

ARTICLE

Dominance or prestige: A review of the effects of power poses and other body postures

Robert Körner  | Astrid Schütz 

Department of Psychology, University of Bamberg, Bamberg, Germany

Correspondence

Astrid Schütz, Department of Psychology, University of Bamberg, Markusplatz 3, 96047 Bamberg, Germany.
Email: astrid.schuetz@uni-bamberg.de

Abstract

Research on the effects of body positions has attracted enormous attention in recent years but has been plagued by failed replication attempts. Today, there is some confusion about which effects can be considered reliable. One problem that may have contributed to this confusion is the fact that most previous studies have not clearly distinguished between different types of body positions. We apply the dominance-prestige framework to distinguish between two types of body positions. On the basis of this reasoning, we argue that research on so-called power poses in fact has analyzed expansiveness as an indicator of dominance, whereas research on postures has focused on the straightness of the spine, which may be seen as a display of prestige. We review the literature and conclude that there is no clear evidence that short-term interventions involving body positions affect physiology or behavior. Still, there are effects on actors' self-perceptions. Repeatedly, studies on power poses have found effects on feelings of power and self-evaluations, and studies on postures have found effects on emotional experience. However, there is hardly any research that has directly compared the two types of interventions.

This is an open access article under the terms of the Creative Commons Attribution License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2020 The Authors. *Social and Personality Psychology Compass* published by John Wiley & Sons Ltd.

1 | INTRODUCTION

Innovative approaches have recently been applied in research on power and status, which are among the most intensively studied psychological constructs, but intense discussions have also ensued. In the present paper, we will review recent research by connecting findings on body positions with the dominance-prestige framework (Cheng & Tracy, 2014).

Studies on the effects of certain body positions, called power poses, have attracted a great deal of attention in academia as well as in the general public (Cuddy, 2012), but since 2014, skepticism has increased because findings could not be replicated. Today, power posing is showcased in the replication crisis. Still, there is some confusion about whether some effects may be considered reliable. It is possible that recent publications have not sufficiently distinguished between different types of body positions. However, a more precise distinction between the two kinds of body positions may help to account for discrepancies in the literature and allow us to draw a clearer picture of which effects may be expected with which position.

Another line of research has suggested that studies dealing with power, hierarchy, and social rank can be integrated and theoretically understood by using the dominance-prestige framework (Cheng & Tracy, 2014; Henrich & Gil-White, 2001). This framework distinguishes between dominance and prestige as two different paths toward social rank. Dominance describes status attainment through threat and intimidation, whereas prestige refers to the allocation of rank on the basis of a person's knowledge and skills (Cheng & Tracy, 2014).

We apply the dominance-prestige framework to distinguish between two different kinds of body positions: expansive versus contractive positions (power poses) and upright versus slumped positions (postures). Whereas high power poses can present a threat to interaction partners and may be regarded as a display of dominance, upright postures typically create an impression of competence (e.g., Schütz, 1993a, 1993b) and can be interpreted as a display of prestige. On the basis of this distinction, we provide an overview of research on body positions and show that different outcome variables were tested and impacted in research on poses versus research on postures. In this literature review, we summarize which effects can be considered reliable in research on poses or postures, which should be dismissed, and which require further investigation. We also point out methodological shortcomings and suggest moderators that should be attended to in future research.

2 | TERMINOLOGY AND THEORIZING

There are two lines of research on body positions. We refer to the first line as power posing: The standard paradigm includes two standing and two sitting positions. The high power poses (HPPs) involve having participants (a) sit on a chair, put their feet on a table, and fold their hands behind their head or (b) stand in front of a desk and put their hands on a table in a "tent fingers" pose. The low power poses (LPPs) involve having participants (a) sit slumped on a chair with legs tight, hands folded between their legs, and head tilted down or (b) stand with legs crossed and arms crossed in front of the body.

As described above, power poses are characterized by expansiveness versus contractiveness. In HPPs, people take up as much space as possible, whereas in LPPs, people make themselves as small as possible. Expansiveness signals who is in charge and emphasizes the vertical dimension of relationships (Henley, 1995). In line with this reasoning, power poses are typically described in terms of dominance (e.g., Chadwick, Metzler, Tijus, Armony, & Grèzes, 2019; Holland, Wolf, Looser, & Cuddy, 2017; Park, Streamer, Huang, & Galinsky, 2013) and can be understood as expressions of power or its pursuit (Schmid Mast & Cousin, 2013). To deduce beliefs about the nonverbal expression of power, Carney, Hall, and LeBeau (2005) in fact asked participants to imagine individuals who differed, *inter alia*, in their trait dominance. The resulting descriptions formed the blueprint for what was later termed power poses. Thus, power poses can be regarded as nonverbal expressions of dominance.

The second line of research focuses on postures: Upright postures (UPs) are defined by an erect spine, whereas slumped postures (SPs) are defined by a curved spine and stooped or slouching position. Manipulating the body in this manner is similar to but still different from the manipulation of the expansiveness of the body as done in power posing research (Allen, Gervais, & Smith, 2013) because HPPs do not necessarily include a straight spine (Golec de Zavala, Lantos, & Bowden, 2017). The distinction between poses and postures is supported by the following finding: When people generated words related to prestige¹ (e.g., “good marks,” “diploma”), they changed their posture on a vertical axis, whereas no bodily change was found along the horizontal axis as movement forward or backward (Oosterwijk, Rotteveel, Fischer, & Hess, 2009). Yet, power poses are characterized by body expansiveness along both a vertical and a horizontal axis.²

Posture research originates from findings on how peripheral expressive feedback (Riskind & Gotay, 1982) and proprioceptive cues influence emotions (Stepper & Strack, 1993). Research on UPs/SPs typically describes body manipulations in terms of pride, not dominance (e.g., Ceunen, Zaman, Vlaeyen, Dankaerts, & Van Diest, 2014; Roberts & Arefi-Afshar, 2007; Stepper & Strack, 1993). Pride in its authentic form is an affective consequence of prestige³ (Cheng, Tracy, & Henrich, 2010), which suggests that UPs/SPs fit into the prestige dimension of the dominance-prestige framework.

Still, studies dealing with manipulations of body positions have not clearly distinguished between effects of poses and effects of postures and have not systematically differentiated between perceptions of dominance and perceptions of prestige. In previous research, both forms of body positions have been described as self-enhancement strategies. By contrast, we suspect that the two body manipulations can be integrated as they can both be seen as strategies that can be applied to attain social status. However, along the lines of the dominance-prestige framework, they may have different effects on actors and perceivers (see Witkower, Tracy, Cheng, & Henrich, 2020).

Our reasoning is based on the following considerations: First, they seem to exhibit differences in intensity. SPs are characterized by a bent spine, and LPPs can also include bending the spine. However, LPPs are more constrictive (e.g., arms in front of the body) than SPs. Thus, LPPs are more intense. Similarly, the defining characteristic of UPs is an erect spine and thus an expansiveness of the back so to speak. HPPs can also involve an erect spine, but HPPs are more intense as they include more expansiveness (e.g., arms spread out or legs occupying a lot of space). Therefore, the characteristics of postures can be similar to the characteristics of poses (see Figures 1 and 2), but there is a difference in intensity. Poses are more intense and overt, whereas postures are less intense and more subtle. This distinction is in line with the intensity concept in emotions (Calder, Rowland, Young, Nimmo-Smith, Keane, & Perrett, 2000; Gao & Maurer, 2009): Nonverbal expressions can also vary in intensity (Dael, Mortillaro, & Scherer, 2012; De Silva, Kleinsmith, & Bianchi-Berthouze, 2005) and may thus convey different diagnostic information. This is also the case for facial expressions: Whereas a slight smile may be more likely to express politeness/friendliness, an intense smile may be more likely to express happiness (Fang, Sauter, & van Kleef, 2019). Intensity in emotion research describes “the relative degree of displacement, away from a neutral relaxed facial expression, of the pattern of muscle movements involved in emotional expressions of a given sort” (Hess, Blairy, & Kleck, 1997, p. 242).

Second, poses and postures seem to have different relations to strategies in the dominance-prestige framework (Henrich & Gil-White, 2001). Prestige and dominance represent different bases of social rank. Dominance is described as an induction of fear through coercion and intimidation and thus resembles coercive bases of power (French & Raven, 1959). Prestige, on the other hand, describes another path toward social rank through skills, knowledge, and success, thus resembling expert power in French and Raven’s (1959) model. Therefore, it is plausible that dominance (e.g., “Some people are afraid of me”) and prestige (e.g., “Members of my peer group respect and admire me”) are different strategies that can be used to achieve social influence (Cheng et al., 2010; Cheng, Tracy, Foulsham, Kingstone, & Henrich, 2013). These strategies are associated with different emotions, traits, and behavioral and neuroendocrine patterns (Cheng & Tracy, 2013). Research has been somewhat inconclusive regarding the relation between dominance and testosterone. Dominance has been found to be positively related to testosterone (Grant & France, 2001; Mazur & Booth, 1998), unrelated to testosterone (Johnson, Burk, & Kirkpatrick, 2007), or positively



FIGURE 1 Sitting and standing upright and slumped postures



FIGURE 2 Sitting and standing high and low power poses

related to testosterone only in individuals with low cortisol levels but unrelated or negatively related in individuals with high cortisol levels (Mehta & Josephs, 2010). A negative relationship was found between prestige and testosterone (Johnson et al., 2007). Further, dominance is associated with high aggression, low agreeableness, and low communion, whereas prestige shows the opposite pattern. But there are also some commonalities as both strategies are positively associated with leadership ability and agency (Cheng et al., 2010).

Thus, dominance and prestige may also have distinct nonverbal displays. In this line of research, initial findings have indicated differences in body behavior between prestigious and dominant individuals. The nonverbal expression of dominance includes large space-consuming movements such as arm extension and a wide stance. By contrast, prestigious individuals show rather subtle changes in posture such as pushing the torso out (Witkower et al., 2020). On the basis of these findings, we suggest that power posing be characterized as a display of dominance and UPs/SPs as displays of prestige. We also suggest that a distinction be made between the two positions to determine whether their effects differ, and we will do so in our review.

Before reviewing studies in the areas of poses and postures, one may ask: What are the functions of these two forms of body positions? Poses are more intense than postures, and they encompass more expansiveness. Thus, poses create an impression of dominance and can elicit submission in observers. It seems plausible that poses are nonverbal expressions of individuals who want to appear strong and capable of threatening others. Actual height and width are associated with status (Blaker, Rompa, Dessing, Vriend, Herschberg, & Van Vugt, 2013; Marsh, Henry, Schechter, & Blair, 2009). Further, Blaker and van Vugt (2014) reported that height is associated with dominance and prestige but muscularity is associated only with dominance. Thus, UPs are similar but less intense. They also lead to increased height but are not as expansive as poses are.

By contrast, the function of engaging in UPs might not be aim to elicit fear in others but to be respected by others. This is in line with the fact that postures are more subtle forms of body enlargements than poses are. Thus, UPs may also signal status (i.e., an individual's level of prestige), but extremely expansive nonverbal displays are not needed to retain one's status because social and cognitive skill and not physical features are the basis of one's prestige in the social hierarchy (Cheng et al., 2010). Actually, other people might not attribute respect to prestigious individuals if they engage in dominant (i.e., space-consuming) displays (cf. Blaker & van Vugt, 2014).

In the following, we use the term poses for HPPs/LPPs and the term postures for UPs/SPs. We use body positions as an umbrella term for poses and postures. We review the relevant research and limit the review to experimental studies, thus focusing on causal effects. Only two field studies were included because of their high ecological validity (Meier, Schöbel, & Feufel, 2018; Yap, Wazlawek, Lucas, Cuddy, & Carney, 2013). The majority of the studies have focused on effects of body positions on the actor. Some studies have analyzed effects on perceivers. We distinguish between these two perspectives. Embodiment manipulations regarding other body parts (e.g., head movements, Briñol & Petty, 2003; hand positions) or movements (e.g., walking styles) are not part of the present review. This review also does not address studies on yoga body postures (e.g., Minvaleev, Nozdrachev, Kir'yanova, & Ivanov, 2004) that are associated with certain states, studies comparing sitting and standing or lying postures (e.g., Berdach & Bakan, 1967), studies comparing approach with avoidant positions, or studies investigating priming effects of power poses (e.g., Bailey, LaFrance, & Dovidio, 2017).

3 | CONTROVERSY AROUND EFFECTS ON BODY POSITIONS

After several failed replication attempts, the effects of body positions on hormones, behavior, and self-report data came under intense scrutiny (Dreber & Johannesson, 2019). Several researchers criticized the paradigm and some argued that demand effects may be driving the effects (Cesario, Jonas, & Carney, 2017; see the Methodological Aspects section). As a consequence, the leading researcher in the field advocated caution in research on power posing (Carney, 2016).

p-curve analyses were conducted to detect questionable research practices such as *p*-hacking. A *p*-curve describes the distribution of *p*-values ($\leq .05$) from a set of studies that addressed a certain research topic (Simonsohn,

Nelson, & Simmons, 2014). If the p -values are right-skewed (there are more low than high p -values), true effects may exist, whereas uniform or left-skewed distributions of p -values indicate that there is no evidential value, and only selective reporting and questionable research practices may have produced the results. In 2017, Simmons and Simonsohn (2017) published a p -curve analysis based on 33 studies on body positions. The distribution of p -values from this set of studies was indistinguishable from the p -values that would be associated with an expected effect size of zero. The authors concluded that there was no general effect of body positions. One year later, p -curve analyses published by Cuddy, Schultz, and Fosse (2018) based on 55 studies showed evidence of effects on emotions, power feelings, and self-evaluations. However, many of these studies did not allow inferences to be made about the effect of a pose/posture relative to a neutral condition (see Credé, 2019), which is a serious shortcoming. Moreover, neither of these overviews was really exhaustive, and most importantly, different types of body positions were not distinguished. Hence, in order to address the differential evidence, a necessary initial step will be to separate the findings for poses from the findings for postures.

4 | OVERVIEW OF STUDIES ON POSES VERSUS POSTURES

There were two decision criteria that we applied to categorize studies as research on poses or postures: (a) If the authors relied on the power posing paradigm as introduced by Carney, Cuddy, and Yap (2010) and used this intervention, the study was assigned to the research on poses. Otherwise, if the authors relied on the paradigm by Riskind and Gotay (1982), the study was assigned to the research on postures. (b) Studies manipulating the expansiveness of the whole body were categorized as research on poses, whereas studies manipulating only the curvature of the spine were categorized as research on postures. A complete assignment of studies to the research on poses or postures and—to the best of our knowledge—an exhaustive summary of the research on body position effects can be found in the Supporting Information Appendix S1. In the following, we focus on studies that dealt with variables that were replicated in several studies or on effects that may be expected from the literature on status and social rank (e.g., action orientation).

5 | SUMMARY OF FINDINGS

First, we review the findings from effects of short-term manipulations of body positions on the person who adopts the position. Within these actor effects, a further categorization of dependent variables follows a distinction that has been made in emotion theories (Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005; Rachman, 1978) in which the effects on physiology, behavior, and self-reports are analyzed separately. As self-reports often do not go along with physiological effects (Dawe et al., 2016; McLeod, Hoehn-Saric, & Stefan, 1986), we used this approach because it allowed us to take a more fine-grained look at which effects on actors may be replicable. Second, we summarize findings from studies that tested effects on perceivers. For each topic, we first review the studies on poses, then the studies on postures.

6 | EFFECTS ON THE ACTOR

6.1 | Physiological parameters

6.1.1 | Poses

In the original study by Carney et al. (2010), HPPs were reported to lead to increases in testosterone and decreases in cortisol, whereas LPPs decreased participants' testosterone levels and increased their cortisol. A

replication failed to reproduce these effects with a high-powered sample size (200 instead of 42 participants; Ranehill, Johannesson, Leiberg, Sul, Dreber, & Weber, 2015). Likewise, later replications did not find effects of poses on hormones (in social phobia patients in Davis et al., 2017; and in others in Deuter, Schächinger, Best, & Neumann, 2016; Metzler & Grèzes, 2019; Ronay, Tybur, van Huijstee, & Morssinkhof, 2017; Smith & Apicella, 2017; Turan, 2015). It was concluded that the findings reported by Carney et al. (2010) were highly sensitive to data analytic choices. If different exclusion criteria for participants or different data analytic procedures were used, the findings were no longer statistically significant (Credé & Phillips, 2017). Thus, an effect of poses on hormones was deemed highly unlikely. Recently, LPPs were reported to increase skin conductance levels (Saggese, Cordasco, Maldonado, Bourbakis, Vinciarelli, & Esposito, 2018). However, replication studies are needed to validate this finding.

6.1.2 | Postures

To the best of our knowledge, no study has tested the influence of postures on hormones yet. Scientists in posture research have tended to focus on cardiovascular responses, but no significant differences between UPs and SPs were found for heart rate, respiration rate, blood pressure, and stroke volume in adults (Nair, Sagar, Sollers, Consedine, & Broadbent, 2014; Wilson, & Peper, 2004). Initial findings in children showed increased heart rate through UPs (Inagaki, Shimizu, & Sakairi, 2018), and UPs in adults were reported to increase eye blink startle (Ceunen et al., 2014). Clearly, there is a need to replicate these findings.

6.2 | Later actor behavior

6.2.1 | Poses

Many studies have investigated risk-taking as a behavioral consequence of power posing. Carney et al. (2010) reported increased risk-taking in HPPs in comparison with LPPs. However, the majority of studies were not able to replicate this finding (Bombari, Schmid Mast, & Pulfrey, 2017; Cesario & McDonald, 2013, Study 2; Cesario & Johnson, 2018, Study 1–3; Chen, Yang, Tan, Gu, & Chen, 2019; Garrison, Tang, & Schmeichel, 2016; Keller, Johnson, & Harder, 2017; Ranehill et al., 2015; Ronay et al., 2017; Smith & Apicella, 2017), whereas only very few studies replicated this finding (Cesario & McDonald, 2013, Study 1; Cesario & Johnson, 2018, Study 4; Saggese et al., 2018).

With respect to action orientation, a study found that after engaging in HPPs, participants were more likely to take a card in a simulated black jack game (Huang, Galinsky, Gruenfeld, & Guillory, 2011) and to take action in different scenarios than those who engaged in LPPs (Park et al., 2013). But there was no effect of HPPs on outcomes in a negotiation task (Cesario & Johnson, 2018). Finally, HPPs were reported to be associated with less restrained eating in women with high concerns about body shape, whereas the reverse effect was observed in women with low concerns about body shape (Allen et al., 2013).

Negative behavioral consequences of HPPs were investigated by Yap et al. (2013). People who engaged in HPPs were more likely to cheat on a test, to take an overpayment, or to commit traffic violations in a driving simulator than people who engaged in LPPs. Further, automobiles in New York with an expansive driver's seat (which leads people to adopt HPPs) were more likely to be illegally parked. The latter finding was replicated in a small German town (Meier et al., 2018) after controlling for car length, brand status, and car price. Finally, people who adopted LPPs worked on fewer problems on an intelligence test than people in normal postures (Kwon & Kim, 2015). Many of these findings are singular, and replication studies are needed to evaluate whether the effects are reliable.

6.2.2 | Postures

Engaging in UPs was reported to lead to higher task persistence than engaging in SPs (Nair et al., 2014; Riskind & Gotay, 1982). When participants received feedback on their performance on an achievement test, the highest task persistence was observed when people adopted the respective posture (Riskind, 1984).

6.3 | Self-reports

6.3.1 | Poses

In various studies that used state measures of power, HPPs were linked to increased feelings of power (Carney et al., 2010; Cesario & Johnson, 2018; Fischer, Fischer, Englich, Aydin, & Frey, 2011; Huang et al., 2011, Study 1; Park et al., 2013; Peña & Chen, 2017; Laborde, Strack, & Mosley, 2019; Raney et al., 2015; Saggese et al., 2018; Teh et al., 2017; Turan, 2015). A meta-analysis of six preregistered studies (special issue on power poses in *Comprehensive Results in Social Psychology*) yielded strong evidence for an effect of poses on feelings of power (Gronau, Van Erp, Heck, Cesario, Jonas, & Wagenmakers, 2017). An extension with an additional study supported the finding (Jansen & Hornbæk, 2018), and the *p*-curve analyses by Simmons and Simonson (2017) and Cuddy et al. (2018) both found evidence that poses affect feelings of power. Effects were also found when indirect measures were used to tap into implicit experiences (Huang et al., 2011, Study 1; Park et al., 2013, Study 3).

Further, there have been reports of increased confirmatory information processing (Fischer et al., 2011), lower agreement with conventional religious beliefs (Fuller & Montgomery, 2015), and a preference for a moving ego perspective instead of a moving time perspective (Duffy & Feist, 2016) as a consequence of HPPs in comparison with LPPs. In addition, after engaging in HPPs, participants judged the weight of boxes to be lighter than participants did after engaging in LPPs (Lee & Schnall, 2014). No effects were found on thought confidence, persuasion, or openness (Latu, Duffy, Pardal, & Alger, 2017).

With respect to state self-esteem, there were also effects of HPPs (Klenner, Otto, & Asbrock, 2016; Körner, Köhler, & Schütz, 2020; Körner, Petersen, & Schütz, 2019) but there were no effects on trait self-esteem (Kwon & Kim, 2015; Nielsen, 2017). Further, LPPs elicited negative mood (Rossberg-Gempton & Poole, 1993) and guilt (Rotella & Richeson, 2013). By contrast, various authors (Davis et al., 2017; Jackson, Nault, Smart Richman, LaBelle, & Rohleder, 2017; Miragall, Etchemendy, Cebolla, Rodríguez, Medrano, & Baños, 2018;⁴ Saggese et al., 2018) found no effects of poses on emotions, social anxiety, or vitality, and Nielsen (2017) reported no difference in optimism between people adopting HPPs versus LPPs. Finally, in chronically powerless people, HPPs elicited more vengeance than LPPs (Strelan, Weick, & Vasiljevic, 2014). Further, participants who adopted HPPs instead of LPPs during a video game reported more enjoyment, presence, and controller responsiveness (Peña & Chen, 2017).

6.3.2 | Postures

With respect to self-reported dominance, no difference was found between UPs and SPs (Ceunen et al., 2014), but UPs led to more thought confidence (Briñol, Petty, & Wagner, 2009), self-perceived strength on a manual muscle test (Peper, Booiman, Lin, & Harvey, 2016), perceptions of one's own leadership (Arnette & Pettijohn II, 2012), and less self-reported difficulty in a mental math performance task (Peper, Harvey, Mason, & Lin, 2018) than SPs.

Many studies have reported more positive or fewer negative emotions from adopting UPs (Kozak, Roberts, & Patterson, 2014; Nair et al., 2014), more negative and fewer positive emotions from adopting SPs (Nair et al., 2014; Veenstra, Schneider, & Koole, 2017), better mood when comparing UPs with SPs or controls (nonclinical individuals in Roberts & Arefi-Afshar, 2007; depressive patients in Wilkes, Kydd, Sagar, & Broadbent, 2017), and better recall of

negative events or words than positive events in SPs in comparison with UPs (depressive patients in Michalak, Mischkat, & Teismann, 2014; nonclinical populations in Peper, Lin, Harvey, & Perez, 2017; Riskind, 1983; Tsai, Peper, & Lin, 2016). Further, SPs led to reduced recovery in negative mood (Veenstra et al., 2017), and when in UPs, participants could more easily generate positive thoughts than when in SPs (Wilson & Peper, 2004). In 12-year-old boys, UPs led to more vitality and pleasure (Inagaki et al., 2018). Only a few studies on UPs/SPs did not find effects on emotions (Briñol et al., 2009; Riskind & Gotay, 1982).

Effects may be enhanced or reduced depending on the context. For example, Riskind (1984) found that when postures are incongruent with feedback on success or failure (e.g., receiving failure feedback in UPs), participants reported higher external locus of control and depression. The same pattern was found for pride. For example, when participants adopted UPs (instead of SPs) while receiving success feedback, they experienced more pride (Stepper & Strack, 1993). Similarly, Welker, Oberleitner, Cain, and Carré (2013) showed that for people in UPs, their mood was worse when they were socially excluded than when they were socially included, whereas no such effect was observed for people in SPs.

6.4 | Effects on perceivers

6.4.1 | Poses

A finding that has attracted attention in academia and the general public was an increase in perceived hireability after people engaged in HPPs. In a typical study, 61 participants were instructed to hold either two HPPs or two LPPs for 2–3 min each before a stressful job interview in the laboratory. The authors reported that the people who had adopted HPPs showed better performance in a job interview and were more likely to be hired than the people who had adopted LPPs (Cuddy, Wilmoth, Yap, & Carney, 2015). However, studies using much larger sample sizes (279 in Keller et al., 2017; 200 in Klaschinski, Schnabel, & Schöder-Abé, 2017) were not able to replicate these findings.

In the context of romantic relationships, men and women who displayed HPPs were rated higher on romantic attractiveness and were more likely to get a yes on a speed date and on a dating app than people displaying LPPs (Vacharkulksemsuk, Reit, Khambatta, Eastwick, Finkel, & Carney, 2016). It was reported that people who displayed HPPs created impressions of competence, admiration, envy, contempt, and less pity in observers than people who displayed LPPs (Rennung, Blum, & Göritz, 2016). However, there was no control group, and this may have been a crucial omission. In a different study, when a neutral posture was included, competence ratings made by observers were in fact higher for people in HPPs than for people in LPPs, but they were highest in controls (Gurney, Howlett, Pine, Tracey, & Moggridge, 2017), suggesting that HPPs are not the best way to signal competence.

Furthermore, people felt more comfortable and liked their interaction partners more when the partners displayed nonverbal complementarity: In same-sex dyads, participants in HPPs felt better when their interaction partners displayed LPPs and vice versa (Tiedens, & Fragale, 2003). Finally, people looked longer and more frequently at people displaying LPPs (Holland et al., 2017).

6.4.2 | Postures

With regard to postures, there is a long tradition attributing upright and slouched positions to certain emotions and characteristics (Mendels, 1970). For example, people in SPs were perceived as more depressed than others (Riskind & Gotay, 1982). Further, SPs were associated with shame (Martens, Tracy, & Shariff, 2012). However, in this line of research, we were not able to find experimental studies that systematically analyzed the effects of postures on observer ratings (e.g., the job interview studies with poses).

7 | MODERATORS

The inconclusiveness of some of the results may be due to the fact that there are some relevant moderator variables. First, several authors have argued that a social context is a necessary condition for effects of body positions (Carney, Cuddy, & Yap, 2015; Cesario & McDonald, 2013), but of course a social context is no guarantee that an effect will occur (e.g., Ronay et al., 2017).

Second, Park et al. (2013) showed that poses that violate cultural norms do not increase feelings of power or action orientation. For example, an expansive-feet-on-desk pose had such effects only in American but not in East-Asian participants. The attention to cultural norms could be more crucial for poses because, through their expansiveness, they are likely to violate collectivist norms of modesty, humility, and restraint. This is less the case for UPs.

Third, participants' gender should be taken into account. For example, Roberts and Arefi-Afshar (2007) reported that for U.S. participants, men showed better and women worse performance self-ratings after engaging in UPs. Bombari et al. (2017) found that feelings of power were higher in men performing HPPs than LPPs, but this pattern was not observed in women. It is possible that baseline self-esteem and gender role orientation play a role here and could be controlled for in future studies.

8 | METHODOLOGICAL ASPECTS

In the majority of studies, only posttest designs (e.g., Huang et al., 2011) were used, and only two conditions were compared—mainly HPPs and LPPs (e.g., Lee & Schnall, 2014). The situation is similar for body postures (e.g., Nair et al., 2014). This does not allow for a comparison of the effects of certain body positions with a neutral baseline. Thus, differences cannot be clearly attributed to one of the conditions. This is crucial because, for poses, the relationship between low and high power and the effects of positions might not be linear (e.g., see competence ratings in Gurney et al., 2017). With respect to power per se, Schaerer, du Plessis, Yap, and Thau (2018) demonstrated that for various outcomes, low power did not lead to the opposite effects of high power, and this is why they recommend the use of three-cell designs. Thus, for various previous pose (and posture) studies, it remained unclear whether the HPP/UP or the LPP/SP group was responsible for an effect. With respect to the effects of body positions on emotions, three studies (Rossberg-Gempton & Poole, 1993; Veenstra et al., 2017; Zabetipour et al., 2015) indicated that the effect was driven by the SP or LPP condition, but many studies did not allow such a conclusion to be drawn (Credé, 2019). Thus, we recommend that studies use control groups in three-cell designs in future research on poses and postures. If it is clear which condition produces an effect on a certain variable, an initial three-cell design study can consecutively be combined with two-cell studies (Schaerer et al., 2018). Similarly, pre-post designs can be complemented by posttest designs, which have the advantage that participants are not sensitized by a pretest, which in turn makes demand effects less likely to occur (Wilson & Putnam, 1982).

In fact, several authors have argued that effects on self-reports may be driven by demand effects (Credé, 2019; Jansen & Hornbæk, 2018; Kozak et al., 2014; Simmons & Simonsohn, 2017). However, Carney et al. (2015) argued that studies most often found effects when credible cover stories were used so that participants could not guess the research question—which suggests that demand characteristics might not be the driving force behind the phenomenon. In fact, in some studies, there was no effect of demand characteristics. For example, there was not a significant difference in outcome emotions between participants who were instructed to hold a pose but were given no other information and those who were instructed to hold a pose and were also told that this body position increases negative feelings (Rossberg-Gempton & Poole, 1993). However, the sample size in this study was rather small, and the study was underpowered. Some studies measured participant expectations and controlled for them. For example, using the Perceived Awareness of the Research Hypothesis Scale (Rubin, 2016) and controlling for awareness, individuals who had adopted HPPs still showed higher state self-esteem than those who had adopted LPPs (Körner et al., 2019), which suggests that there are effects that go beyond demand effects. A recent meta-analysis

by Gronau et al. (2017) found that poses have a strong impact on power feelings, but when they analyzed only participants who were unfamiliar with the effect of poses, the evidence was only moderate. Altogether, we conclude that demand effects may partly, but not fully, explain the findings.

9 | DISCUSSION AND CONCLUSION

On the basis of the dominance-prestige framework (Cheng et al., 2013; Henrich & Gil-White, 2001; Witkower et al., 2020) and differences in the intensity or subtlety of nonverbal expressions, we argue that poses and postures are two distinct forms of nonverbal behavior. Poses can be regarded as displays of dominance and postures as displays of prestige.

Some researchers have found a positive relation between dominance and testosterone levels (e.g., Grant & France, 2001). This is why poses were expected to have an impact on testosterone levels; however, no effects of poses on hormones were found (e.g., Ranehill et al., 2015). This finding might not necessarily be a failure to apply the dominance-prestige framework to body positions because other researchers have also suggested that there is no relation between dominance and testosterone (see Johnson et al., 2007). Further, it may be the case that engaging in poses for a short time does not have the potential to change physiological parameters. Similarly, studies on postures have investigated effects on cardiovascular responses, but no effects have been found in this domain (e.g., Nair et al., 2014). We conclude that no replicable effects of body positions on physiology have been found.

As dominance is associated with aggression (Johnson et al., 2007) and low prosociality (Cheng et al., 2010), it makes sense that researchers suspected that poses might be related to antisocial behavior. Poses were indeed found to be related to antisocial behavior (e.g., Yap et al., 2013) and also to action orientation (e.g., Huang et al., 2011). Still, these findings have yet to be replicated. However, with respect to risk behavior or success in negotiations, no effects of poses have been found (e.g., Cesario & Johnson, 2018).

Both of the strategies that are applied to attain social rank (i.e., dominance and prestige) are associated with agency (Cheng & Tracy, 2014), but as prestige is a strategy that is applied to attain social rank through skills and knowledge (Henrich & Gil-White, 2001), it seems plausible that especially individuals high in prestige need to be persistent. Dovetailing with this assumption, studies on postures have reported positive effects of UPs on task persistence (e.g., Risking & Gotay, 1982). Overall, however, the findings have provided no clear evidence on behavioral outcomes of body positions, and more research is thereby needed—particularly in comparing effects of poses and postures on the same dependent variables.

Dominance is associated with feelings of superiority (Cheng et al., 2010) and prioritizing self-interest (Cheng, 2020). The effects of poses on experience are in line with this reasoning: Poses have reliable effects on feelings of power (see Gronau et al., 2017) and self-evaluations (e.g., Körner et al., 2019). By contrast, prestige is associated with admiration and liking (Algoe & Haidt, 2009; Cheng et al., 2013), which is why positive emotions such as happiness can be expected to be higher in individuals engaging in upright postures. In line with this, there is strong evidence that certain postures have general effects in increasing positive and reducing negative feelings (e.g., Veenstra et al., 2017).⁵ With respect to the effects of poses on emotions, there are not many studies, and the results have been mixed.

The findings on effects of body positions on observers also seem to be in line with the dominance-prestige framework: Participants performing HPPs did not perform better in job interviews (e.g., Klaschinski et al., 2017). Further, participants in neutral body positions (that resemble UPs) received higher competence ratings than participants in HPPs (e.g., Gurney et al., 2017). However, we inferred this conclusion from studies that looked only at poses, and there are no posture studies that directly compared competence ratings of UPs with controls.

On the basis of our review of current studies, we conclude that both types of body positions can have effects on an actor's self-perceptions. There are quite a few studies that have shown effects of postures on emotional

experience and studies that have demonstrated effects of poses on experiences of higher power. Yet, the effects are likely to last only for the short-term, and the behavioral consequences are not yet clear.

Further, it should be noted that our rationale for separating poses from postures may work primarily for the high ends of the dimensions because it separates HPPs from UPs to a greater extent. Whereas LPPs show subtle nonverbal differences from SPs (both types of positions are constrictive), clearer differences emerge when comparing HPPs with UPs (HPPs are much more expansive and intense than UPs as the arms and legs are spread out; see Figures 1 and 2).

A second point that should be considered is that studies on poses versus postures had a different focus with respect to the dependent variables. There are many more publications on postures that investigated emotions as the dependent variable than in the literature on poses. With respect to power feelings, which is one of the most intensively studied variables in research on poses, we identified only one published study on postures (Ceunen et al., 2014) with a dependent variable that was related to dominance. It is not clear whether this lopsidedness is due to publication bias or research focus. In any case, previous research has failed to directly compare the effects of poses and postures. In fact, this leads to a limitation of our descriptive review: We cannot actually contrast the findings on poses and postures. Clearly, future experimental research is needed to directly compare effects of poses and postures on different self-reported variables and perceiver ratings.

One may also ask whether a differentiation between poses and postures matters in practice. In real-life contexts, people tend to engage in postures because of widespread norms or health standards (e.g., sitting up straight; Nierenberg, 2016), and thus, UPs may occur frequently. By contrast, poses are more intense and less subtle, which is why they should occur less frequently in everyday situations. In fact, poses can include postures (i.e., standing up straight), but because of differences in intensity, they should have different effects on the observer and the self and can be understood as displays of dominance instead of prestige (Witkower et al., 2020).

More research is needed on effects of long-term and repeated interventions (for initial attempts, see Metzler & Grèzes, 2019; Weineck, Messner, Hauke, & Pollatos, 2019). Additionally, more clarification is needed on the role of demand effects. Preregistration is a promising way to reestablish the credibility of research on poses and postures. Peer-reviewed preregistered projects would also be useful for advancing the field of poses and postures (e.g., Cesario et al., 2017). Moreover, the applicability of poses and postures in real-life contexts would advance the field. Finally, future studies should thoroughly test our predictions using poses and postures to further establish the validity of the administration of the dominance-prestige framework in embodiment research.

ACKNOWLEDGEMENTS

The authors are grateful to Jane Zagorski for language editing. Further, we thank Zachary Witkower, Sebastien Brion, and an anonymous reviewer for extremely valuable comments on an earlier version of our manuscript.

ORCID

Robert Kömer  <https://orcid.org/0000-0001-8793-0830>

Astrid Schütz  <https://orcid.org/0000-0002-6358-167X>

ENDNOTES

- ¹ In fact, participants were instructed to generate words related to success and pride. However, the generated words showed a great deal of similarity to prestige.
- ² By horizontal axis, we mean expansive lateral displays as well as expansiveness on a forward–backward dimension (see the HPPs in Figure 2).
- ³ Another form of pride is hubristic pride, which represents the emotional foundation of dominance (Cheng et al., 2010; see the authentic-hubristic model of pride, Tracy & Robins, 2007a; see Witkower & Tracy, 2019, for the bodily communication of pride). The authors (Ceunen et al., 2014; Roberts & Arefi-Afshar, 2007; Stepper & Strack, 1993) who connected pride with postures describe pride in a positive way and are probably referring to authentic pride but do not explicitly

distinguish between hubristic and authentic pride. Because humans cannot distinguish nonverbal displays of authentic from hubristic pride (Lange & Crusius, 2015; Tracy & Robins, 2007b), we will not focus on this distinction in this paper.

⁴ Miragall et al. (2018) stated that “women in the expansive condition showed higher positive emotions after the mirror exposure task” (p. 1, Abstract), suggesting that poses may affect emotions in this study. However, this is only partially true: In fact, women who had adopted HPPs afterwards reported more positive emotions than women who had adopted LPPs, but both groups showed a decrease in positive emotions. This is why we do not view this finding as a positive effect of poses on emotions.

Moreover, the authors measured six negative and two positive emotions. There were no significant differences between HPPs and LPPs for all six negative emotions, and when considering alpha error inflation, we concluded that the study could not be regarded as evidence of an effect of poses on emotions. When calculating a MANCOVA (pretest values for general negative emotions, insecurity, anxiety, disgust, shame, sadness, anger, general positive emotions, self-confidence, and happiness as covariates; posttest values for these variables as dependent variables) with the data provided by Miragall et al. (2018), we found no evidence of an effect of poses (condition: HPP vs. LPP), Wilks $\lambda = 0.837$, $F(8, 51) = 1.24$, $p = .296$.

⁵ A limitation of this claim is that we cannot say which specific emotions are influenced by postures as most studies have used general mood measures such as the PANAS (Watson, Clark, & Tellegen, 1988) or POMS (McNair, Lorr, & Droppelman, 1992) or adjective lists that contained several emotions.

FURTHER READING

Cuddy, A. J. C., Schultz, S. J., & Fosse, N. E. (2018). P-curving a more comprehensive research on postural feedback reveals clear evidential value for “power posing” effects: Reply to Simmons and Simonsohn (2017). *Psychological Science*, 29(4), 656–666.

Witkower, Z., & Tracy, J. L. (2019). Bodily communication of emotion: Evidence for extrafacial behavioral expressions and available coding systems. *Emotion Review*, 11(2), 184–193.

Witkower, Z., Tracy, J. L., Cheng, J. T., & Henrich, J. (2020). Two signals of social rank: Prestige and dominance are associated with distinct nonverbal displays. *Journal of Personality and Social Psychology*, 118(1), 89–120.

REFERENCES

- Algoe, S. B., & Haidt, J. (2009). Witnessing excellence in action: The ‘other-praising’ emotions of elevation, gratitude, and admiration. *The Journal of Positive Psychology*, 4(2), 105–127.
- Allen, J., Gervais, S. J., & Smith, J. L. (2013). Sit big to eat big: The interaction of body posture and body concern on restrained eating. *Psychology of Women Quarterly*, 37(3), 325–336.
- Amette, S. L., & Pettijohn, T. F., II. (2012). The effects of posture on self-perceived leadership. *International Journal of Business and Social Science*, 3, 8–13.
- Bailey, A. H., LaFrance, M., & Dovidio, J. F. (2017). Could a woman be superman? Gender and the embodiment of power postures. *Comprehensive Results in Social Psychology*, 2(1), 6–27.
- Berdach, E., & Bakan, P. (1967). Body position and free recall of early memories. *Psychotherapy: Theory, Research & Practice*, 4(3), 101–102.
- Blaker, N. M., Rompa, I., Dessing, I. H., Vriend, A. F., Herschberg, C., & Van Vugt, M. (2013). The height leadership advantage in men and women: Testing evolutionary psychology predictions about the perceptions of tall leaders. *Group Processes & Intergroup Relations*, 16(1), 17–27.
- Blaker, N. M., & van Vugt, M. (2014). The status-size hypothesis: How cues of physical size and social status influence each other. In J. T. Cheng, J. L. Tracy, & C. Anderson (Eds.), *The psychology of social status* (pp. 119–137). New York, NY: Springer.
- Bohns, V. K., & Wiltermuth, S. S. (2012). It hurts when I do this (or you do that): Posture and pain tolerance. *Journal of Experimental Social Psychology*, 48(1), 341–346.
- Bombardi, D., Schmid Mast, M., & Pulfrey, C. (2017). Real and imagined power poses: Is the physical experience necessary after all? *Comprehensive Results in Social Psychology*, 2(1), 44–54.
- Briñol, P., & Petty, R. E. (2003). Overt head movements and persuasion: A self-validation analysis. *Journal of Personality and Social Psychology*, 84(6), 1123–1139.
- Briñol, P., Petty, R. E., & Wagner, B. (2009). Body posture effects on self-evaluation: A self-validation approach. *European Journal of Social Psychology*, 39(6), 1053–1064.
- Calder, A. J., Rowland, D., Young, A. W., Nimmo-Smith, I., Keane, J., & Perrett, D. I. (2000). Caricaturing facial expressions. *Cognition*, 76(2), 105–146.
- Carney, D. R. (2016). *My position on “power poses”*. (Unpublished manuscript). Berkeley: University of California.

- Carney, D. R., Cuddy, A. J. C., & Yap, A. J. (2010). Power posing: Brief nonverbal displays affect neuroendocrine levels and risk tolerance. *Psychological Science*, 21(10), 1363–1369.
- Carney, D. R., Cuddy, A. J. C., & Yap, A. J. (2015). Review and summary of research on the embodied effects of expansive (vs. contractive) nonverbal displays. *Psychological Science*, 26(5), 657–663.
- Carney, D. R., Hall, J. A., & LeBeau, L. S. (2005). Beliefs about the nonverbal expression of social power. *Journal of Nonverbal Behavior*, 29(2), 105–123.
- Cesario, J., & Johnson, D. J. (2018). Power poseur: Bodily expansiveness does not matter in dyadic interactions. *Social Psychological and Personality Science*, 9(7), 781–789.
- Cesario, J., Jonas, K. J., & Carney, D. R. (2017). CRSP special issue on power poses: What was the point and what did we learn? *Comprehensive Results in Social Psychology*, 2(1), 1–5.
- Cesario, J., & McDonald, M. M. (2013). Bodies in context: Power poses as a computation of action possibility. *Social Cognition*, 31, 260–274.
- Ceunen, E., Zaman, J., Vlaeyen, J. W., Dankaerts, W., & Van Diest, I. (2014). Effect of seated trunk posture on eye blink startle and subjective experience: Comparing flexion, neutral upright posture, and extension of spine. *PLoS One*, 9(2), e88482.
- Chadwick, M., Metzler, H., Tijus, C., Armony, J. L., & Grèzes, J. (2019). Stimulus and observer characteristics jointly determine the relevance of threatening facial expressions and their interaction with attention. *Motivation and Emotion*, 43(2), 299–312.
- Chen, O., Yang, Z., Tan, X., Gu, Z., & Chen, J. (2019). Powerful postures do not lead to risky behaviors. *Journal of Pacific Rim Psychology*, 13, e23.
- Cheng, J. T. (2020). Dominance, prestige, and the role of leveling in human social hierarchy and equality. *Current Opinion in Psychology*, 33, 238–244.
- Cheng, J. T., & Tracy, J. L. (2013). The impact of wealth on prestige and dominance rank relationships. *Psychological Inquiry*, 24(2), 102–108.
- Cheng, J. T., & Tracy, J. L. (2014). Toward a unified science of hierarchy: Dominance and prestige are two fundamental pathways to human social rank. In J. T. Cheng, J. L. Tracy, & C. Anderson (Eds.), *The psychology of social status* (pp. 3–27). New York, NY: Springer.
- Cheng, J. T., Tracy, J. L., Foulsham, T., Kingstone, A., & Henrich, J. (2013). Two ways to the top: Evidence that dominance and prestige are distinct yet viable avenues to social rank and influence. *Journal of Personality and Social Psychology*, 104(1), 103–125.
- Cheng, J. T., Tracy, J. L., & Henrich, J. (2010). Pride, personality, and the evolutionary foundations of human social status. *Evolution and Human Behavior*, 31(5), 334–347.
- Credé, M. (2019). A negative effect of a contractive pose is not evidence for the positive effect of an expansive pose: Comment on Cuddy, Schultz, and Fosse (2018). *Meta-Psychology*, 3.
- Credé, M., & Phillips, L. A. (2017). Revisiting the power pose effect: How robust are the results reported by Carney, Cuddy, and Yap (2010) to data analytic decisions? *Social Psychological and Personality Science*, 8(5), 493–499.
- Cuddy, A. J., Wilmuth, C. A., Yap, A. J., & Carney, D. R. (2015). Preparatory power posing affects nonverbal presence and job interview performance. *Journal of Applied Psychology*, 100(4), 1286–1295.
- Cuddy, A. J. C. (2012). *Your body language shapes who you are*. TedTalks. Retrieved from http://www.ted.com/talks/amy_cuddy_your_body_language_shapes_who_you_are
- Dael, N., Mortillaro, M., & Scherer, K. R. (2012). Emotion expression in body action and posture. *Emotion*, 12(5), 1085–1101.
- Davis, M. L., Papini, S., Rosenfield, D., Roelofs, K., Kolb, S., Powers, M. B., & Smits, J. A. (2017). A randomized controlled study of power posing before public speaking exposure for social anxiety disorder: No evidence for augmentative effects. *Journal of Anxiety Disorders*, 52, 1–7.
- Dawe, K., Montgomery, A., McGee, H., Panagopoulou, E., Morgan, K., Hackshaw, L., & Vedhara, K. (2016). The effects of perceived stress on biological parameters in healthcare professionals: A systematic review. *Journal of Health Psychology*, 21(5), 607–618.
- De Silva, P. R., Kleinsmith, A., & Bianchi-Berthouze, N. (2005). Towards unsupervised detection of affective body posture nuances. In *International conference on affective computing and intelligent interaction* (pp. 32–39). Berlin, Heidelberg: Springer.
- Deuter, C. E., Schächinger, H., Best, D., & Neumann, R. (2016). Effects of two dominance manipulations on the stress response: Cognitive and embodied influences. *Biological Psychology*, 119, 184–189.
- Dreber, A., & Johannesson, M. (2019). Statistical significance and the replication crisis in the social sciences. In *Oxford research encyclopedia of economics and finance*. Oxford, England: Oxford University Press.
- Duffy, S. E., & Feist, M. I. (2016). Power in time: The influence of power posing on metaphorical perspectives on time. *Language and Cognition*, 9(4), 637–647.
- Ge, W., Bennett, T. K., & Oller, J. C. (2017). Should high-power posing be integrated in physical therapy? *Journal of Physical Therapy Science*, 29(4), 697–701.

- Fang, X., Sauter, D. A., & van Kleef, G. A. (2019). Unmasking smiles: The influence of culture and intensity on interpretations of smiling expressions. *Journal of Cultural Cognitive Science*. <https://link.springer.com/article/10.1007/s41809-019-00053-1>
- Fischer, J., Fischer, P., Englich, B., Aydin, N., & Frey, D. (2011). Empower my decisions: The effects of power gestures on confirmatory information processing. *Journal of Experimental Social Psychology*, 47(6), 1146–1155.
- French, J. R. P., & Raven, B. H. (1959). The bases of social power. In D. Cartwright (Ed.), *Studies in social power* (pp. 150–167). Ann Arbor, MI: Institute for Social Research.
- Fuller, R. C., & Montgomery, D. E. (2015). Body posture and religious attitudes. *Archive for the Psychology of Religion*, 37(3), 227–239.
- Gao, X., & Maurer, D. (2009). Influence of intensity on children's sensitivity to happy, sad, and fearful facial expressions. *Journal of Experimental Child Psychology*, 102(4), 503–521.
- Garrison, K. E., Tang, D., & Schmeichel, B. J. (2016). Embodying power: A preregistered replication and extension of the power pose effect. *Social Psychological and Personality Science*, 7(7), 623–630.
- Golec de Zavala, A. G., Lantos, D., & Bowden, D. (2017). Yoga poses increase subjective energy and state self-esteem in comparison to 'power poses'. *Frontiers in Psychology*, 8, 752.
- Grant, V. J., & France, J. T. (2001). Dominance and testosterone in women. *Biological Psychology*, 58(1), 41–47.
- Gronau, Q. F., Van Erp, S., Heck, D. W., Cesario, J., Jonas, K. J., & Wagenmakers, E. J. (2017). A Bayesian model-averaged meta-analysis of the power pose effect with informed and default priors: The case of felt power. *Comprehensive Results in Social Psychology*, 2(1), 123–138.
- Gurney, D. J., Howlett, N., Pine, K., Tracey, M., & Moggridge, R. (2017). Dressing up posture: The interactive effects of posture and clothing on competency judgements. *British Journal of Psychology*, 108(2), 436–451.
- Henley, N. M. (1995). Body politics revisited: What do we know today? In P. J. Kalbfleisch & M. J. Cody (Eds.), *Gender, power, and communication in human relationships* (pp. 27–61). Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.
- Henrich, J., & Gil-White, F. J. (2001). The evolution of prestige: Freely conferred deference as a mechanism for enhancing the benefits of cultural transmission. *Evolution and Human Behavior*, 22(3), 165–196.
- Hess, U., Blairy, S., & Kleck, R. E. (1997). The intensity of emotional facial expressions and decoding accuracy. *Journal of Nonverbal Behavior*, 21(4), 241–257.
- Holland, E., Wolf, E. B., Looser, C., & Cuddy, A. (2017). Visual attention to powerful postures: People avert their gaze from nonverbal dominance displays. *Journal of Experimental Social Psychology*, 68, 60–67.
- Huang, L., Galinsky, A. D., Gruenfeld, D. H., & Guillory, L. E. (2011). Powerful postures versus powerful roles: Which is the proximate correlate of thought and behavior? *Psychological Science*, 22(1), 95–103.
- Inagaki, K., Shimizu, T., & Sakairi, Y. (2018). Effects of posture regulation on mood states, heart rate and test performance in children. *Educational Psychology*, 38(9), 1129–1146.
- Jackson, B., Nault, K., Smart Richman, L., LaBelle, O., & Rohleder, N. (2017). Does that pose become you? Testing the effect of body postures on self-concept. *Comprehensive Results in Social Psychology*, 2(1), 81–105.
- Jansen, Y., & Hornbæk, K. (2018). How relevant are incidental power poses for HCI? In *Proceedings of the 2018 CHI conference on human factors in computing systems* (p. 14). Montreal, Canada: ACM.
- Johnson, R. T., Burk, J. A., & Kirkpatrick, L. A. (2007). Dominance and prestige as differential predictors of aggression and testosterone levels in men. *Evolution and Human Behavior*, 28(5), 345–351.
- Keller, V. N., Johnson, D. J., & Harder, J. A. (2017). Meeting your inner super(wo)man: Are power poses effective when taught? *Comprehensive Results in Social Psychology*, 2(1), 106–122.
- Klaschinski, L., Schnabel, K., & Schöder-Abé, M. (2017). Benefits of power posing: Effects on dominance and social sensitivity. *Comprehensive Results in Social Psychology*, 2(1), 55–67.
- Klenner, K., Otto, A., & Asbrock, F. (2016). *Die Wirkung von Selbstaufmerksamkeit auf "Power Posing"* (The effect of self-awareness on power posing). Presentation on the 50th Congress of the German Psychological Society, Leipzig, Germany.
- Körner, R., Köhler, H., & Schütz, A. (2020). Powerful and confident children through expansive body postures? A preregistered study of fourth graders. *School Psychology International*, 41(4), 315–330.
- Körner, R., Petersen, L.-E., & Schütz, A. (2019). Do expansive or contractive body postures affect feelings of self-worth? High power poses impact state self-esteem. *Current Psychology*. <https://link.springer.com/article/10.1007/s12144-019-00371-1>
- Kozak, M. N., Roberts, T. A., & Patterson, K. E. (2014). She stoops to conquer? How posture interacts with self-objectification and status to impact women's affect and performance. *Psychology of Women Quarterly*, 38(3), 414–424.
- Kwon, J., & Kim, S. Y. (2015). The effect of posture on stress and self-esteem: Comparing contractive and neutral postures. In J. Rotschedl & K. Cermakova (Eds.), *Proceedings of the 18th International Academic Conference* (pp. 397–404). Prague, Czech Republic: International Institute of Social and Economic Sciences.

- Laborde, S., Strack, N., & Mosley, E. (2019). The influence of power posing on cardiac vagal activity. *Acta Psychologica*, 199, 102899.
- Lange, J., & Crusius, J. (2015). The tango of two deadly sins: The social-functional relation of envy and pride. *Journal of Personality and Social Psychology*, 109(3), 453–472.
- Latu, I. M., Duffy, S., Pardal, V., & Alger, M. (2017). Power vs. persuasion: Can open body postures embody openness to persuasion? *Comprehensive Results in Social Psychology*, 2(1), 68–80.
- Lee, E. H., & Schnall, S. (2014). The influence of social power on weight perception. *Journal of Experimental Psychology: General*, 143(4), 1719–1725.
- Marsh, A. A., Henry, H. Y., Schechter, J. C., & Blair, R. J. R. (2009). Larger than life: Humans' nonverbal status cues alter perceived size. *PLoS One*, 4(5), e5707.
- Martens, J. P., Tracy, J. L., & Shariff, A. F. (2012). Status signals: Adaptive benefits of displaying and observing the nonverbal expressions of pride and shame. *Cognition & Emotion*, 26(3), 390–406.
- Mauss, I. B., Levenson, R. W., McCarter, L., Wilhelm, F. H., & Gross, J. J. (2005). The tie that binds? Coherence among emotion experience, behavior, and physiology. *Emotion*, 5(2), 175–190.
- Mazur, A., & Booth, A. (1998). Testosterone and dominance in men. *Behavioral and Brain Sciences*, 21(3), 353–363.
- McLeod, D. R., Hoehn-Saric, R., & Stefan, R. L. (1986). Somatic symptoms of anxiety: Comparison of self-report and physiological measures. *Biological Psychiatry*, 21(3), 301–310.
- McNair, D. M., Lorr, M., & Droppleman, L. F. (1992). *Manual for the profile of mood states*. San Diego, CA: Educational and Industrial Testing Service.
- Mehta, P. H., & Josephs, R. A. (2010). Testosterone and cortisol jointly regulate dominance: Evidence for a dual-hormone hypothesis. *Hormones and Behavior*, 58(5), 898–906.
- Meier, F. C., Schöbel, M., & Feufel, M. A. (2018). Does size matter? Spacious car cockpits may increase the probability of parking violations. *Ergonomics*, 61(12), 1613–1618.
- Mendels, J. (1970). *Concepts of depression*. New York, NY: Wiley.
- Metzler, H., & Grèzes, J. (2019). Repeatedly adopting power postures does not affect hormonal correlates of dominance and affiliative behavior. *PeerJ*, 7, e6726.
- Michalak, J., Mischkat, J., & Teismann, T. (2014). Sitting posture makes a difference: Embodiment effects on depressive memory bias. *Clinical Psychology & Psychotherapy*, 21(6), 519–524.
- Minvaleev, R. S., Nozdrachev, A. D., Kir'yanova, V. V., & Ivanov, A. I. (2004). Postural influences on the hormone level in healthy subjects: I. The cobra posture and steroid hormones. *Human Physiology*, 30(4), 452–456.
- Miragall, M., Etchemendy, E., Cebolla, A., Rodriguez, V., Medrano, C., & Baños, R. M. (2018). Expand your body when you look at yourself: The role of the posture in a mirror exposure task. *PLoS One*, 13(3), e0194686. <https://doi.org/10.5281/zenodo.1195550>
- Nair, S., Sagar, M., Sollers, J., Consedine, N., & Broadbent, E. (2014). Do slumped and upright postures affect stress responses? A randomized trial. *Health Psychology*, 34(6), 632–641.
- Nielsen, S. K. (2017). Posture and social problem solving, self-esteem, and optimism. *International Journal of Psychological Studies*, 9(4), 44–52.
- Nierenberg, C. (2016). *Sit up straight! How good posture benefits your health*. LiveScience. Retrieved from <https://www.livescience.com/54289-how-posture-affects-health.html>
- Oosterwijk, S., Rotteveel, M., Fischer, A. H., & Hess, U. (2009). Embodied emotion concepts: How generating words about pride and disappointment influences posture. *European Journal of Social Psychology*, 39(3), 457–466.
- Park, L. E., Streamer, L., Huang, L., & Galinsky, A. D. (2013). Stand tall, but don't put your feet up: Universal and culturally-specific effects of expansive postures on power. *Journal of Experimental Social Psychology*, 49(6), 965–971.
- Peña, J., & Chen, M. (2017). Playing with power: Power poses affect enjoyment, presence, controller responsiveness, and arousal when playing natural motion-controlled video games. *Computers in Human Behavior*, 71, 428–435.
- Peper, E., Booiiman, A., Lin, I. M., & Harvey, R. (2016). Increase strength and mood with posture. *Biofeedback*, 44(2), 66–72.
- Peper, E., Harvey, R., Mason, L., & Lin, I. M. (2018). Do better in math: How your body posture may change stereotype threat response. *NeuroRegulation*, 5(2), 67–74.
- Peper, E., Lin, I. M., Harvey, R., & Perez, J. (2017). How posture affects memory recall and mood. *Biofeedback*, 45(2), 36–41.
- Rachman, S. (1978). Human fears: A three systems analysis. *Cognitive Behaviour Therapy*, 7(4), 237–245.
- Ranehill, E., Johannesson, M., Leiberg, S., Sul, S., Dreber, A., & Weber, R. A. (2015). Assessing the robustness of power posing: No effect on hormones and risk tolerance in a large sample of men and women. *Psychological Science*, 26(5), 653–656.
- Rennung, M., Blum, J., & Göritz, A. S. (2016). To strike a pose: No stereotype backlash for power posing women. *Frontiers in Psychology*, 7, 1463.
- Riskind, J. H. (1983). Nonverbal expressions and the accessibility of life experience memories: A congruence hypothesis. *Social Cognition*, 2(1), 62–86.

- Riskind, J. H. (1984). They stoop to conquer: Guiding and self-regulatory functions of physical posture after success and failure. *Journal of Personality and Social Psychology*, 47(3), 479–493.
- Riskind, J. H., & Gotay, C. C. (1982). Physical posture: Could it have regulatory or feedback effects on motivation and emotion? *Motivation and Emotion*, 6(3), 273–298.
- Roberts, T. A., & Arefi-Afshar, Y. (2007). Not all who stand tall are proud: Gender differences in the proprioceptive effects of upright posture. *Cognition and Emotion*, 21(4), 714–727.
- Ronay, R., Tybur, J. M., van Huijstee, D., & Morssinkhof, M. (2017). Embodied power, testosterone, and overconfidence as a causal pathway to risk-taking. *Comprehensive Results in Social Psychology*, 2(1), 28–43.
- Rossberg-Gempton, I., & Poole, G. D. (1993). The effect of open and closed postures on pleasant and unpleasant emotions. *The Arts in Psychotherapy*, 20(1), 75–82.
- Rotella, K. N., & Richeson, J. A. (2013). Body of guilt: Using embodied cognition to mitigate backlash to reminders of personal & ingroup wrongdoing. *Journal of Experimental Social Psychology*, 49(4), 643–650.
- Rubin, M. (2016). *The perceived awareness of the research hypothesis scale: Assessing the influence of demand characteristics*. Figshare. https://figshare.com/articles/The_Perceived_Awareness_of_the_Research_Hypothesis_Scale_Assessing_the_influence_of_demand_characteristics/4315778
- Saggese, D., Cordasco, G., Maldonado, M. N., Bourbakis, N., Vinciarelli, A., & Esposito, A. (2018). Power poses affect risk tolerance and skin conductance levels. In *IEEE 30th International Conference on Tools with Artificial Intelligence (ICTAI)* (pp. 1033–1039). IEEE. <https://ieeexplore.ieee.org/document/8576157>
- Schaerer, M., du Plessis, C., Yap, A. J., & Thau, S. (2018). Low power individuals in social power research: A quantitative review, theoretical framework, and empirical test. *Organizational Behavior and Human Decision Processes*, 149, 73–96.
- Schmid Mast, M., & Cousin, G. (2013). Power, dominance, and persuasion. In J. A. Hall, & M. L. Knapp (Eds.), *Nonverbal communication* (pp. 613–635). Boston, MA: de Gruyter.
- Schütz, A. (1993a). Political advertising and the use of modern myths: A campaign film for Ronald Reagan. *Politics and the Individual*, 3, 95–103.
- Schütz, A. (1993b). Self-presentational tactics used in a German election campaign. *Political Psychology*, 14, 471–493.
- Simmons, J. P., & Simonsohn, U. (2017). Power posing: P-curving the evidence. *Psychological Science*, 28(5), 687–693.
- Simonsohn, U., Nelson, L. D., & Simmons, J. P. (2014). P-curve: A key to the file-drawer. *Journal of Experimental Psychology: General*, 143(2), 534–547.
- Smith, K. M., & Apicella, C. L. (2017). Winners, losers, and posers: The effect of power poses on testosterone and risk-taking following competition. *Hormones and Behavior*, 92, 172–181.
- Stepper, S., & Strack, F. (1993). Proprioceptive determinants of emotional and nonemotional feelings. *Journal of Personality and Social Psychology*, 64(2), 211–220.
- Strelan, P., Weick, M., & Vasiljevic, M. (2014). Power and revenge. *British Journal of Social Psychology*, 53(3), 521–540.
- Teh, P. L., Lim, W. M., Ahmed, P. K., Chan, A. H., Loo, J. M., Cheong, S. N., & Yap, W. J. (2017). Does power posing affect gerontechnology adoption among older adults? *Behaviour & Information Technology*, 36(1), 33–42.
- Tiedens, L. Z., & Fragale, A. R. (2003). Power moves: Complementarity in dominant and submissive nonverbal behavior. *Journal of Personality and Social Psychology*, 84(3), 558–568.
- Tracy, J. L., & Robins, R. W. (2007a). The psychological structure of pride: A tale of two facets. *Journal of Personality and Social Psychology*, 92(3), 506–525.
- Tracy, J. L., & Robins, R. W. (2007b). The prototypical pride expression: Development of a nonverbal behavior coding system. *Emotion*, 7(4), 789–801.
- Tsai, H. Y., Peper, E., & Lin, I. M. (2016). EEG patterns under positive/negative body postures and emotion recall tasks. *NeuroRegulation*, 3(1), 23–27.
- Turan, B. (2015). Is a submissive posture adaptive when being evaluated negatively? Effects on cortisol reactivity. *Neuroendocrinology Letters*, 36(4), 394–398.
- Vacharkulksemsuk, T., Reit, E., Khambatta, P., Eastwick, P. W., Finkel, E. J., & Carney, D. R. (2016). Dominant, open nonverbal displays are attractive at zero-acquaintance. *Proceedings of the National Academy of Sciences*, 113, 4009–4014.
- Veenstra, L., Schneider, I. K., & Koole, S. L. (2017). Embodied mood regulation: The impact of body posture on mood recovery, negative thoughts, and mood-congruent recall. *Cognition and Emotion*, 31(7), 1361–1376.
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 1063–1070.
- Weineck, F., Messner, M., Hauke, G., & Pollatos, O. (2019). Improving interoceptive ability through the practice of power posing: A pilot study. *PLoS One*, 14(2), e0211453.
- Welker, K. M., Oberleitner, D. E., Cain, S., & Carré, J. M. (2013). Upright and left out: Posture moderates the effects of social exclusion on mood and threats to basic needs. *European Journal of Social Psychology*, 43(5), 355–361.
- Wilkes, C., Kydd, R., Sagar, M., & Broadbent, E. (2017). Upright posture improves affect and fatigue in people with depressive symptoms. *Journal of Behavior Therapy and Experimental Psychiatry*, 54, 143–149.

- Wilson, V. E., & Peper, E. (2004). The effects of upright and slumped postures on the recall of positive and negative thoughts. *Applied Psychophysiology and Biofeedback*, 29(3), 189–195.
- Wilson, V. L., & Putnam, R. R. (1982). A meta-analysis of pretest sensitization effects in experimental design. *American Educational Research Journal*, 19(2), 249–258.
- Yap, A. J., Wazlawek, A. S., Lucas, B. J., Cuddy, A. J. C., & Carney, D. R. (2013). The ergonomics of dishonesty: The effect of incidental posture on stealing, cheating, and traffic violations. *Psychological Science*, 24(11), 2281–2289.
- Zabetipour, M., Pishghadam, R., & Ghonsooly, B. (2015). The impacts of open/closed body positions and postures on learners' moods. *Mediterranean Journal of Social Sciences*, 6(2 S1), 643–655.

AUTHOR BIOGRAPHIES

Robert Körner is currently a research associate in the Department of Psychology at the Otto-Friedrich-University of Bamberg, Germany, where he works with Dr. Astrid Schütz in personality and assessment. He is a doctoral student in social psychology in the Department of Psychology at the Martin-Luther-University of Halle-Wittenberg, Germany, where he obtained his BSc and MSc in psychology. His research is supported by a PhD fellowship from the Land of Saxony-Anhalt. He is broadly interested in power research such as the nonverbal expression of power, measurement of power, and impact of power on illusions.

Astrid Schütz received her PhD in psychology with minors in sociology and education in 1992. She has been a postdoctoral researcher at the University of Virginia and a visiting scholar at Case Western Reserve University and the University of Southampton before she became an Associate Professor at Chemnitz University of Technology, Germany. In 2011, she joined the University of Bamberg where she is now the Chair of Personality and Assessment and Director of the Centre of Personnel Psychology. Her research focuses on personality in social relationships. She studies self-esteem, narcissism, and emotional intelligence in social interactions. She is the author of over 100 peer-reviewed articles and the author/editor of over 30 books in the areas of personality and assessment.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

How to cite this article: Körner R, Schütz A. Dominance or prestige: A review of the effects of power poses and other body postures. *Soc Personal Psychol Compass*. 2020;14:e12559. <https://doi.org/10.1111/spc3.12559>