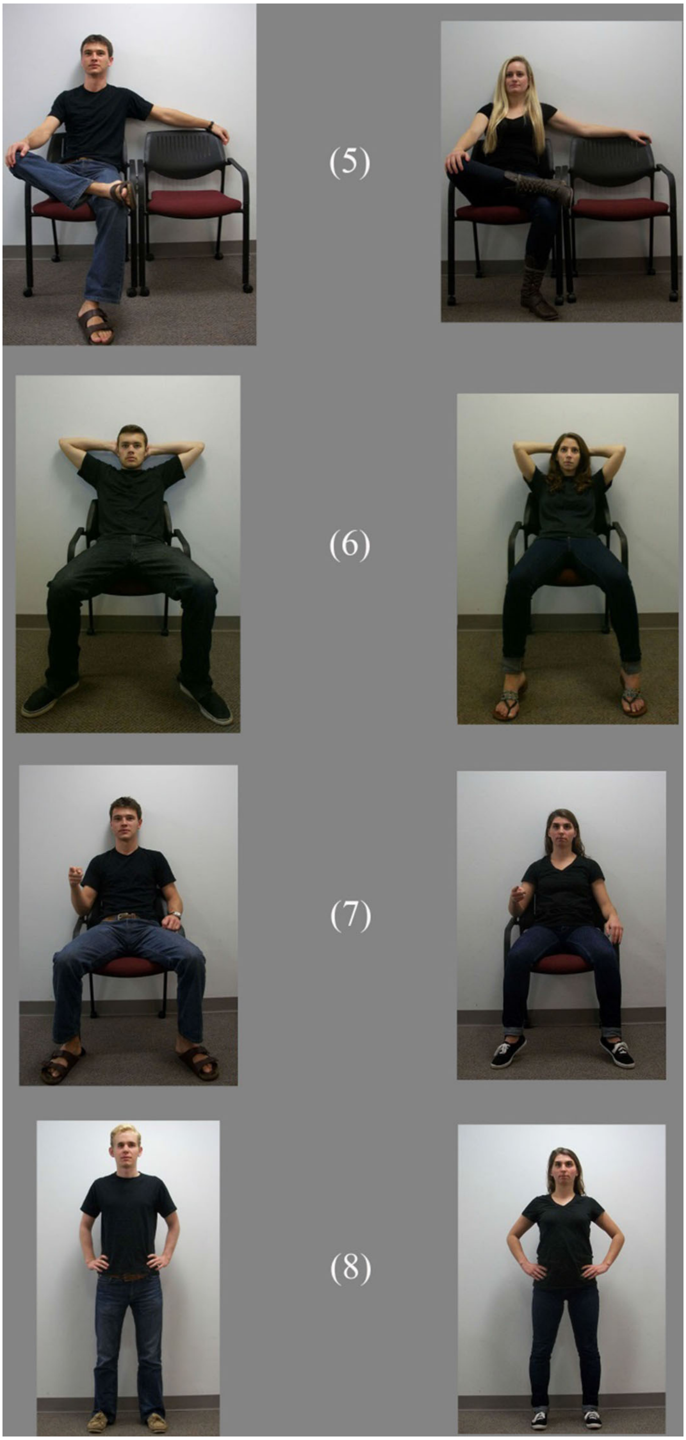

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◀**Fig. 2** Each high V pose enacted by a sample of men compared to women is here depicted. Again the men's pictures tend to be larger; pictures were scaled relative to body size and this difference reflects the average difference in men and women's height

Table 1 Demographic information and attractiveness rating for individual person primes

Prime person ID	Sex	Hair color	Height (cm)	Attractiveness (*SD*)
SL	M	Brunette	177.8	4.00 (0.90)
JL	M	Brunette	182.9	4.61 (0.99)
AF	M	Blond	172.7	3.22 (1.23)
Mean for all male primes			177.8	3.94 (0.66)
JG	F	Brunette	157.5	4.26 (1.21)
LB	F	Brunette	160.0	3.61 (0.89)
HS	F	Blond	172.7	4.74 (0.86)
Mean for all female primes			163.4	4.20 (0.74)

[a] Mean height for Caucasian males is 178.0 cm (Visscher 2008)

[b] Mean height for Caucasian females is 165.0 cm (Visscher 2008)

Table 2 Target words with V ratings from preliminary study

High V words	Mean (*SD*)	Low V words	Mean (*SD*)
Dominant	1.03 (0.18)	Submissive	6.77 (0.18)
Powerful	1.03 (0.57)	Powerless	6.45 (0.68)
Controlling	1.03 (1.44)	Passive	6.26 (0.96)
Coercive	1.03 (1.18)	Dependent	6.03 (1.25)
Respected	1.03 (1.17)	Compliant	6.00 (1.03)
Skilled	2.84 (0.78)	Inept	5.65 (1.05)
Active	2.90 (0.83)	Incompetent	5.42 (1.15)
Knowledgeable	2.94 (0.81)	Naïve	5.39 (0.88)
Grand mean	2.22 (1.15)	Grand mean	6.02 (1.07)

[a] All scores are reported with 1 being dominant and 7 being submissive

investigates which component of the prime takes precedence (gender or pose), participants were not asked to identify congruency between the word and one of the components of the prime (cf. White et al. 2009), as this would artificially inflate the importance of one of the components. Participants were instructed to remain still throughout and to time their blinking to avoid artifact interference. The 96 trials were randomized and repeated in four blocks, constituting 384 total trials plus eight initial practice trials. The trials took about 25–30 min to complete, including breaks designed to combat fatigue at approximately 8-min intervals. Finally, participants were brought into a separate room and asked to rate stimuli in neutral poses on their attractiveness. In total, the experiment took 45–60 min to complete.

Analysis

The behavioral data were analyzed with a 2 (gender prime: men or women) × 2 (pose prime: high V or low V) × 2 (target word type: high V or low V) repeated measures

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ANOVA with error rate and RTs as the dependent measures. The effect of participant sex is not a main focus of this study; however, including it as a factor in both error rate and RT analyses did not dramatically change the results nor reveal any additional significant effects (though only six men participated). Sphericity was adjusted for using the Greenhouse–Geisser correction, which, though conservative, is appropriate for repeated measures designs. RTs were analyzed for correct answers only, and any responses that exceeded two standard deviations in either direction were eliminated. Noting that proportions tend to display platykurtosis, the error rate data was transformed using the arcsine of the square root transformation for analysis in order to meet the assumptions of a parametric test (Sokal and Rohlf 2012). Orthogonal paired-sample t-tests were conducted to understand the effect of attractiveness ratings and on the error rates and RTs to conduct contrasts.

The ERP data were analyzed with a 2 (gender prime: male or female) × 2 (pose prime: high V or low V) × 2 (target word: high v or low V) × 2 (hemisphere: left or right) × 5 (electrode region: central, frontal, occipital, parietal, or temporal[4]) repeated measures ANOVA. The baseline (0–100 ms) for all 80 conditions was averaged and subtracted from the averaged time window of interest (i.e. 300–500 ms) to generate a single averaged amplitude index.

Results

Behavioral Results

We predicted that if participants attended to gender more than pose, pose incongruity with target word would have little effect on all measures. However, if they attended to pose more, pose incongruity would have a large impact. We also expected to conceptually replicate established associations between gender and pose, pose and V words, and gender and V words.

Preliminary Analyses

Since attractiveness can affect V attribution (Anderson et al. 2001), it was necessary to ensure that attractiveness was not confounded with the gender prime manipulation. A paired-sample t test did not reveal any significant difference in attractiveness ratings for male primes ($M = 3.94$, $SD = 0.66$) and female primes ($M = 4.20$, $SD = 0.74$), $t(22) = 1.41$, $p = .173$. Moreover, the error rate difference scores for each participant between male and female primes were not significantly correlated with the attractiveness rating difference scores between male and female primes, $r(21) = 0.26$, $p = .234$. For RTs, there was similarly no correlation between RT difference scores and attractiveness rating difference scores concerning the gender prime, $r(21) = 0.27$, $p = .206$. This indicates that it does not appear that any of the below gender effects are confounded by an attractiveness halo effect (Anderson et al. 2001; Landy and Sigall 1974).

Concerning the pose manipulation, we predicted that there would be an interaction between pose and target word, collapsing across gender, for both error rates and RTs. The ANOVA on error rates revealed an interaction between pose and target word, $F(1,$

4FL01 [4] The 128 electrodes were broken up into five clusters of channels that corresponded roughly to basic
4FL02 anatomical structures of the brain (Kelly et al. 2004).

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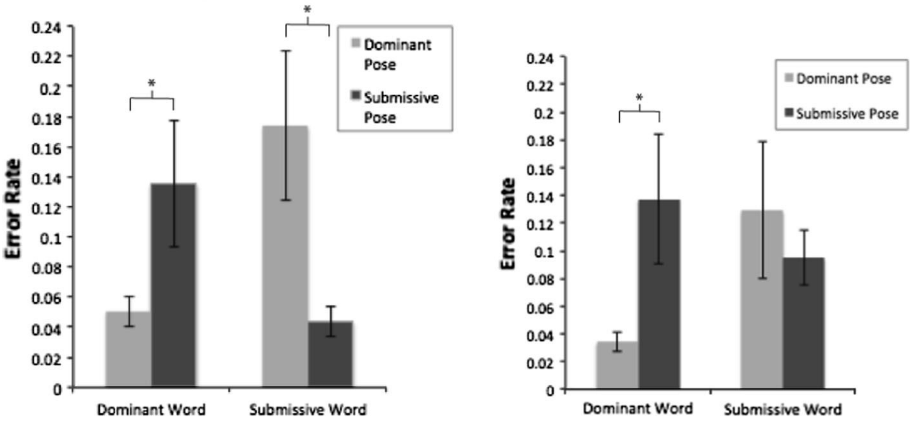

Fig. 3 The effect of pose prime and word type on untransformed mean error rates (SE) for female primes (*left graph*) and male primes (*right graph*), $*p < .05$

22) = 6.38, $p = .019$, $\eta_p^2 = 0.23$; there were fewer errors in identifying high V words following high V poses ($M = 0.04$, $SD = 0.04$) compared to low V poses ($M = 0.14$, $SD = 0.21$), $t(22) = -3.06$, $p = .006$, $d = 1.28$, and marginally significantly fewer errors identifying low V words following low V poses ($M = 0.07$, $SD = 0.08$) compared to high V poses ($M = 0.15$, $SD = 0.23$), $t(22) = 1.97$, $p = .061$, $d = 0.82$. Similarly the ANOVA on RTs revealed a significant interaction between pose and target word, $F(1, 22) = 7.26$, $p = 0.013$, $\eta_p^2 = 0.25$. There were quicker RTs for identifying high V words following high V poses ($M = 712.98$, $SD = 121.85$) compared to following low V poses ($M = 740.41$, $SD = 127.70$), $t(22) = -2.91$, $p = .008$, $d = -1.21$, and inversely, for identifying low V words following low V poses ($M = 751.27$, $SD = 115.41$) compared to following high V poses ($M = 779.63$, $SD = 140.62$), $t(22) = 2.16$, $p = .042$, $d = 0.90$. These findings can be conceptualized as a successful pose manipulation check. However both were qualified by statistically significant higher order effects discussed in detail below.

Gender Versus Pose

Concerning error rates, the ANOVA revealed a significant interaction between gender, pose, and target word, $F(1, 22) = 8.60$, $p = .008$, $\eta_p^2 = 0.28$, observed power = 0.80 (see Fig. 3). For female primes, congruent pose-target word pairings elicited fewer errors than incongruous pairings for both high V and low V pose congruities. Specifically, female primes followed by high V words led to fewer errors when the prime included a high V pose ($M = 0.05$, $SD = 0.05$)[5] compared to a low V pose ($M = 0.14$, $SD = 0.20$), $t(22) = -2.86$, $p = .009$, $d = -1.19$, and female primes followed by low V words led to fewer errors when the prime included a low V pose ($M = 0.04$, $SD = 0.05$) compared to a high V pose ($M = 0.17$, $SD = 0.24$), $t(22) = 3.52$, $p = .002$, $d = 1.47$ (see Fig. 3, left

[5] All reported error rate means and standard deviations are the untransformed values. Analyses were conducted on transformed values, according to the arcsine of the square root function, as is appropriate for proportions (Sokal and Rohlf 2012).

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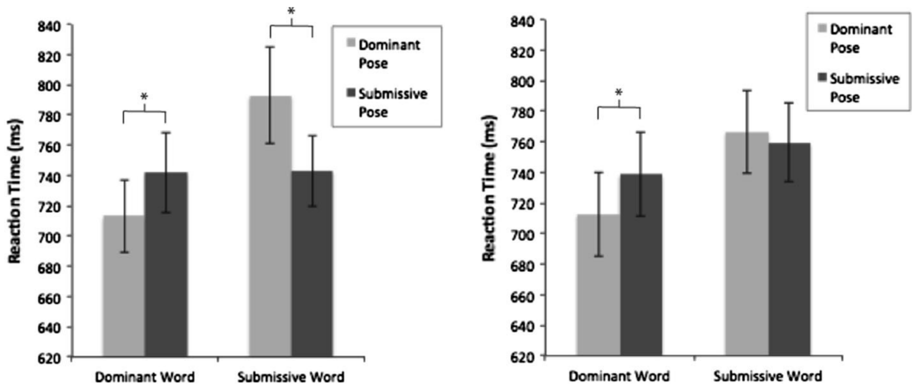

Fig. 4 The effect of pose prime and word type on mean RTs (SE) for female primes (*left graph*) and male primes (*right graph*), *$p < .05$

graph). Thus, considering *both* high V and low V words female posing significantly impacted word identification.

In contrast, a different pattern of results emerged for male primes. As with female primes, male primes followed by high V words led to fewer errors when the prime included a high V pose ($M = 0.03$, $SD = 0.04$) compared to a low V pose ($M = 0.14$, $SD = 0.22$), $t(3,22) = -3.09$, $p = .005$, $d = -1.29$. However, high V ($M = 0.13$, $SD = 0.23$) and low V ($M = 0.10$, $SD = 0.09$) poses did not make a statistical difference when male primes preceded low V words, $t(22) = 0.30$, $p = .767$, $d = 0.30$ (see Fig. 3, right graph). In line with the prediction that pose matters, pose had a large impact overall, above and beyond gender, except for male low V posing. Though it was in the expected direction, male low V posing did not lead to statistically fewer errors concerning low V words indicating it was particularly difficult to associate men with low V regardless of pose.

Examination of RTs reveals an overall complementary pattern, indicating that there was not a speed-accuracy trade off. The ANOVA again revealed an interaction between gender, pose, and target word, $F(1, 22) = 4.27$, $p = .051$, $\eta_p^2 = 0.16$, observed power $= 0.51$ (see Fig. 4). For female primes, congruent pose-target word pairings elicited quicker RTs than incongruous pairings for both high V and low V congruities. Specifically, female primes followed by high V words led to quicker RTs when the prime included a high V pose ($M = 713.18$, $SD = 24.00$) compared to a low V pose ($M = 742.13$, $SD = 26.47$), $t(22) = -2.45$, $p = .023$, $d = -1.02$, and when followed by low V words, female primes led to quicker RT when the prime included a low V pose ($M = 743.20$, $SD = 23.38$) compared to a high V pose ($M = 792.76$, $SD = 32.01$), $t(22) = 3.74$, $p = .001$, $d = 1.56$ (see Fig. 4, left graph).

As with error rates, male primes elicited a different pattern. Male primes followed by high V words led to quicker RTs when the prime included a high V pose ($M = 712.78$, $SD = 27.50$) compared to a low V pose ($M = 738.69$, $SD = 27.40$), $t(22) = -2.52$, $p = 0.019$, $d = -1.05$. However, low V pose ($M = 759.35$, $SD = 25.95$) and high V pose ($M = 766.51$, $SD = 27.10$) did not make a statistical difference when male primes preceded low V words, $t(22) = 0.44$, $p = .667$, $d = 0.18$ (see Fig. 4, right graph). Again, in line with the prediction that pose matter, pose had a large impact on RTs with the exception of men in low V poses. Though again in the expected direction, male low V posing did not significantly facilitate identification of low V words indicating a particular difficulty associating men with low V regardless of pose.

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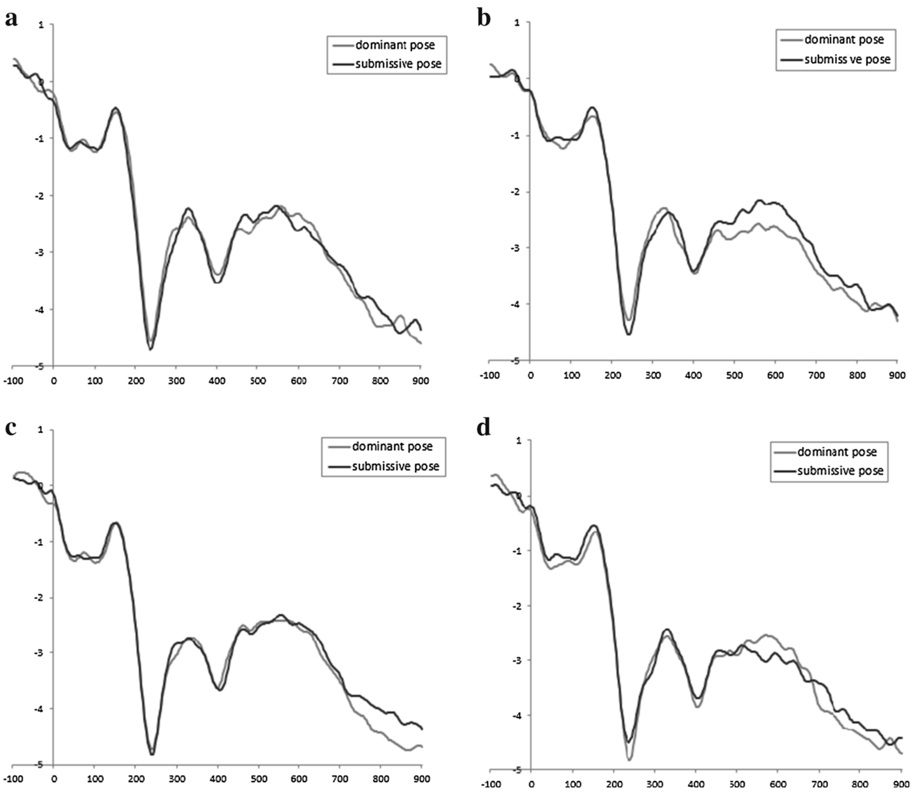

Fig. 5 The null effect of **a** female pose when followed by dominant words, **b** female pose followed when by submissive words, **c** male pose when followed by dominant words, and **d** male pose when followed by submissive words on N400 amplitude differences in the parietal region [selected as exemplar based on van Berkum et al. (2008) and Key et al. (2005)]. Negative is down

ERP Results

The ANOVA did not reveal a main effect of gender or pose, or an interaction between gender prime, pose prime, or target word for the N400 component at time window 300–500 ms, or time window 350–450 ms (Kutas and Hillyard 1984; White et al. 2009) (see Fig. 5). Since the relatively different RTs for target word type, low V words were processed more slowly, could be adding additional variability to the brainwaves, analyses were run considering high V and low V words separately, but there were still no significant N400 differences.

Discussion

Predictions Revisited

First, we did not find evidence for the predicted N400 differences based on prime condition. This is somewhat puzzling considering that behavioral effects should arise from

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neurological differences.[6] It could be that the task did not adequately require participants to attend to the prime image because it did not require participants to identify if the target word was congruent or incongruent with the prime (cf. White et al. 2009). Although the N400 component can be elicited in cases where the prime is not explicitly linked to the task, this does create a more muted response (Key et al. 2005; Kutas and Federmeier 2011). In the present study, this may explain why the effect does not emerge in the ERP component but does emerge in the error rates and RTs. An alternative and more theoretically interesting possibility is that the N400 amplitude did not differ according to condition because the subtle pragmatic cues provided by the prime image did not change how the words were processed for meaning. The subsequent behavioral RT and error rate differences may be driven by different cognitive processes besides semantic processing. However, caution should be used in accepting this latter conclusion as it is based on a *lack* of difference in N400 amplitude, which is difficult to demonstrate conclusively.

Secondly, there was evidence in the error rate and RT measures that replicated the associations already established in the literature between men and high V posing and women and low V posing (e.g., Hall 1998) and between more open body posing and high V words and more closed body posing and low V words (e.g., Hall et al. 2005). There was less support for the associations between men and high V words and women and low V words (cf. Rudman et al. 2012), seemingly because pose had such a large impact.

Finally, this study gives novel insight into the interplay between visual gender and pose cues (cf. Aguinis and Henley 2001; Aguinis et al. 1998) in affecting V attributions. It appears that, overall, pose was more important. For female primes, both high V and low V words were facilitated by congruous posing. For male primes, congruous posing facilitated high V words but pose had no impact on low V words. Female primes were more flexibly associated with V words, and target word identifications tracked pose type, while male primes were rigidly *disassociated* with low V words, such that even male primes in low V poses did not facilitate low V words.

To our knowledge, the only previous work that considered gender versus pose also found a greater impact of women's than men's body language on V perceptions. Focusing just on men, Aguinis et al. (1998) used vignettes that described a man using various descriptions of his body language—eye contact, facial expression, and postures—and found that there was no effect of posture when participants rated him on his V. In contrast, Aguinis and Henley (2001) replicated this study using vignettes about a woman instead, and then found an effect of body language. Though these studies point to a similar conclusion as the present study, they are limited in two key ways.

First, the gender comparison was made across studies. Secondly, the studies artificially focused participant attention on nonverbal displays by describing body language in writing. Though this vignette paradigm can research *beliefs* about nonverbal displays, it does not necessarily address actual *perception*. Research indicates that beliefs about nonverbal displays cannot be directly translated to perceived differences (Carney et al. 2005; Hall et al. 2005). The present study used visual poses of actual nonverbal differences to test the effect of perceived differences on V attributions without artificially drawing participant attention to the poses themselves, thereby more closely replicating real-life interactions. By doing so, it extends the effect of imagined women's but not imagined men's broad postural cues on V attributions (Aguinis et al. 1998; Aguinis and Henley 2001) to actual perceptions of postural cues. Crucially, the present study also found, more precisely, that men's V

[6] It is not unprecedented to discover behavioral effects but not the expected N400 effect. See Brown and Hagoort (1993) for an example and Holcomb et al. (2005) for a more nuanced interpretation.

posing actually *does* impact high V attributions; it is only when considering low V attributions that pose no longer had an impact.

What may account for this interesting difference between perceptions of men and women's posing when it comes to low V words? One possibility is that participants had difficulty associating men with low V because, for male primes, they only attended to gender and ignored pose. However, if this were true men in low V poses should have facilitated identification of high V words equally as well as men in high V poses did, which was not the case. Men in low V poses did not facilitate high V, indicating that male posing was attended to and had some impact. Therefore, we can reject the explanation that concerning men, participants only pay attention to gender.

Another related explanation is that though pose was attended to, men are so *disassociated* with low V concepts that participants found it difficult to associate men in either pose type with low V. This indicates that when men were followed by low V words, there were similar cognitive processes underlying the slow RTs and high error rates for both high V and low V poses. In both conditions, low V words simply jarred with the male image prime. This explanation, though tenable, is less satisfying because participants' viewed the prime image *before* knowing if the target word would be high V or low V.

An alternative explanation is that men in high V poses and men in low V poses elicited different cognitive processes. Men in high V poses caused spreading activation in high V constructs, leading to the observed lack of facilitation of low V words. While men in low V poses did not cause spreading activation of high V constructs, as demonstrated by the lack of facilitation of high V words, or seemingly of low V constructs, as demonstrated by the lack of facilitation of low V words. Therefore though men in high V poses activated high V. Men in low V poses caused confusion. Though the observed results for men in high V poses and low V poses followed by low V words were not statistically different, they could be caused by these different underlying cognitions.

There is evidence that men's gender performance is more strictly controlled than women's (Pleck 1995), which may explain why men's counter-stereotypical posing may have caused confusion while women's did not. We know that men are associated with high V posing and women with low V posing (Aries 1996; Hall 1990). It could be for men that this association is more binding than for women. Therefore, it is possible that initially, men in low V poses looked strange to participants because they were not accustomed to seeing men in anything but high V poses. Women, on the other hand, may be able to perform a variety of behaviors, including counter-stereotypical high V poses, while still being fully accepted as women (Pleck 1995). Therefore, women's high V posing was *not* flagged as less expected which allowed it to prime the associated words.

Empirically, developmental studies concerning "tomboys", masculine girls, compared to "sissys", feminine boys, confirms the greater acceptable variation given to girls' gender performance (Hemmer and Kleiber 1981; Hilgenkamp and Livingston 2002). The results from the present study also seem to point to this greater fluidity for adult women. Masculinity theorists propose that since traditional constructions of gender value masculinity, masculinity is rewarded when enacted by both men and women, while femininity is not (Levant and Pollack 1995). Men are more strictly regulated than women for gender-role violations (Pleck 1995). Indeed, data surrounding self-concept and self-esteem confirm that men suffer greater psychological effects from violating gender roles (O'Neil et al. 1995). The present study implicates social perceptions as one mechanism by which this stricter standard for men is maintained. Put simply, men in low V poses look strange, but women in high V poses are okay.

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Regardless of specific explanation for the findings, the present study also adds support to the possibility that women, more than men, can use counter-stereotypical nonverbal behaviors to subvert wrongful V attributions based on gender stereotypes. DePaulo (1992) confirms that in certain circumstances, nonverbal behavior can be strategically deployed to meet self-presentational needs. Nonverbal behaviors that are well-suited to impression management manipulation include those under conscious control that are accessible to the individual such as broad postural changes involving large muscles groups. This describes the nonverbal displays used in the present study, which speaks to the potential to generalize the findings of the present study to real-life scenarios.

Future Directions

The present study used young, white, heterosexual-identifying models as primes in order to isolate only two power cues—gender and pose—rather than considering the additional complexity of other cues such as race or sexuality. Future studies could turn their attention to which cue is more important, gender or pose, considering different groups.

Additionally, to achieve leadership in real world situations, research indicates that a combination of high V and low V cues is particularly useful (i.e., competence *and* warmth) (Keating 2011). High V women are not always liked (Henley 1995; Eagly and Karau 2002). Koenig et al. (2011) found that over time leadership traits are becoming increasingly androgynous due to an inclusion of more feminine traits, not an exclusion of high V typically masculine traits. Therefore, it may still benefit women and men seeking leadership positions to be perceived as high in V, though perhaps not exclusively. Future research could test these questions directly by using more explicit behavioral measure to consider participants' intentional actions. For instance, rather than having participants rapidly identify high V and low V words following primes, they could be given images and asked to indicate on a scale how much the individual displays the trait in question. The drawback of this approach is that it may lead participants to over-compensate to appear politically correct or because they hold men and women to different standards for what counts as high V (Biernat 2009). To avoid this problem, research could use more subtle though still explicit manipulations such as requiring that participants make choices modeling hiring decisions where only the gender and body language of candidates are manipulated.

Conclusion

The associations between men, dominant words, and dominant posing remains strong, as does the associations between women, submissive words, and submissive posing. However, women's counter-stereotypical nonverbal performance appears to have a greater impact. When pitting gender and pose together, for women, pose is a powerful predictor of participants' expectations of either dominance or submissiveness. Therefore for women, pose appears to be one way to counteract faulty status cues, such as gender stereotypes. Despite the removal of formal barriers, women are still underrepresented as leaders. This is a societal loss, since high status positions are not filled from the most balanced pool. Body language presents one way to subvert existing implicit barriers. Importantly, self-presentational manipulation via counter-stereotypical body posing appears to be an option primarily for women. The present study adds insight into the *different*, not necessarily

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parallel, pressures on men and women according to their respective gender performance. Men, though privileged, may have less flexibility in how they can use counter-stereotypical nonverbal displays to demonstrate their relative positions of power.

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Conflict of interest The authors declare that they have no conflict of interest.

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