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Size or Openness: Expansive but Closed Body Posture Increases Submissive Behavior

Abstract: *Expansive body posture is the most commonly studied and widely described in psychological literature. For many years, expansive posture was universally identified as a pose of power, but more recent research has revealed that the link between expansive posture and power may be moderated by gender, culture or even contextual cues. Our findings show that with little variation added to expansive posture it does not necessarily lead to the sense of power, and may actually trigger the opposite effect: a feeling of submissiveness. In three studies, persons assuming their body in a standing-at-attention posture were perceived as being more obedient (Experiment 1), thus participants who expanded their body in a standing-at-attention manner (although actually doing a non-obedient unrelated task) displayed greater compliance to requests (Experiment 2) and declared greater submissiveness toward social norms (Experiment 3). We discuss how the cultural and interpersonal context imprinted in specific body posture can modify the feedback of innate and universal body states.*

Key words: *embodiment, expansive posture, submissiveness, social distance*

Some body postures have universal, evolutionary, innate meaning (e.g. Darwin, 1872/2009; de Waal, 1998). Observation of both the animal and human worlds would suggest that expansive posture is a clear sign of power and domination (Carney, Hall, & Smith LeBeau, 2005; Hall, Coats, & Smith LeBeau, 2005). Interestingly, expansive postures are both defined in the literature in terms of expanding the physical size of the body and the openness of the posture. A dominant person would not only increase the size of his or her whole body but also keep his/her limbs expanded and assume open body position (see Carney, Cuddy, & Yap, 2010). In our research we try to disentangle between those two candidates for postural sources of increased feelings of power by introducing a posture that is expansive in terms of size yet contracted in terms of bodily openness. Thus, our goal behind this line of research was to answer a very simplistic series of questions: Which bodily cue will result with which interpretation? Is the overall body expansion or the openness of the limbs a key

factor in power posing? Will a subtle change of the body manipulation be enough to alter this effect?

Within the framework of embodied or grounded cognition, sensorimotor mechanisms are often connected to 'higher level' cognition (Gibson, 1979; Barsalou, 1999). There is more and more evidence that bodily sensations can influence the way we perceive, feel and behave (Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005). Empirically, embodied perspectives have been supported by studies demonstrating that postures (Riskind & Gotay, 1982), full body movement (e.g., Mussweiler, 2006), facial muscles (Parzuchowski & Szymkow-Sudziarska, 2008), gestures (Parzuchowski & Wojciszke, 2014, Parzuchowski, Szymkow, Baryla, & Wojciszke, 2014; Parzuchowski & Szymków, 2013; Chandler & Schwarz, 2009), and hand configurations (Schubert, 2004) can influence individuals' thoughts, feelings and behaviors. Numerous studies have found a link between an expansive body posture and

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feelings of pride, dominance and power (see Carney, Cuddy, & Yap, 2010; Ellyson & Dovidio, 1985; Hall, Coats, & LeBeau, 2005; Riskind & Gotay, 1982; Tiedens & Fragale, 2003). Importantly, Carney, Cuddy and Yap (2010) demonstrated that posing in high-power displays causes an elevation of the dominance hormone (testosterone) and a reduction of the stress hormone (cortisol). In another experiment, Huang, Galinsky, Gruenfeld and Guilory (2011) found that adopting expansive posture leads to the activation of power and the taking of riskier action, regardless of hierarchical role. Those authors suggest that the influence of body expansiveness on power-related behavior may precede perception and is direct, or at least more direct, than the influence of the individual's hierarchical role.

On the other hand, some researchers argue that the association between posture and the feelings it produces does not have to be direct, but the bodily information influences psychological states by defining for a person which actions can and cannot be performed, and is integrated with relevant information from other sources (Gibson, 1979; Cesario & McDonald, 2013). Accordingly, the inclusion of proprioceptive stimuli to the perceptual processes helps us to navigate and understand the world around us (Smith & Semin, 2004). Thus, the impact of body expansiveness on feelings of power should be highly contextual and varied, depending on the possible actions that may be carried out (Schubert & Semin, 2009). Body movements should translate to a feeling of power only if acting on this feeling (showing your power to others) is possible. In fact, recently Cesario and McDonald (2013) proved that the influence of bodily states is not independent of situational factors, and that the reverse is actually true: that the body "*exists in context*" (p. 260) and the very same posture may induce contradictory feelings (powerful vs. powerless), depending on the situation. In their studies, displaying an expansive posture did not induce power when it was not held in an interpersonal context, or when one imagined oneself occupying a submissive role (expansive posture did not result in enhanced feelings of power when it was a part of being frisked, for example).

In this paper, we show our strong support for the latter claim. Through our experiments, we demonstrate that the effect of the body's modality on feeling and behavior is a result of abstract concept evocation (submissiveness, in this case) that co-occurred with concrete bodily sensations in specific situations in the past. Subsequently, if one performs a very specific position associated with a very specific meaning, the contextual meaning of that position is evoked, rather than an innate meaning of the current general body state. In the three experiments described here, we tested the hypothesis that some variation of expansive posture can, in fact, signal a submissive change in the relations created with other people. To do so, we examined the behavioral effects of the brief engagement of a body posture that is expansive, but has the very specific and culturally-dependent context of being submissive.

Standing at attention

Chin up, chest out, shoulders back, stomach in, arms fixed at the side and heels together. Regardless of how many times in your past you have actually stood at attention, you probably recognized the social meaning of this specific posture. In many cultures, this posture of motionless alertness is related to the context of submissive and subordinated behavior (i.e. showing respect to someone of a higher status). Anecdotal evidence from various domains of society suggests that it is not exclusive to the military or boy scout meetings, but can also easily be observed during the roll call at schools, the singing of a national anthem, or the recitation of a pledge of allegiance. On all such occasions, submissive behavior and norm compliance are required: while assuming erect postures, individuals are expected to await orders from their superiors, withhold their personal needs or goals, and to show proper respect toward those with higher status. The current research aims to demonstrate that there is a causal link between the bodily feedback from assuming this posture of standing-at-attention and the experience of submissiveness. We also propose that this brief posture manipulation can also affect the relations we create with other people in hierarchies between parties, thus making others seem more dominant and socially distant.

What makes the standing-at-attention posture interesting is the fact that the body is fully expanded when performing it, and according to classical Darwinian observation (1872/2009) and numerous other studies (Carney, Cuddy, & Yap, 2010; Ellyson & Dovidio, 1985; Hall, Coats, & LeBeau, 2005; Riskind & Gotay, 1982; Schubert, Schubert, & Tropolinsky, 2013), should therefore result in an increase in the individual's sense of power. A sense of submissiveness is usually associated with body collapse and shrinkage, and should not logically be present when individuals perform the standing-at-attention posture (Weeks, Heimberg, Heuer, 2011). And so these conflicting predictions raise a question: may the meaning of the body state that is innate be blocked by the meaning that is acquired?

Thus, our research aims at suggesting that this particular expansive posture may indeed yield feelings of submission. We are, of course, not suggesting that this posture can be exploited in all contexts and situations as a prime for submissiveness, nor that it is specific only to the concept of submissiveness. Instead, our hypothesis implies that the modal perceptual symbols that compose our knowledge of the concept of submissiveness involve, among other things, a pattern of specific muscle activation that is used to signal submissive intentions with a standing-at-attention posture, and that that pattern is used whenever it is activated.

We claim that not all expansive postures are created equal, and we show that the psychological effects of "power posing" cannot be linked universally with the mechanism of simple posture expansion. We are interested in whether even slight differences in body postures (adding joined feet and arms alongside the body to expansive posture

manipulations of Cuddy and colleagues, 2009) can embody the completely opposite concept in accordance with its cultural meaning. Paraphrasing Cesario and McDonald's (2013) claim that "*the body exists in context*" we would propose that "*the context can also exist in the body*", thus a specific body configuration may elicit states accompanying a particular situational context which was learned in the past.

We tested our idea in three experiments that involved many facets of submissiveness measurements, varying from behavioral (compliance to requests), through imaginary interpersonal contact (a drawing task), to declarative measures (norm compliance). First, we attempted to verify our basic presumption that people associate standing at attention with being submissive. Next, we manipulated participants' body posture and measured a few different manifestations of submissiveness, specifically, the subject's compliance to an experimenter's request, their readiness to comply with social norms, and their ability to delay gratification. Addressing Cesario and McDonald's (2013) findings on interpersonal context necessity to observe body expansion effects, we also measured interpersonally specific manifestations such as spatial distance regulation in relation to one's partner in an interaction. Previous studies indicate that relationships of power involve a sense of being distinct from others (Smith & Trope, 2006; Lee & Tiedens, 2001; Lammers, Galinsky, Gordijn & Otten, 2012). Originally, an increase of distance was observed among individuals maintaining power, however it seems logical to presume that greater distance is experienced by *both* partners of an interaction as a defining feature of relations which involve unequal status. Greater distance is also associated with politeness (Stephan, Liberman, & Trope, 2010); participants instructed to use polite language in addressing another person preferred a relatively large spatial distance from this person. If people associate the standing-at-attention posture with greater submissiveness and norm compliance, they should activate this concept while performing this very posture, and thus, in a quest for equilibrium, should also distance themselves from others.

Experiment 1

In order to test whether the standing-at-attention posture is generally associated with submissiveness, we first checked if this particular posture can symbolically communicate submissiveness. If people associate this posture with being submissive, they should infer traits associated with obedience when perceiving a person assuming this posture, even if they do not explicitly think about the meaning of the posture. To test this hypothesis, we asked participants for an open-ended description of a person performing the standing-at-attention posture, and we then examined if those traits pertained to the concept of submissiveness. Because traits related to submissiveness may be inferred from other features of target persons (and not their posture), we also introduced a control condition with the same target person performing a control (relaxed) posture (shown in Figure 1).

Figure 1. Photographs of the control (left) and standing-at-attention (right) postures used in Experiment 1



Method

One hundred seventy six participants (127 female; $M_{\text{age}} = 28,10$; $SD = 8.86$) completed an online study in response to an invitation published on a popular educational website over a course of three days. The study was presented as dealing with person perception, and the participants were asked to write a brief description of a young man showed in a photograph, either with the standing-at-attention or control posture.

Procedure and dependent measure

The cover story presented the study as dealing with the communication skills of the photographed person. Participants were asked to answer a single question: "*What does the person in the photograph communicate to others? List 5 associations that come to mind when you see this person*". Both conditions differed only in the randomized use of the photograph depicting one of each postures. After listing traits associated with the target person, participants were asked for the perceived purpose of the study (none of the participants guessed our hypothesis), and thanked for their participation. Debriefing information was sent only to those participants who left their e-mail address after collecting data from all respondents.

The primacy-of-output method suggests that a concept is considered accessible if it is mentioned as the first trait in the description (see Higgins, King, & Mavin, 1982; Narvaez, Lapsley, Hegele, & Lasky, 2006). Therefore in the next phase we have used only the 59 traits (out of 176 listed) that were unique and mentioned as their first association with the depicted person. Next, we wanted to find how related are those used traits to the concept of submissiveness. Thus, we asked another set of blind raters recruited online ($N = 27$; 22 women; $M_{\text{age}} = 29.96$; $SD = 6.36$) to rate those 59 traits (arranged in alphabetical order) using a 6-point Likert scale (1 – *this is definitely not a sign of submissiveness* to 6 – *this is definitely related to submissiveness*; participants were also presented with a Webster's dictionary definition of submissiveness). As a result we obtained a separate

mean association rating for each of the 59 trait words, that varied greatly e.g. for traits unrelated or opposite to the concept of submissiveness, i.e. 'assertive' – $M = 1.54$ or 'casual' – $M = 2.0$ to traits highly related to that concept e.g. 'submissive' – $M = 5.81$ or 'servile' – $M = 5.31$. Next, we counted the mean submissiveness index for each of the postures presented in the pictures.

Results and Discussion

The most frequently used descriptions in the control condition was calm (used by 15 people as the first association), bored (11 times) and open (6), while in the at-attention condition the most frequent was tensed (16), subordinated (8), and disciplined (6). As predicted, when we inserted the submissiveness index for each of the words used in both conditions we found that a person performing the standing-at-attention posture was described in terms that pertained to submissiveness more frequently ($M_{\text{at-attention}} = 3.51$, $SD = .94$) than was the same person depicted in the control posture ($M_{\text{control}} = 3.01$, $SD = 0.75$), $t(174) = 3.90$; $p = .00014$, $d = .59$, $CI [.25 - .75]$. This finding supports the hypothesis that merely seeing a person performing the standing-at-attention posture activates the concept of submissiveness. This establishes a link between this posture and perceived submissiveness.

Experiment 2

The results of Experiment 1 clearly suggest that one can efficiently communicate submissiveness without language, and by merely using this standing-at-attention posture. But would a participant's own behavior change accordingly to the activated concept when they encode the modal stimuli by obviously performing the posture themselves? In Experiment 2 we asked participants to adopt the bodily instructions that resulted with them inadvertently performing either a posture of standing-at-attention (experimental group), or a control simple instruction (standing at ease), or complex control group condition. The logic behind having two control groups was to test if the submissiveness could be the result of the mere complexity of the instruction given or of receiving orders. Since we were interested in the participants' level of submissiveness, they were exposed to a personal request from the experimenter which required some effort on their part. They also had a possibility to draw a symbolic representation of a target person they were to meet afterwards (a drawing task). We assumed that if people associate the standing-at-attention posture with feeling a lack of power and with submissiveness, they should infer that others are more powerful when this posture is performed, even if they do not explicitly think about the meaning of the posture. And since previous studies revealed that people in many cultures show a strong mental association between size cues and power (manifestations in language, architecture or numbers, Fiske, 2004; physical size, Schubert, Waldzus, & Giessner, 2009; overestimation of the height of influential people, Higham & Carment, 1992), we measured the size of the drawing representation of the target person.

Method

Seventy students (60 female; $M_{\text{age}} = 21.79$; $SD = 2.65$) from the University of Gdansk volunteered to participate in the procedure in exchange for a course credit. Participants were randomly assigned to one of three conditions: standing at attention, and two control postures that differed in complexity of instructions. Sixteen participants were excluded from the final analysis because they guessed the purpose of the study, resulting in a final sample of 54 participants.

Procedure and dependent measure

The study was presented as a procedure of calibrating a new laser device for measuring various bodily parameters. In order to test the benchmark of the state-of-the-art measuring device, we asked participants to stand in front of the apparatus for 30 seconds while performing an instructed posture. In fact, the measuring tool included only a disguised video camera mounted on a tripod recording participants' posture in order to control the level of compliance to the presented instructions, and the experimenter's tone of voice when presenting a final personal request. Participants received an auditory instruction (prerecorded using a speech-synthesizer with IVONA TTS, IVO Software) that instructed participants in the experimental condition to "straighten up, heels together, arms along the body and stand still so that we can accurately measure your body parameters". Participants in the simple posture control group were told to "stand at ease so that we can accurately measure your body parameters", while the participants in the complex posture control group were told to "relax your shoulders, put your right leg forward, hold your hands together behind your back and stand still so that we can accurately measure your body parameters".

After 30 seconds of the alleged measurement-taking, participants were presented with a set of six pieces of information about the target person (a man who has expressed 4 positive and 2 negative behaviors i.e. "He is never late for meetings", "He sometimes cheats on exams"). Next, participants were presented with a piece of paper with a print of a square and a 5 mm circle in the middle of it. They were asked to sign that circle with their name and to draw a second circle (unrestricted in size and distance) representing the target person. This drawing task was previously used to measure perceived social dominance and social distance toward other people (Piotrowski & Wojciszke, 2015). Afterwards, participants were falsely informed that they had reached the end of the study, but at the moment that the participant was leaving the lab, an experimenter made a request of them: they were asked to carry a stack of magazines (58 issues of *Psychological Science*, approx. weight 20 kg) to the university copy center (a distance of 50 meters). Each time the request had the same wording: "I have one request. These magazines need to be taken to the university copy center. Could you take some and deliver them there?" We were interested in how many magazines the participant would take (a behavioral measure of submissiveness), but soon after participants had

decided on the number of the magazines that they would move (after they had lifted the stack of their choosing), they were stopped and carefully debriefed. They were also interviewed and asked if they had any guesses about the aim of the study.

Results and discussion

In order to make sure that participants in all conditions fulfilled the given auditory instructions, we cut out 20-second movie clips with participants performing the postures¹. Next, two independent raters who were blind to the experimental conditions watched the silent videos in random order, judging the intensity of the standing-at-attention posture of each participant (using the scale: 1 – *He/she is definitely not standing at attention* to 5 – *He/she is definitely standing at attention*).

Then we conducted an analysis of variance that revealed the predicted main effect of instructed posture, $F(2, 46) = 14.40, p = .00001, \eta_p^2 = .38$. A planned contrast comparison revealed that participants in the experimental group stood at attention more effectively ($M_{\text{standing-at-attention}} = 4.33, SD = .86$ [2]) than did the control groups ($M_{\text{simple posture}} = 3.44; SD = 1.33$ [-1] and $M_{\text{complex posture}} = 2.33; SD = .98$ [-1]), $t(47) = 4.67, p = .00003, d = 1.38, CI [.81 - 2.05]$ indicating that our manipulation worked as intended.

We also controlled whether the experimenter made the request in the same manner every time. Two independent raters listened to audio recordings of all requests the experimenter made, and judged how pleasing the experimenter's voice was. It was determined that there was no difference in the experimenter's voice between conditions, $F < 1$.

Drawing task

Participants in the attention condition depicted the target person as being larger in size ($M = 8.35$ mm in diameter, $SD = 5.52$) than those in the control condition ($M_{\text{simple posture}} = 5.9; SD = 1.37$ and $M_{\text{complex posture}} = 5.47; SD = 2.26$), $F(2, 49) = 3.34, p = .044, \eta_p^2 = .12$. A planned contrast comparison (designed in the same manner as for the control of manipulation) was close to reaching the conventional level of significance, $t(50) = 1.92, p = .07, d = .57, CI [-.25 - 5.53]$.

It was established in previous research that people associate power and status with size, where high power/status is identified with 'bigness' and low power/status is identified with 'smallness' (Weeks et al., 2011). For example, the powerful tend to underestimate the size of other people (Yap, Mason, & Ames, 2013), and they also see themselves as physically larger than they actually are (Duguid & Goncalo, 2012). Other findings show that people associate status with greater length (Schubert, Waldzus, & Giessner, 2009) and height (Wilson, 1968). Even in the consumer world choosing large products is often a signal of the consumer's high status (Dubois,

Rucker, & Galinsky, 2012). Therefore, we conclude that the larger size of the target person – as depicted by the participants who stood at attention – indicates that they perceived others as being more dominant and powerful than themselves.

Behavioral submissiveness

As predicted, participants in the standing-at-attention condition complied to the request more effectively and grabbed more copies of the journals ($M_{\text{at-attention}} = 28.22, SD = 15.94$) than those in the control conditions ($M_{\text{simple posture}} = 17.25; SD = 8.66$ and $M_{\text{complex posture}} = 20.19; SD = 13.32$), $F(2, 51) = 3.64, p = .033, \eta_p^2 = .13$. A planned contrast comparison was significant, $t(52) = 2.62, p = .011, d = .76, CI [2.27 - 17.06]$. Thus it suggests that prompt posture manipulation influenced participants' behavior as the experimental group responded with much greater compliance to the experimenter's request.

Experiment 3

Experiment 2 showed that performing the standing-at-attention posture results in greater submissiveness (complying with the experimenter's request) and perceiving the target person as more dominant (bigger size in depicting a target person). In Experiment 3, submissiveness was measured again, this time as a declarative measure of compliance to norms. We also attempted to test if standing at attention may induce distance between participant and others. To test this hypothesis, we asked participants to place their seats in front of the experimenter after the posture manipulation. Additionally participants' disposition to delay gratification was measured, since it is commonly associated with discipline (Mischel, Shoda, & Peake, 1988; Loewenstein, Read, & Baumeister, 2003).

Method

Thirty-nine students (22 female; $M_{\text{age}} = 22.22; SD = 3.17$) volunteered to participate in exchange for a course credit. Participants were randomly assigned to one of two conditions and completed the study individually.

Procedure and dependent measure

The body posture's manipulation was the same as in Experiment 1, but this time we had only one control group (the staying-at-ease condition). As in Experiment 2, the participants were video recorded and all instructions were played with the speech-synthesizer. After twenty seconds of fake body measurements, participants were told to grab a chair and sit in front of the experimenter to fill out a questionnaire on submissive behavior that measures readiness to comply with social norms (e.g. "Usually I act according to social norms", "I feel respect towards older people", "I am generally kind and understanding to others", "I respect other people's opinions even if I do not agree with them", "When I interact with strangers I try to

¹ Even though a third of the participants were instructed to stand at ease without further instructions, some of the P's performed a posture that is undistinguishable from the instructed posture at-attention.

be particularly polite”, 5 items, $\alpha = .64$). They also filled out a questionnaire on financial dilemmas to measure the ability to delay gratification, a task in which participants make a number of binary choices between money received at different times (Zhong & DeVoe, 2010), as well as Rosenberg’s Self-Esteem Scale (1965) and a mood questionnaire (Wojciszke & Baryla, 2006).

Results and Discussion

Spatial distance

Results indicate that participants standing at attention chose to sit further from the experimenter ($M = 183.52$ cm from chair to chair, $SD = 94.31$) than did participants in the control condition ($M = 116.39$, $SD = 26.19$), $t(37) = 3.13$, $p = .005$, $d = 1.11$, $CI [22.74 - 111.53]$. It is consistent with our assumption that the standing-at-attention posture causes the interaction with others to be considered as a distant (formal, official) relation between people of unequal status.

Norm compliance and gratification delay

Participants in the condition of standing-at-attention scored higher on the scale in the submissive behavior questionnaire ($M_{\text{at attention}} = 5.42$, $SD = .43$ vs. $M_{\text{control}} = 4.89$, $SD = .91$), $t(37) = 2.26$, $p = .03$, $d = .79$, $CI [.05 - 1.01]$). Moreover, they were more prone to postpone gratification in the financial dilemmas questionnaire ($M_{\text{at attention}} = 5.19$, $SD = 3.71$ vs. $M_{\text{control}} = 8.72$, $SD = 6.49$), $t(37) = 2.04$, $p = .05$, $d = .69$, $CI [-7.09 - .02]$. These findings are consistent with the idea that standing at attention induces discipline, both in the face of other people and in the face of one’s own egotistical impulses.

Neither spatial distance nor norm compliance and gratification delay interacted with mood (Wojciszke & Baryla, 2006) or explicit self-esteem (Rosenberg, 1965). Therefore, observed effects cannot be explained by a decrease in mood or self-esteem as a result of demonstrating the standing-at-attention posture.

Summing up, by expanding the pattern of the findings of Experiment 2, results suggest that when the participants stood at attention, they indicated greater submissiveness, as well as a greater preference for future benefits (postponing gratification), in comparison to the control group. Additionally, they chose to maintain a greater distance between themselves and the other person.

General Discussion

Across all three experiments, irrespective of how submissiveness was measured, we found evidence that participants who unwittingly stood in the expanded body but contracted limbs posture (at-attention posture) for a brief period of time reinterpreted the follow-up social situations in formal categories related to submissiveness, distance, and acknowledged dominance of others. The body’s impact on cognition was not mediated by the participant’s mood changes or their self-esteem. What is important to note is that the proposed association between the standing-at-attention posture and participants’

submissiveness was tested with a hidden social meaning of the posture. We thereby demonstrated that even the slightest modification in expansive body posture can overwrite the innate meaning of the posture with the cultural meaning behind it.

Our studies’ results constitute another voice in the debate about the limitations of classical embodiment findings and about the simple nature of embodiment effects (see Raney, Dreber, Johannesson, Leiber, Sul, & Weber, 2015). The assuming of an identical or almost identical posture can affect people differently, even in completely opposite ways, depending on the participants’ gender (Schubert, 2004; Roberts, Arefi-Afshar, 2007), culture (Park, Streamer, Huang & Galinsky, 2013), situational context (Cesario & McDonald, 2013), or if the variation of the posture has a specific cultural meaning itself, as we have shown. It does not necessarily have to mean that Darwin’s supposition about the innate relation between body expansion and dominance is not true, but it does mean that along with innate bodily feedback, there are also cultural meanings of different body states, and that the two may work independently, exclusively or interact. In our studies we did not manipulate the different situational context that defines action possibility as Cesario and McDonald did (2013); instead we showed the context may be embedded in the particular posture. As Cohen and Leung (2009, p. 1279) propose “Cultural artifacts, etiquette, models, and scripts encourage or afford certain types of bodily actions and compartments. Such actions may pre-dispose a person toward various basic affective and cognitive reactions; and cultural schemas, context, and rules of interpretation also shape which of these particular reactions will be evoked.”

Inspired by Cesario and McDonald’s (2013) research, we suggest it would be worth testing how the standing-at-attention posture affects people under different context activation. Being submissive is unquestionably associated with standing at attention, but there are also other associated states, such as a feeling of pride while standing at attention and singing the national anthem. Priming those different situational contexts before the posture manipulation should induce the corresponding reactions.

Moving from the situational context to the interpersonal context, it would also be interesting to find out if the status of the person with whom participants interact may modify the standing-at-attention posture-submissiveness relation.

Of course it has been established earlier that the symbolic meanings of the poses are important driving source in embodiment effects (see Marsh, Yu, Schechter, & Blair, 2009). and if people agree that the standing-at-attention pose is symbolically more submissive (Experiment 1), than this pose could elicit submissive behavior (Experiment 2 and 3) while still involving body expansion (in comparison to the control condition). Yet, one could argue that elements of our posture manipulation could also influence the feelings of pride that should fuel the feelings of power (chin up, chest out; see Cheng, Tracy, & Henrich, 2010). The standing-at-attention pose seems

to have components of both subordination and pride, which makes it exceedingly interesting to study. There is clearly a gap in reconciling these findings, which is a great opportunity for the future work on this matter.

Further, our studies demonstrate that bodily states do not only affect self-perception, but also the perception of others and one's relations with them. Although we are not the first to propose this notion, this aspect of embodied cognition is less frequently stressed both in literature and research and it does seem important and intriguing to better understand how body cues can shape (strengthen and weaken) interpersonal relations.

Our claim would be strengthened, if the experiments were to be replicated in other countries and in cultures where different relations to postures of power and powerlessness exist. We claim that our findings are limited to those cultures in which people experience acknowledge the association between standing at attention and feelings of obedience. Indeed, in Poland people have quite extensive experience with the standing-at-attention posture. For example, it is typical for physical education classes to begin and end with a roll call drill. This posture is also expected at schools during national holiday ceremonies and events. However, in many other countries people stand at attention for various other occasions and reasons as well e.g., class visitations and minutes of silence.

Future studies might also address the link between merely repeating a specific posture and the co-occurrence of the abstract meaning behind it. We would hypothesise to find significant differences in declared levels of submissiveness (after standing at attention) between e.g. soldiers who have just started military training and those who have months of such training and experiences under their belt. Relatedly, it must be noted, that in our experiments participants consisted of mostly females (thus the manipulated submissiveness conformed to the feminine social roles; Eagly, 1997), future studies could address this issue and keep the amount of both genders equal between conditions.

It is also worth noting that our claim is limited in terms how we disentangle dimensions of openness and size expansion with our current research. One may argue that our studies compare only single variation of power posing that indeed alters its wired meaning. We definitely agree that in order to rule out this explanation it would be crucial for future research to compare several alternative bodily manipulations for both size expansion and openness on both participants' upper and lower body parts. Please note that in our manipulations we are in fact keeping the upper torso expanded while we instruct participants to keep their legs together. Thus, this is not ideal to conservatively test our contradictory pattern of results in light of previous manipulation of power (see Carney et al., 2010). Future experiments should address if the very same body posture manipulation could exert different effects depending on context or interpretation.

Recent models of embodied cognition propose that people use their concrete bodily sensations to make sense of complexities in their social life (Barsalou, 2009; Landau,

Meier, & Keefer, 2010). As Barsalou points out (1999), abstract concepts are grounded in specific situations, and people tend to produce broad situational content when asked to describe concepts (Barsalou, 2009). We experience many social situations and learn that, for example, telling the truth has been previously associated with looking directly into someone's eyes or putting a hand over one's heart (Parzuchowski, Szymkow, Baryla, Wojciszke, 2014). Such situated conceptualizations constitute the complex configurations of multimodal components (that contain visual, auditory, olfactory, proprioceptive or interoceptive information), which can be viewed as a perceptual pattern (Barsalou, 2009). Perceptual patterns operate on the premise of associative simulation: when a component of a given pattern is triggered, the remaining components are likely to be brought to use as well, as they have frequently co-occurred with this very modality in the past. Thus, once entrenched in memory, situated conceptualizations play an important role in social cognition (Barsalou, 2009). By increasing the accessibility of the specific concept, they influence thoughts, feelings and judgments to which the concept is applicable (Barsalou, 1999; 2009; Niedenthal et al., 2005).

In conclusion, our results suggest that even body expanding (while having your limbs contracted) may induce feelings related to submissiveness, if performing this posture has a specific cultural meaning. There is no pure meaning of one body state; rather, it is composed of evolutionary and sociocultural meanings, as well as of the situational context in which it occurs. And one posture may be contextual itself, predisposing an individual to display different reactions, regardless of which abstract concept was actually evoked.

References

- Anderson, N. H. (1968). Likableness ratings of 555 personality-trait words. *Journal of Personality and Social Psychology*, 9, 272–279. doi: 10.1037/h0025907
- Aquino, K., Freeman, D., Reed, A., Lim, V. G., & Felps, W. (2009). Testing a social-cognitive model of moral behavior: The interactive influence of situations and moral identity centrality. *Journal of Personality and Social Psychology*, 97(1), 123–141. doi: 10.1037/a0015406
- Barsalou, L. W. (1999). Perceptual symbol systems. *Behavioral And Brain Sciences*, 22(4), 577–660. doi: 10.1017/S0140525X99002149
- Barsalou, L. W. (2008). Cognitive and neural contributions to understanding the conceptual system. *Current Directions in Psychological Science*, 17(2), 91–95. doi: 10.1111/j.1467-8721.2008.00555.x
- Barsalou, L. W. (2008). Grounding symbolic operations in the brain's modal systems. In G. R. Semin, E. R. Smith (Eds.), *Embodied grounding: Social, cognitive, affective, and neuroscientific approaches* (pp. 9–42). New York, NY US: Cambridge University Press.
- Barsalou, L. W. (2009). Situating concepts. In P. Robbins, M. Aydede (Eds.), *The Cambridge handbook of situated cognition* (pp. 236–263). New York, NY US: Cambridge University Press.
- Carney, D. R., Cuddy, A. C., & Yap, A. J. (2010). Power posing: Brief nonverbal displays affect neuroendocrine levels and risk tolerance. *Psychological Science*, 21(10), 1363–1368. doi: 10.1177/0956797610383437
- Carney, D. R., Hall, J. A., & LeBeau, L. (2005). Beliefs about the nonverbal expression of social power. *Journal of Nonverbal Behavior*, 29(2), 105–123. doi: 10.1007/s10919-005-2743-z

- Cesario, J., & McDonald, M. M. (2013). Bodies in context: Power poses as a computation of action possibility. *Social Cognition, 31*(2), 260–274. doi: 10.1521/soco.2013.31.2.260
- Chandler, J., & Schwarz, N. (2009). How extending your middle finger affects your perception of others: Learned movements influence concept accessibility. *Journal of Experimental Social Psychology, 45*(1), 123–128. doi: 10.1016/j.jesp.2008.06.012
- Cheng, J. T., Tracy, J. L., Henrich, J. (2010). Pride, personality, and the evolutionary foundations of human social status. *Evolution and Human Behavior, 31*, 334–347.
- Cohen, D., & Leung, A. Y. (2009). The hard embodiment of culture. *European Journal of Social Psychology, 39*(7), 1278–1289. doi: 10.1002/ejsp.671
- Cuddy, A. C., Fiske, S. T., Kwan, V. Y., Glick, P., Demoulin, S., Leyens, J., & ... Ziegler, R. (2009). Stereotype content model across cultures: Towards universal similarities and some differences. *British Journal of Social Psychology, 48*(1), 1–33. doi: 10.1348/014466608X314935
- Darwin, C. (2009). *The expression of the emotions in man and animals*. New York, NY: Oxford (Original work published 1872).
- de Waal, F. (1998). *Chimpanzee politics: Power and sex among apes* (rev. ed.). Baltimore, MD, US: Johns Hopkins University Press.
- Dubois, D., Rucker, D. D., & Galinsky, A. D. (2012). Super size me: Product as a signal of status. *Journal of Consumer Research, 38*(6), 1047–1062. doi: 10.1086/661890
- Duguid, M. M., & Goncalo, J. A. (2012). Living large: The powerful overestimate their own height. *Psychological Science, 23*(1), 36–40.
- Ellyson, S. L., & Dovidio, J. F. (1985). Power, dominance, and nonverbal behavior: Basic concepts and issues. In S. L. Ellyson, & J. F. Dovidio (Eds.), *Power, dominance, and nonverbal behavior* (pp. 1–27). New York, NY: Springer-Verlag.
- Fiske, A. (2004). Four modes of constituting relationships: consubstantial assimilation; space, magnitude, time, and force; concrete procedures; abstract symbolism. In N. Haslam (Ed.), *Relational models theory: A contemporary overview* (pp. 61–146). Mahwah, NJ US: Lawrence Erlbaum Associates Publishers.
- Gibson, J. (1979). *The ecological approach to visual perception*. Boston, MA, US: Houghton, Mifflin and Company.
- Hall, J. A., Coats, E. J., & LeBeau, L. (2005). Nonverbal Behavior and the Vertical Dimension of Social Relations: A Meta-Analysis. *Psychological Bulletin, 131*(6), 898–924. doi: 10.1037/0033-2909.131.6.898
- Higgins, E., King, G. A., & Mavin, G. H. (1982). Individual construct accessibility and subjective impressions and recall. *Journal of Personality and Social Psychology, 43*(1), 35–47. doi: 10.1037/0022-3514.43.1.35
- Higham, P. A., & Carment, D. (1992). The rise and fall of politicians: The judged heights of Broadbent, Mulroney and Turner before and after the 1988 Canadian federal election. *Canadian Journal of Behavioural Science/Revue Canadienne Des Sciences Du Comportement, 24*(3), 404–409. doi:10.1037/h0078723
- 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*, 95–102. doi: 10.1177/0956797610391912
- IJzerman, H., & Semin, G. R. (2009). The thermometer of social relations: Mapping social proximity on temperature. *Psychological Science, 20*(10), 1214–1220. doi: 10.1111/j.1467-9280.2009.02434.x
- IJzerman, H., & Semin, G. R. (2010). Temperature perceptions as a ground for social proximity. *Journal of Experimental Social Psychology, 46*(6), 867–873. doi: 10.1016/j.jesp.2010.07.015
- Lammers, J., Galinsky, A. D., Gordijn, E. H., & Otten, S. (2012). Power increases social distance. *Social Psychological and Personality Science, 3*(3), 282–290. doi: 10.1177/1948550611418679
- Landau, M. J., Meier, B. P., & Keefer, L. A. (2010). A metaphor-enriched social cognition. *Psychological Bulletin, 136*(6), 1045–1067. doi: 10.1037/a0020970
- Lee, F., & Tiedens, L. Z. (2001). Who's being served? 'Self-serving' attributions in social hierarchies. *Organizational Behavior and Human Decision Processes, 84*(2), 254–287. doi: 10.1006/obhd.2000.2925
- Loewenstein, G., Read, D., & Baumeister, R. (2003). *Time and decision: Economic and psychological perspectives on intertemporal choice*. New York, NY US: Russell Sage Foundation.
- Marsh, A. A., Yu, H. H., Schechter, J. C., Blair, R. J. R. (2009). Larger than life: Humans' nonverbal status cues alter perceived size. *PLoS ONE, 4*(5): e5707. doi: 10.1371/journal.pone.0005707
- Mischel, W., Ayduk, O., & Mendoza-Denton, R. (2003). Sustaining delay of gratification over time: A hot-cool systems perspective. In G. Loewenstein, D. Read, R. Baumeister (Eds.), *Time and decision: Economic and psychological perspectives on intertemporal choice* (pp. 175–200). New York, NY US: Russell Sage Foundation.
- Mischel, W., Shoda, Y., & Peake, P. K. (1988). The nature of adolescent competencies predicted by preschool delay of gratification. *Journal of Personality and Social Psychology, 54*(4), 687–696. doi: 10.1037/0022-3514.54.4.687
- Mussweiler, T. (2006). Doing Is for Thinking! Stereotype Activation by Stereotypic Movements. *Psychological Science, 17*(1), 17–21. doi: 10.1111/j.1467-9280.2005.01659.x
- Narvaez, D., Lapsley, D. K., Hagele, S., & Lasky, B. (2006). Moral chronicity and social information processing: Tests of a social cognitive approach to the moral personality. *Journal of Research in Personality, 40*(6), 966–985. doi: 10.1016/j.jrp.2005.10.003
- Niedenthal, P. M., Barsalou, L. W., Winkielman, P., Krauth-Gruber, S., & Ric, F. (2005). Embodiment in attitudes, social perception, and emotion. *Personality and Social Psychology Review, 9*(3), 184–211. doi: 10.1207/s15327957pspr0903_1
- 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. doi: 10.1016/j.jesp.2013.06.001
- Parzuchowski, M., & Szymkow-Sudziarska, A. (2008). Well, slap my thigh: Expression of surprise facilitates memory of surprising material. *Emotion, 8*(3), 430–434. doi: 10.1037/1528-3542.8.3.430
- Parzuchowski, M., & Wojciszke, B. (2014). Hand over heart primes moral judgments and behavior. *Journal of Nonverbal Behavior, 38*(1), 145–165. doi: 10.1007/s10919-013-0170-0
- Parzuchowski, M., Szymkow, A., Baryla, W., & Wojciszke, B. (2014). From the heart: Hand over heart as an embodiment of honesty. *Cognitive Processing, 14*(1), 1–10. doi: 10.1007/s10339-014-0606-4
- Szymkow, A., Parzuchowski, M. (2013). Communion embodied: The influence of communion priming on temperature estimates. *Psychologia Społeczna, 8*(27), 367–379 (Wspólnotowość ucieleśniona: wpływ aktywizacji cech wspólnotowych na odczuwanie temperatury).
- Piotrowski, J., & Wojciszke, B. (2015). Agentic thinking on others makes them closer. *Polish Psychological Bulletin, 46*(1), 1–10.
- Ranehill, E., Dreber, A., Johannesson, M., Leiberg, S., Sul, S., & 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*(10), 1214–1220. doi: 10.1177/0956797614553946
- Riskind, J. H. (1983). Nonverbal expressions and the accessibility of life experience memories: A congruence hypothesis. *Social Cognition, 2*(1), 62–86. doi: 10.1521/soco.1983.2.1.62
- 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. doi: 10.1007/BF00992249
- Roberts, T., & 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. doi: 10.1080/02699300600826432
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Schubert, T. W. (2004). The power in your hand: gender differences in bodily feedback from making a fist. *Personality and Social Psychology Bulletin, 30*(6), 757–769. doi: 10.1177/0146167204263780
- Schubert, T. W., & Semin, G. R. (2009). Embodiment as a unifying perspective for psychology. *European Journal of Social Psychology, 39*(7), 1135–1141. doi: 10.1002/ejsp.670
- Schubert, T. W., Waldzus, S., & Giessner, S. R. (2009). Control over the association of power and size. *Social Cognition, 27*(1), 1–19. doi: 10.1521/soco.2009.27.1.1
- Schubert, L., Schubert, T. W., & Topolinski, S. (2013). The effect of spatial elevation on respect depends on merit and medium. *Social Psychology, 44*, 147–159. doi: 10.1027/1864-9335/a000134
- Smith, E. R., & Semin, G. R. (2004). Socially Situated Cognition: Cognition in its Social Context. In M. P. Zanna (Ed.), *Advances in experi-*

- mental social psychology, Vol. 36 (pp. 53–117). San Diego, CA, US: Elsevier Academic Press. doi: 10.1016/S0065-2601(04)36002-8
- Smith, P. K., & Trope, Y. (2006). You focus on the forest when you're in charge of the trees: Power priming and abstract information processing. *Journal of Personality and Social Psychology, 90*(4), 578–596. doi: 10.1037/0022-3514.90.4.578
- Stephan, E., Liberman, N., & Trope, Y. (2010). Politeness and psychological distance: A construal level perspective. *Journal of Personality and Social Psychology, 98*(2), 268–280. doi: 10.1037/a0016960
- Stepper, S., & Strack, F. (1993). Proprioceptive determinants of emotional and nonemotional feelings. *Journal of Personality and Social Psychology, 64*(2), 211–220. doi: 10.1037/0022-3514.64.2.211
- Szymkow, A., Chandler, J., IJzerman, H., Parzuchowski, M., & Wojciszke, B. (2013). Warmer hearts, warmer rooms: How positive communal traits increase estimates of ambient temperature. *Social Psychology, 44*(2), 167–176. doi: 10.1027/1864-9335/a000147
- 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. doi: 10.1037/0022-3514.84.3.558
- Weeks, J. W., Heimberg, R. G., & Heuer, R. (2011). Exploring the Role of Behavioral Submissiveness in Social Anxiety. *Journal of Social and Clinical Psychology, 30*(3), 217–249.
- Williams, L. E., & Bargh, J. A. (2008). Experiencing physical warmth promotes interpersonal warmth. *Science, 322*(5901), 606–607. doi: 10.1126/science.1162548
- Wilson, P. R. (1968). Perceptual distortion of height as a function of ascribed academic status. *The Journal of Social Psychology, 74*(1), 97–102. doi: 10.1080/00224545.1968.9919806
- 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. doi: 10.1023/B:A PBI.0000039057.32963.34
- Wojciszke, B., Baryla, W. (2005). Skale do pomiaru nastroju i szesciu emocji. *Czasopismo Psychologiczne, 11*, 31–47.
- Yap, A. J., Mason, M. F., & Ames, D. R. (2013). The powerful size others down: The link between power and estimates of others' size. *Journal of Experimental Social Psychology, 49*(3), 591–594. doi: 10.1016/j.jesp.2012.10.003
- Zhong, C., & DeVoe, S. E. (2010). You are how you eat: Fast food and impatience. *Psychological Science, 21*(5), 619–622. doi: 10.1177/0956797610366090