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Research article

Upright and left out: Posture moderates the effects of social exclusion on mood and threats to basic needs

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Abstract

Adopting a powerful posture leads individuals to feel more confident and dominant. Social exclusion can strongly impact individuals' mood and basic social needs. The current research combines these bodies of research, investigating the effects of dominant and submissive poses on responses to social exclusion and inclusion. In two experiments, participants held a slouching or upright pose and were either socially included or excluded using the Cyberball social exclusion manipulation. Social exclusion only affected participants' mood when individuals took a powerful posture: Excluded participants in powerful postures had more negative mood after exclusion than included power-posing participants, but effects of exclusion and inclusion did not differ among submissive-posing participants (Experiments 1 and 2). Similarly, it was also found that social exclusion affected basic needs only when participants' adopted powerful poses (Experiment 2). Copyright © 2013 John Wiley & Sons, Ltd.

Human beings are motivated to belong and be accepted by groups (Leary, 2010). Despite being driven toward social acceptance, virtually all human beings have experienced social rejection at some point. This rejection often leads to negative emotional consequences for excluded individuals, including threats to the basic needs for control, belonging, self-esteem, and a meaningful existence (for a review, see Williams, 2007). Socially excluded individuals experience increased psychological and physiological indicators of distress (e.g. Eisenberger, Lieberman, & Williams, 2003; Gunnar, Sebanc, Tout, Donzella, & van Dulmen, 2003; Smith & Williams, 2004; Zadro, Williams, & Richardson, 2004), threats to basic needs (Williams, Shore, & Grahe, 1998), sadness (Baumeister & Leary, 1995), and anger (Baumeister & Leary, 1995). Social excluded individuals may re-establish their status through reconnecting with others (Maner, DeWall, Baumeister, & Schaller, 2007) or aggressing on others (Twenge, Baumeister, Tice, & Stucke, 2001). In both human and animal literature, high status individuals are more vigilant and aggressive toward status threats (see Mazur & Booth, 1998, for a review), which may include rejection.

Posture can influence both perceptions of dominance, confidence, status, and implicit processing of power-related thoughts (Bohns & Wiltermuth, 2012; Huang, Galinsky, Gruenfeld, & Guillory, 2011). This research extends out of embodied cognition, which posits that physiological experiences and bodily actions serve as cues for the interpretation of the self and others (see Barsalou, Niedenthal, Barbey, & Ruppert, 2003, for a review) and, more broadly, cognition itself (see Barsalou, 2008; Lakoff & Johnson, 1999, for reviews). Carney, Cuddy, and Yap (2010), accordingly, found that "power-posing" individuals experience increased feelings of power, risk taking, and a rise in testosterone concentrations relative to those who hold "submissive poses." These findings are noteworthy given that testosterone reactivity to social challenges predicts status-relevant traits and behaviors including dominance and aggression (see Carré, McCormick, & Hariri, 2011, and Eisenegger, Haushofer, & Fehr, 2011, for reviews). In a similar vein of research, Briñol, Petty, and Wagner (2009) manipulated whether participants held an upright, confident, or a slumped, unconfident posture. Participants with an upright posture indicated they would be a better job candidate, interviewee, job performer, and a more satisfied employee in the future compared with participants with slumped postures. Huang and colleagues (2011) also assigned individuals to high or low power roles, along with submissive or powerful postures. They found that posture was more effective than status roles for impacting participants' implicit activation of power, sense of power, and decisions to take action.

Although power posing creates positive self-perceptions, the extent to which posturing influences subjective responses

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to social exclusion is currently unexplored.[1] Because power posing increases confidence, perceived status, and self-esteem, individuals in powerful postures may be buffered against the negative effects of social exclusion. Excluded individuals with low-trait self-esteem, for example, show greater self-reported social pain and activation in the dorsal anterior cingulate cortex (Onoda et al., 2010), a key region of the brain involved in processing both physical and psychosocial pain (Eisenberger et al., 2003). Other research, however, suggests the opposite pattern may occur. Josephs, Sellers, Newman, and Mehta (2006) reported a mismatch effect where high testosterone individuals assigned to a low status position and low testosterone individuals assigned to a high status position both experienced negative mood and poor cognitive performance. In contrast, high testosterone individuals in a high status position and low testosterone individuals in a low status position performed relatively well on a cognitive task (Josephs et al., 2006). These findings may pertain to social exclusion: High status posture individuals that are social excluded may have more negative reactions to exclusion than individuals who are holding a submissive posture and excluded.

Holding a dominant posture may alleviate or exacerbate the experience of social exclusion. To determine which outcome is the case, the present research utilized two experiments to manipulate participants' posture and social exclusion status using a frequently used social exclusion manipulation (Cyberball; Williams, Cheung, & Choi, 2000) and by asking participants to hold dominant or submissive postures. Because mood and threats to basic needs are conceptualized as immediate, reflexive consequences of social exclusion (Williams, 2009), these are included as primary dependent variables in both experiments. Experiment 1 investigated these effects during a standard game of Cyberball. In Experiment 2, however, participants were informed that other participants, who would include or exclude the player, could see an avatar of the players' appearance.

EXPERIMENT 1

Experiment 1 was designed to investigate if taking a dominant or submissive posture would moderate the effects of being socially excluded on mood and relational need threats. Participants were randomly assigned to a 2 (Posture: Dominant vs. Submissive) × 2 (Cyberball: Inclusion vs. Exclusion) experimental design.

Method

Participants

One hundred and two undergraduate psychology students were randomly assigned to the four conditions and received course credit for participation. Of those, eight participants were noted by the researcher as failing to hold their posture throughout the session and another three admitted that they were familiar with the Cyberball exclusion paradigm prior to the study. These participants were removed from the analyses, leaving 91 participants in the analyzed data (56 women, 35 men). Unless otherwise noted, gender did not have any main effects or interactions in any reported results.

Materials and Procedure

After completing the informed consent, participants were instructed on the posture they were to hold. Participants were not given a cover story but were simply told that the posture was an important part of the study and it was essential for them to hold it for the duration of the study. The assignment of postures was similar to that of Briñol and colleagues (2009): Participants assigned to the upright posture condition were shown a simplistic drawing of an individual sitting up in a chair with their back upright and instructed to "sit upright" with their "back touching the back of their chair" and their "chest pushed out." Participants in the slouching posture condition, however, were shown a similar picture of a person slouching forward and were instructed to sit "slouched forward" with their "head lowered." All participants were also instructed to not cross their legs during the study and to hold their assigned posture for the entire duration of the experimental session. The researcher monitored the participants throughout the session to make sure participants held the posture, and reminded participants to hold the posture if it was not being held. Then, participants played a virtual ball tossing game (Cyberball; Williams et al., 2000) with what they believed were three other participants. In reality, participants were playing the game with computer-controlled characters. Depending on the condition, participants were randomly assigned to be excluded (receive 3 out of 30 ball tosses) or included (receive 10 out of 30 ball tosses).

After completing Cyberball, participants completed the 12-item need threat scale (adapted from Zadro et al., 2004) with four sub-scales assessing threats to basic needs for belonging, self-esteem, meaningful existence, and control, which utilized 9-point Likert style scales (1 = *not at all*; 9 = *very much so*). Participants also completed a mood measure asking them to indicate where they fall in the range of two adjectives on six 9-point bipolar scales based on the mood measures used by Zadro and colleagues (2004): bad–good, sad–happy, tense–relaxed, included–rejected (reversed), angry–calm, and unconfident–confident (Cronbach's $\alpha = .73$, all items loaded on one factor that explained 46.41% of the variance). The scores for each item were averaged for each of these five scales, and the scores from the four basic needs were averaged, as well. Higher scores on these measures indicated greater fulfillment of basic needs and more positive mood, respectively. Basic needs and mood were positively correlated ($r = .41$, $p < .001$).

Results

Effects on Basic Needs For the mean fundamental need threat scores, there was a main effect of exclusion, $F(1, 87) = 41.31$, $p < .001$, $\eta_p^2 = 0.322$. Consistent with a wealth of Cyberball exclusion findings (see Williams, 2009, for a

[1]For other studies finding moderators of the effects of ostracism, see Twenge, Zhang, Catanese, Dolan-Pascoe, Lyche, and Baumeister (2007), Bernstein, Sacco, Young, Hugenberg, and Cook (2010), and Bernstein and Claypool (2012a, 2012b).

review), excluded participants had lower relational need scores ($M = 4.56$, $SE = 0.13$) compared with included individuals ($M = 5.75$, $SE = 0.13$). Although the hypothesized Posture Cyberball interaction did not reach significance, $F(1, 87) = 1.26$, $p = .265$, $\eta_p^2 = 0.01$, it is worth noting that the basic need threat difference between included and excluded participants was larger in participants with dominant postures ($M_d = 1.40$, $SE_d = 0.26$, $F(1, 87) = 29.58$, $p < .001$, $\eta_p^2 = 0.25$) than those with submissive posture ($M_d = 0.95$, $SE_d = 0.267$, $F(1, 87) = 13.58$, $p < .001$, $\eta_p^2 = 0.13$; Figure 1A). There was a marginally significant posture main effect, $F(1, 87) = 3.84$, $p = .053$, $\eta_p^2 = 0.04$, with dominant posture participants having marginally lower basic need scores ($M = 4.97$, $SE = 0.13$) than submissive posture participants ($M = 5.34$, $SE = 0.13$).

For basic need threats, there was a significant three-way Gender × Posture × Cyberball interaction, $F(1, 83) = 4.79$, $p = .031$, $\eta_p^2 = 0.06$. This three-way interaction occurred because the hypothesized 2-way Posture × Cyberball interaction was significant in women ($F(1, 52) = 5.05$, $p = .029$, $\eta_p^2 = 0.09$) but not men ($F(1, 31) = 1.00$, $p = .326$, $\eta_p^2 = 0.03$). In the submissive posture condition, basic needs did not differ between excluded women ($M = 5.05$, $SE = 0.23$) and included women ($M = 5.48$, $SE = 0.30$), $F(1, 52) = 1.35$, $p = .251$, $\eta_p^2 = 0.03$. However, within the dominant posture condition, excluded women ($M = 4.26$, $SE = 0.23$) had lower basic needs compared with included women ($M = 5.80$, $SE = 0.23$), $F(1, 52) = 22.91$, $p < .001$, $\eta_p^2 = 0.31$. However, because the cell sizes in this analysis were small (*N*s between 8 and 16) and there were more women ($N = 56$) than men ($N = 35$) in the sample, it is important to exercise caution when interpreting these results. Other than this, there were no significant main effects of gender, and gender did not interact with any variables in Experiment 1.

Effects on Mood For a similar 2 × 2 ANOVA on mood, there was a significant main effect of Cyberball, $F(1, 87) = 15.49$, $p < .001$, $\eta_p^2 = 0.15$. Excluded participants reported more negative mood ($M = 5.02$, $SE = 0.19$) than included participants ($M = 6.08$, $SE = 0.19$). The main effect of posture was not significant, $F(1, 87) = 1.10$, $p = .297$, $\eta_p^2 = 0.01$. These effects were qualified by a significant Posture × Cyberball interaction, $F(1, 87) = 5.49$, $p = .021$, $\eta_p^2 = 0.06$ (Figure 1A). Simple effects tests revealed that when participants were in a dominant posture, mood was significantly more negative in excluded participants ($M = 4.56$, $SE = 0.27$) compared with included participants ($M = 6.23$, $SE = 0.26$), $F(1, 87) = 20.47$, $p < .001$, $\eta_p^2 = 0.19$. Mood did not differ between participants holding submissive postures that were included ($M = 5.91$, $SE = 0.29$) or excluded ($M = 5.48$, $SE = 0.26$), $F(1, 87) = 1.22$, $p = .272$, $\eta_p^2 = 0.01$. An alternative analysis of these simple effects tests showed that excluded individuals with dominant postures had more negative mood than excluded individuals in submissive postures, $F(1, 87) = 5.97$ $p = .017$, $\eta_p^2 = 0.06$, whereas no differences were found between the two included Cyberball conditions, $F(1, 87) = 0.81$, $p = .371$, $\eta_p^2 = 0.01$.

Discussion

Experiment 1 found that posture moderated the effects of social exclusion on mood. The negative mood effects of social exclusion occurred when participants power posed, but not when participants held submissive postures. Although a similar pattern was identified for the relational need scores, this interaction was nonsignificant. Previous research has found that the type of exclusion manipulation used can influence the negative impacts of social exclusion (Bernstein & Claypool, 2012a, 2012b). Similarly, within the Cyberball ostracism manipulations, the extent to which individuals feel excluded may depend on the extent to which they are rejected on the basis of personal characteristics (e.g. appearance). In Experiment 1, participants were not given any information about the other "players" (aside from the labels of Player 1, Player 2, etc.) and were not informed that the other players knew any information about the participant. Moreover, in this rejection experience, it appeared to participants that the Cyberball players could not know any personal information about each other that would determine whether they include or exclude other participants. Altogether, the saliency of the social exclusion manipulation may not have been adequately robust.

EXPERIMENT 2

Experiment 2 was designed to replicate Experiment 1 with a similar design, additional manipulation check variables, and a more robust manipulation of social exclusion. To strengthen the saliency of social exclusion, the Cyberball manipulation was modified so that participants were informed that avatars, or computer-generated representations of players, would be created on the basis of all participants' appearance, and saw these avatars in the game. Because avatars are often used in video games and can facilitate social perceptions of others in

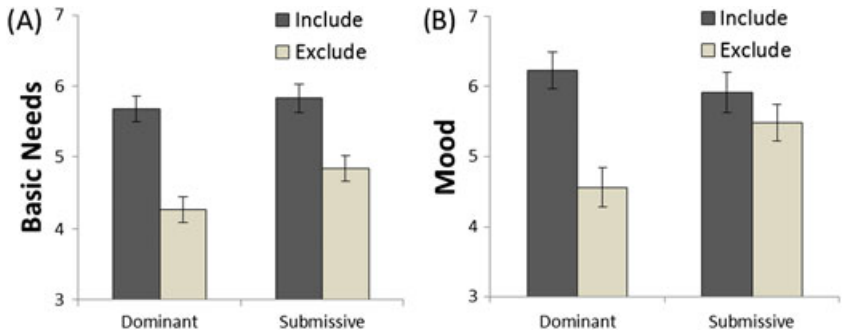

Figure 1. Mood and basic need threat as a function of posture and Cyberball condition (Experiment 1). Error bars represent standard errors

the absence of typical in-person cues (e.g. Nowak & Rauh, 2006), we chose to have the Cyberball game include avatars of other participants to make the game seem more social in nature. Thus, this manipulation could allow for a more robust threat effects on individuals' basic needs. Experiment 2 also featured a self-report manipulation check for posture and an additional manipulation check for social exclusion that required participants to estimate the number of ball tosses they received. To discern if participants found one posture more difficult than the other, participants were also asked to rate how difficult it was to hold the postures.

Method

Participants

Ninety-eight participants were randomly assigned to a 2 (Posture: Dominant vs. Submissive) × 2 (Cyberball: Include vs. Exclude) design, receiving course credit for participation. Out of these participants, 13 failed to hold the correct posture throughout the session, and one other participant indicated that he knew the Cyberball game was fake.[2] These participants were removed from the analyses, leaving 84 participants in the analyzed data (51 women, 32 men; 1 participant did not report gender). There were no significant main effects of gender, and gender did not interact with any of the other manipulated variables within Experiment 2.

Materials and Procedure

Posture and Exclusion Manipulations Following completion of the preliminary measures, participants were seated at a computer and instructed to hold submissive/slouching or dominant/upright postures for the rest of the study in the same manner as Experiment 1. Participants were then instructed on how to play Cyberball, similarly to Experiment 1. However, to ensure participants could not attribute the experiences of the game to a poorly designed avatar (figures that are standardized in-game to show the ball being thrown and are part of the Cyberball software), as well as to increase the robustness of the exclusion methodology, participants were then instructed that custom avatars would be created for all players in the game. It was further explained that these avatars would be next to standard in-game avatar and would be created on the basis of physical characteristics of each participant in the game. They were then told that this would be performed to increase the realism of the game and to make it feel more like a face-to-face interactionrather than a simple experience over the internet. Given that there were no other real players, and so that the experimenters did not have to design an avatar for each participant, all participants were informed that each Cyberball player would be able to see other players' avatars but that no players would be able to see their own avatars. Participants were then briefly seated facing away from the screen while the researcher ostensibly entered in things about their physical characteristics (none of which was actually entered). Once the game began, the participant would then see the three Avatars for the other (computer controlled) players. These were created via an online Nintendo Wii avatar (Mii) generator. To ensure that participants did not feel included or excluded because of something about their physical characteristics (e.g. ethnicity), the in-game avatars were created to be of three different ethnicities, and there were both male and female avatars. Although one participant commented during the study that it was strange that she could not see her own avatar, no participants indicated skepticism regarding their avatars.

Self-report Measures Participants completed the same basic needs measures as Experiment 1, along with similar mood measures (Cronbach's $\alpha = .85$, all items loaded on one factor that explained 55.44% of the variance).[3] Similar to Experiment 1, mood and basic needs were positively correlated ($r = .29$, $p = .007$).

Final Questionnaire Following the self-report measures, participants rated their posture and how comfortable it was on 7-point scales (1 = *very slouched*, 7 = *very upright* and 1 = *very uncomfortable*, 7 = *very comfortable*). As a manipulation check, participants also estimated the number of ball tosses they received while playing Cyberball. Following this, participants were questioned for suspicion and debriefed.

Results

Manipulation Checks and Posture Difficulty Similar to Experiment 1, unless otherwise specified, all analyses utilized 2 (posture) × 2 (Cyberball) ANOVAs. Participants in the dominant posture condition rated their posture as more upright ($M = 6.20$, $SE = 0.11$) than participants in the submissive posture condition ($M = 1.98$, $SE = 0.12$), $F(1, 80) = 695.71$, $p < .001$, $\eta_p^2 = 0.90$. Participants reported that the slouching position was more difficult to hold ($M = 4.33$, $SE = 0.27$) than the upright posture ($M = 3.45$, $SE = 0.26$), $F(1, 80) = 5.71$, $p = .019$, $\eta_p^2 = 0.07$. There was a marginally significant Posture Cyberball interaction, $F(1, 80) = 3.00$, $p = .087$, $\eta_p^2 = 0.04$. When participants were included, submissive postures were more difficult ($M = 4.76$, $SE = 0.37$) than dominant postures ($M = 3.24$, $SE = 0.37$), $F(1, 80) = 8.53$, $p = .005$, $\eta_p^2 = 0.10$. However, when participants were excluded, submissive postures were not significantly more difficult to hold ($M = 3.90$, $SE = 0.39$) than dominant postures ($M = 3.65$, $SE = 0.35$), $F(1, 80) = 0.21$, $p = .645$, $\eta_p^2 = 0.00$. There was no main effect of exclusion on posture difficulty, $F(1, 80) = 0.375$, $p = .542$, $\eta_p^2 = 0.00$. Posture difficulty was not significantly related to mean basic needs or mood ($ps \geq .504$) and thus was not considered as a covariate or when performing analyses with these variables. Excluded participants also reported receiving less ball tosses ($M = 2.82$, $SE = 0.41$) than included participants ($M = 7.52$, $SE = 0.41$), $F(1, 80) = 67.01$, $p < .001$, $\eta_p^2 = 0.46$.

[2]Not following directions was classified as the researcher observing participants did not hold the posture or the participants indicating that they did not hold the posture they were assigned in the questionnaire (e.g. rating their posture as slouched when they were instructed to hold an upright posture). Both posture conditions had an equal number of participants removed.

[3]The mood measures were identical to those of Experiment 1, except that the aroused–not aroused item was removed because of a lower factor loading (.36) and not included in the Experiment 2 questionnaires. Two other mood items were added in its place, which improved reliability and factor structure: unconfident–confident (factor loading .84) and bored–excited (factor loading .64).

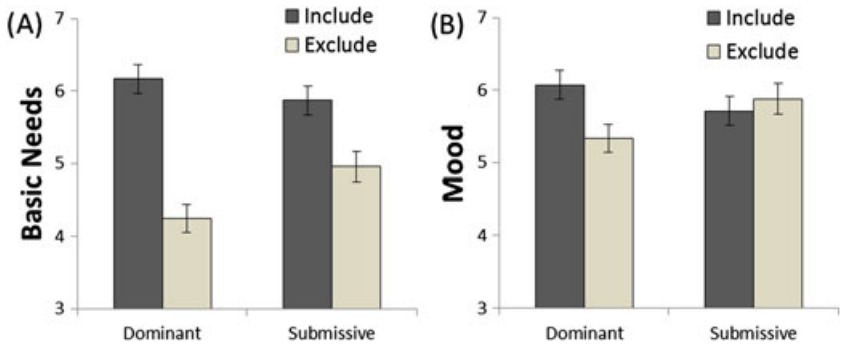

Figure 2. Mood and basic need threat as a function of Cyberball condition and posture (Experiment 2). Error bars represent standard errors

Effects on Basic Needs Using ANOVA to analyze the mean basic needs scores revealed a significant main effect of Cyberball condition, $F(1, 80) = 74.63$ $p < .001$, $\eta_p^2 = 0.48$. Similar to Experiment 1 and a wealth of literature, excluded individuals had lower relational need scores ($M = 4.60$, $SE = 0.12$) than included individuals ($M = 6.02$, $SE = 0.12$). The main effect of posture was not significant, $F(1, 80) = 1.52$, $p = .221$, $\eta_p^2 = 0.02$. The hypothesized Posture × Cyberball interaction was significant, $F(1, 80) = 9.44$, $p = .003$, $\eta_p^2 = 0.11$ (Figure 2A). Simple effects tests showed that the basic needs did not differ between included participants who were holding a submissive posture ($M = 5.87$, $SE = 0.16$) versus dominant posture ($M = 6.17$, $SE = 0.16$), $F(1, 80) = 1.70$, $p = .196$, $\eta_p^2 = 0.02$. However, excluded participants in a dominant posture had lower basic needs ($M = 4.25$, $SE = 0.16$) than excluded participants with submissive postures ($M = 4.96$, $SE = 0.17$), $F(1, 80) = 9.23$, $p = .003$, $\eta_p^2 = 0.10$.[4] In contrast to Experiment 1, there was no significant Gender × Posture × Exclusion interaction on basic needs scores, $F(1, 75) = 0.01$, $p = .906$, $\eta_p^2 = 0.00$, suggesting that the interaction we found in Experiment 1 may have been spurious.

Effects on Mood Similar to Experiment 1, analyzing the general mood scores with a 2-way ANOVA found that there was no significant main effect of posture, $F(1, 79) = 0.240$, $p = .626$, $\eta_p^2 = 0.00$ (Figure 2B). Although not reaching statistical significance, excluded participants reported more negative mood after Cyberball ($M = 5.58$, $SE = 0.14$) compared with included participants ($M = 5.91$, $SE = 0.14$), $F(1, 79) = 2.06$, $p = .155$, $\eta_p^2 = 0.03$. However, more importantly, there was a significant Posture × Cyberball interaction, $F(1, 79) = 5.14$, $p = .026$, $\eta_p^2 = 0.06$ (Figure 2B). Simple effects tests revealed that in the dominant posture conditions, excluded participants had more negative mood ($M = 5.33$, $SE = 0.19$) than included participants ($M = 6.07$, $SE = 0.20$), $F(1, 79) = 7.12$ $p = .009$, $\eta_p^2 = 0.08$. However, in the submissive posture condition, mood did not differ between included participants ($M = 5.71$, $SE = 0.20$) and excluded participants ($M = 5.88$, $SE = 0.21$), $F(1, 79) = 0.33$, $p = .565$, $\eta_p^2 = 0.00$.

[4]Although previous analyses found that posture difficulty was marginally positively correlated with basic needs in the powerful (dominant/upright) posture exclusion group, no significant difference in posture difficulty was found between the include power-pose and excluded power-pose groups, $t(42) = -0.84$, $p = .40$, $d = -0.26$, suggesting that posture difficulty did not mediate the above interaction effect.

Discussion

In Experiment 2, posture moderated the effects of social exclusion on mood and basic needs measures. Similar to Experiment 1, excluded individuals in a dominant pose showed more negative effects of social exclusion than those that were in submissive postures. Additionally, the relative difficulty of holding powerful and submissive postures was ruled out as an explanation for the observed effects. Socially included participants also found it more difficult to hold submissive postures compared with dominant postures.

GENERAL DISCUSSION

The current research broadly suggests that posture moderates the effects of social exclusion on mood and relational need threats. Across both experiments, differences in mood after being included or excluded were observed only when individuals were sitting in a dominant posture. No differences in mood were found between included and excluded submissive-pose participants in either Experiment 1 or 2. In Experiment 2, the effects of inclusion and exclusion on relational need threats were more robust when participants were sitting in a dominant pose compared with a submissive pose. Taking a dominant, confident pose does not appear to protect individuals against the negative effects of being excluded but rather makes individuals feel even worse following exclusion. Conversely, when individuals are in a submissive posture, the negative effects of social exclusion on mood and relational need threats were either nonexistent or lessened in comparison with individuals who held a dominant posture. Additionally, socially included participants found dominant postures much easier to hold than socially excluded participants.

One explanation of the current results lies in the status-heightening effects of power poses compared with submissive poses. Because powerful postures lead individuals to feel more confident and dominant, thus giving individuals an increased perception of status, being socially excluded may hurt even more when one's posture makes one feel powerful. Although subjective social status has not been investigated experimentally as a moderator of social exclusion, it has been implicated as a mediator of gender differences in responses to exclusion (Bozin & Yoder, 2008). Although not status per se, high narcissism individuals, who generally perceive themselves as

being superior to others, have more negative responses to social rejection (Twenge & Campbell, 2003). Additionally, because powerful postures increase testosterone (Carney et al., 2010), a biomarker indicative of social status (Mazur & Booth, 1998; Mehta & Josephs, 2010), the increased perceived status of individuals in power poses may lead to more negative reactions to social exclusion. Conceptualizing testosterone as a mediating mechanism of this effect presents an interpretation of the status-testosterone "mismatch effect" found by Josephs and colleagues (2006), which may explain our current data. When individuals who perceive themselves as being high on status (because of posture in our research) are excluded by others (demoted in social status), the effects of this exclusion are more negative than for individuals that are in a submissive status or posture and socially excluded. Although speculative, it is reasonable to predict that the more differentiated effects of social exclusion that occur when individuals hold powerful postures may be a result of the increased testosterone from an upright posture interacting with social exclusion.

Because social exclusion has been found to lead to retaliatory aggressive responses (e.g. Twenge et al., 2001), similar to our current findings, posture may also moderate the extent to which social exclusion leads to aggressive reactions. Changes in testosterone have been found to be predictive of aggression (Carré et al., 2011). In one recent study, testosterone reactivity to a Cyberball manipulation predicted subsequent reactive aggression when individuals were socially included but not excluded (Geniole, Carré, & McCormick, 2011). On the basis of the current findings, it may be that testosterone reactivity to social exclusion would map onto subsequent aggression but only among individuals sitting in a relatively upright (i.e. powerful) posture.

An additional potential explanation for our findings is that dominant power poses may lead individuals to become more attentive to self-relevant goals and cues, whereas submissive poses may lead individuals away from focusing on these goals. The situated focus theory of power (Guinote, 2007) holds that power allows individuals to focus on information relevant to their goals. When an individual holds a submissive posture or status, the focus on the basic needs to have control, esteem, a meaningful existence, and belonging (Williams, 2007) may be attenuated.

It is important to connect the effects of posture on social exclusion to what posture individuals normally hold during exclusion. Posture and, subsequently, perceptions of status vary depending on whether individuals feel dominant and submissive relative to their social outcomes (Weisfeld & Beresford, 1982), as a function of social status (Carney et al., 2010), and to communicate social status (Cashdan, 1998). When one feels intimidated or inferior, one might shrink and slouch their body, whereas when one feels a surge of confidence and dominance, one might adopt a more expansive, upright posture. Although we experimentally manipulated posture, we reason that, on average, individuals could hold a variety of postures during an experience of social exclusion and that, on average, individuals will hold a posture that is somewhere between the postures we manipulated in our study. Future research is needed to investigate these possibilities, as well as examine how natural variability in posture affects other reactions to social events.

Despite the significance of these findings, there are a few limitations to the current research. In both experiments, we did not measure participants' perceptions of status or testosterone reactivity, which have been found to be influenced by power posing and may be potential mediators of the effects we observed. Additionally, research on dominant, powerful, and weak, submissive postures primarily use two different techniques: those that either involve upright or slouching postures (e.g. our study, Bohns & Wiltermuth, 2012; Briñol et al., 2009), or those that involve either expansive or constricted postures (e.g. Carney et al., 2010; Huang et al., 2011). Although the effects of both techniques on confidence and dominance appear to be parallel, future research would benefit from investigating if there are any differential effects between the effects these two methodologies have on self and social perceptions. Additionally, future research should also aim to examine the effects of other manipulations of status other than posture on reactions to social exclusion.

Future research will benefit from investigating processes that explain the effects that we find here. One possibility for this investigation is the role of expectation violations. When individuals hold submissive postures, they may feel that others are more powerful than them and thus experience exclusion less negatively. However, when individuals hold powerful postures, they may expect to be included by others because of their feelings of increased status. Consistent with this possibility, Wesselmann, Butler, Williams, and Pickett (2010) manipulated whether participants believed they were accepted or disliked by a group. When participants were later led to believe the group excluded them, those that were led to expect inclusion based on the previous interaction responded more aggressively than those that initially were led to believe the group disliked them. Although we did not measure aggression, the act of power posing may similarly change individual's expectations of whether they will be accepted by others, which could be responsible for our effects.

CONCLUSION

This research adds to a steadily growing body of research that increasingly demonstrates the role of posture, among other embodied factors, in modulating perceptions of the self, others, and relations between the self and others (Goldman & de Vignemont, 2009). Embodied cognition holds that our cognitions, perceptions, and responses to external events are situated in physiological experiences (Barsalou, 2008). Although a growing body research has established that physical body position and movements are important in shaping social cognition (e.g. Briñol & Petty, 2008; Chandler & Schwarz, 2009; Lakoff & Johnson, 1999; Goldman & de Vignemont, 2009, Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005; Slepian, Young, Rule, Weisbuch, & Ambadi, 2012), the current research is novel in that it shows that posture and external social events interact to affect cognitions. Broadly, future research on posture effects will help elucidate important interconnections between physiological movements and processes, as well as social perceptions and actions. Even though powerful postures

lead to more positive and powerful self-perceptions, these effects may backfire when individuals face adverse social situations such as social exclusion.

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