

Body posture and interpersonal perception in a dyadic interaction: A Big Two analysis

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Abstract

Body posture influences feelings about the self, but little is known about its impact on social cognition more generally. We apply the Big Two framework (Agency/Competence, Communion/Warmth) and study how body posture influences interpersonal perception in a dyadic interaction. In three experiments, we studied dyads with different body postures (Exps. 1 and 2: expanded/restricted; Exp. 3: expanded/neutral). Dyad members worked on a joint task, and rated self and other. Findings showed that participants in an expanded posture rated the self higher and the other lower on agency, whereas those in a submissive (or neutral) posture rated the self lower and the other higher on agency. In Experiment 2, participants in a submissive posture also rated their communion lower. Results are important both for the impact of body posture on interpersonal perception and for context effects in the relationship of Agency versus Communion ratings of self and others.

KEYWORDS

agency, Big Two, body posture, communion, compensation, interpersonal perception

1 | INTRODUCTION

Beginning with Carney, Cuddy, and Yap (2010; see also Park, Streamer, Huang, & Galinsky, 2013), several studies have argued that taking a “power pose” (expanded posture; see Figure 1) versus taking a submissive pose (restricted posture; see Figure 1) influences biological states, feelings about the self, behavioral intentions, and even behaviors. Although some of the original effects seem hard to replicate (Davis et al., 2017; Garrison & Schmeichel, 2016; Ranehill et al., 2015; for reviews, see Cuddy, Schultz, & Fosse, 2018; Jonas et al., 2017; Simmons & Simonsohn, 2017), the accumulated work shows that body posture has an impact on feelings about the self (Cuddy et al., 2018) and on self-validation (Brinol, Petty, & Wagner, 2009). These findings notwithstanding, research on the effects of body posture on more general aspects of self-perception

such as, for instance, self-perception on traits or self-esteem remains scarce. Moreover, most of the studies addressed individuals, for example, how body posture influences an individual's feelings, perception, cognitions, and behaviors. There is hardly any research on the effects of power posing in social interactions, for example, how people perceive both self and their interacting partner when taking different body postures. This is all the more surprising because research on non-verbal behavior stresses the influence that body posture has on impression formation (for power perception, see Hall, Coats, & LeBeau, 2005; Hall, Schmid Mast, & Latu, 2015).

The present research aims at studying the impact of body posture on interpersonal perception in a two-person encounter. We extend previous research with respect to three issues. Firstly, we study the effects of power posing and submissive (or neutral) posing on both self-perception and perception of the other person

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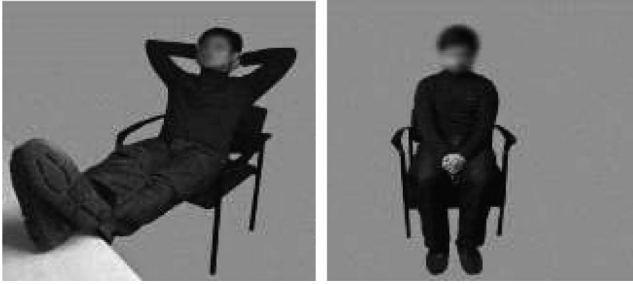


FIGURE 1 Power posing in Experiment 1 (adapted from Carney et al., 2010)

in an interpersonal encounter. Given that previous research concerned mostly the individual level, this adds to our understanding of the effects of body posture. Secondly, we combine the power-posing research with the Big Two framework of social cognition, for example, the dimensions of Agency/Competence (“getting ahead”) and Communion/Warmth (“getting along”). Given that many approaches to social cognition and evaluation are based on the Big Two approach (for an overview see, Abele & Wojciszke, 2014, 2018; Fiske, 2015, 2018; Yzerbyt, 2016, 2018), this also adds to our understanding of the effects of body posture on social cognition and evaluation. Thirdly, we examine the relations between the Big Two when people perceive the self and the other in such a situation. Previous research has shown that people tend to compensate between the Big Two when comparing social entities (for a review, see Yzerbyt, 2018), for example, if one dimension is high, then the other is rated lower, and the present studies will test if such compensation effects may also occur in interpersonal encounters between people taking different body postures.

2 | BODY POSTURE AND INTERPERSONAL PERCEPTION IN A SOCIAL INTERACTION

Why should body posture have a different effect when displayed alone or when displayed in a dyadic interaction? It has long been argued that subtle nonverbal cues influence impression formation (Argyle, 1988) and interaction partners mutually react to the other’s nonverbal cues. Tiedens and Fragale (2003), for instance, showed that participants exposed to a dominant (expanded posture) versus submissive (constricted posture) confederate tended to show complementary behavior such that they displayed more submission in their posture when exposed to a dominant confederate and more dominance when exposed to a submissive confederate. They also liked the confederate more when the latter showed complementary behavior than behavioral mimicry. In situations in which interaction partners have no chance to complement or mimic the other’s body posture they may nevertheless influence each other. Displaying a power posture when interacting with a person in a submissive posture may have different effects on perception of both self and other than displaying this posture

in front of a person in a neutral posture. Moreover, effects of posture on mutual perception may be different if the perspective is from submissive (or neutral) to powerful or if the perspective is from powerful to submissive (or neutral). We are not aware of research analyzing these questions.

3 | THE BIG TWO FRAMEWORK

For half a century, researchers have acknowledged that human beings rely on two fundamental dimensions in order to navigate the social world (Bakan, 1966; Rosenberg, Nelson, & Vivekanathan, 1968). One is called agency/competence or vertical dimension, and the other communion/warmth or horizontal dimension (for reviews, see Abele, Ellemers, Fiske, Koch, & Yzerbyt, 2020; Abele & Wojciszke, 2007, 2014, 2018; Fiske, 2015, 2018; Yzerbyt, 2016, 2018). The first dimension deals with differences of power, resources, and status, and concerns “getting ahead” on the motivational level (Abele & Wojciszke, 2014, 2018; Bakan, 1966; Fiske, Cuddy, Glick, & Xu, 2002; Hogan, 1983; Judd, James-Hawkins, Yzerbyt, & Kashima, 2005; Yzerbyt, Provost, & Corneille, 2005). The second dimension deals with interdependence and relationships and concerns “getting along” on the motivational level (Abele & Wojciszke, 2014; Bakan, 1966; Fiske et al., 2002; Hogan, 1983; Judd et al., 2005; Yzerbyt et al., 2005). In the present context, these dimensions are relevant as they cover the most important aspects of perceiving and evaluating self and others.

Although the Big Two dimensions are independent at the conceptual level (Abele & Wojciszke, 2007; Rosenberg et al., 1968), they are differently associated when assessing specific targets. Previous research revealed examples of independence (Abele, 2003; Abele & Spurk, 2011; Spence, Helmreich, & Stapp, 1974; Uchronski, 2008), positive associations (Wojciszke & Abele, 2008; Wojciszke, Abele, & Baryla, 2009), as well as negative associations (“compensation”; Kervyn, Yzerbyt, & Judd, 2010; Yzerbyt, 2016, 2018). In the present context, analyzing the relationship of these dimensions will show if and how different body postures influence not only one dimension, for example, Agency/Competence in the case of expanded versus restricted body postures, but also have an impact on the other dimension in the form of “compensation” between Agency and Communion (negative association) or “halo” (positive association).

To our knowledge, no research has applied the Big Two framework to power posing in an interpersonal setting. We are only aware of one study that applied the Big Two framework to perception of others. Renning, Blum, and Goeritz (2016) presented their participants with photographs of men and women with different high versus low power postures and asked them to rate these targets on the Big Two. Power posing had only effects on the Agency/Competence dimension but not on the Communion/Warmth dimension. It should be noted, however, that participants’ ratings were based on photographs and that the raters did not interact with the person displaying the pose.

4 | THE BIG TWO, BODY POSTURE, AND INTERPERSONAL PERCEPTION

Among the various theoretical and empirical efforts aimed at understanding the roles, functions, and mechanisms attached to the Big Two, one model focuses particularly on social perception in interpersonal encounters: the Dual Perspective Model (DPM; Abele & Wojciszke, 2007; for reviews see Abele & Wojciszke, 2014, 2018). According to the DPM, people's perspective in a social interaction is a crucial element for their construal of agency and communion. Indeed, actors are more concerned with agency because they want to pursue their goals in an effective manner. In contrast, observers (or recipients of an action) are more concerned with communion because they want to know the actor's—benevolent or malevolent—intentions. In line with this reasoning, numerous studies have shown that actors construe their behavior more in terms of agency than observers do and that observers construe an actor's behavior more in terms of communion than actors do. This said, DPM studies also revealed that people rated both themselves and others higher on communion than agency (“primacy of communion”) and that ascribing communion to both self and others was less variable than ascribing agency (Abele & Wojciszke, 2014, for a review).

Yet, no DPM studies examined the possible moderating role of body posture. The DPM would suggest that people are sensitive to situational cues like, for instance, own and the other's body posture. People in a power posture should perceive themselves as more agentic than people in a submissive posture do. Since communion ascription is generally higher and less variable than agency ascription, the DPM would not state a specific prediction on the impact of power posing on perception of own and other's communion.

Next to the DPM, two others models focus more specifically on the relationship between the Big Two in perceiving self, others, and groups: the Dimensional Compensation Model (DCM; Yzerbyt, Kervyn, & Judd, 2008; Yzerbyt et al., 2005) and the Dimensional Comparison Theory (DCT; Helm & Möller, 2018; Möller & Marsh, 2013).

The DCM is concerned with situations in which people consider two social targets in relation to each other. Provided certain conditions are met (for reviews, see Kervyn et al., 2010; Yzerbyt, 2018), the DCM holds that people will compensate between the Big Two. For example, Yzerbyt et al. (2005) had French and Belgian respondents rate France and Belgium on the Big Two. As predicted, French people were rated higher on the vertical than on the horizontal dimension whereas the reverse pattern emerged for Belgians (for further research, see Cambon & Yzerbyt, 2017, 2018; Cambon, Yzerbyt, & Yakimova, 2015; Judd et al., 2005; Kervyn, Yzerbyt, Demoulin, & Judd, 2008; Yzerbyt & Cambon, 2017). Several DCM findings point to the greater reality constraints attached to the vertical (agency) compared to the horizontal (communion) dimension. For instance, Yzerbyt and Cambon (2017) found that, when given only one dimension to evaluate, members of a high-status group rated themselves as high on communion/warmth as members of a low-status group

whereas the latter conceded greater agency/competence to the former.

As the focus of DCM research is on intergroup settings, only a handful of studies dealt with interpersonal settings (Judd et al., 2005, Experiment 4; Kervyn, Bergsieker, Grignard, & Yzerbyt, 2016; Kervyn et al., 2009). For instance, Kervyn et al. (2009, Exp. 3) created an interpersonal setting with a minimal group assignment of the participants. Respondents showed some evidence of a compensatory pattern when judging the other respondent. At the same time, respondents did not compensate in their self-judgments. Also looking at compensation in an interpersonal setting, Terache, Demoulin, and Yzerbyt (2020) adapted Ross, Amabile & Steinmetz's (1977) Quiz Master paradigm to create a difference of competence/agency between two contestants. Questioners and answerers as well as observers rated both contestants on warmth/communion and competence/agency. Results replicated the Quiz Master pattern in that questioners appeared more competent both for observers and for answerers but not for questioners. As predicted, observers manifested compensation by judging answerers warmer than questioners. Whereas no compensation emerged for answerers, questioners perceived the answerer as warmer than they perceived themselves. Again, participants did not compensate in their self-judgments.

Importantly, the DCM has not studied the possible moderating role of body posture. Still, in line with earlier efforts (Kervyn et al., 2009), the DCM would predict that people in an expanded posture should rate the other's agency lower and the other's communion higher than people in a restricted posture would. Additionally, the work on compensation leads to predict that people in a power posture should rate the submissive other as lower on agency and as higher on communion than the self, whereas people in a submissive posture should rate the powerful other as higher on agency and as lower on communion than the self. Building on the work by Kervyn et al. (2009) and Terache et al. (2020), the DCM would not predict compensation in self-judgments.

Coming from a different research tradition, the DCT looks at self-perception. Specifically, the DCT examines how social and dimensional comparison processes lead to changes in different domains of self-perception. Whereas social comparison refers to interpersonal comparisons of self with others (for example, Festinger, 1954; see also DCM), dimensional comparisons refer to intra-personal comparisons when people compare self-perception in one domain with self-perception in another domain (Möller & Marsh, 2013). DCT originally emerged in educational psychology in order to explain why students change their academic self-concept in one academic subject when they receive information about their high or low performance in another subject (Helm & Möller, 2018). Some DCT research also investigated dimensional comparisons in non-academic settings. For instance, Möller and Savyon (2003) showed contrastive dimensional comparison effects of feedback about intelligence (the agency dimension) on self-perception of honesty (the communion dimension; similarly see Helm et al., 2017; for different results, see Abele, Rupperecht, & Wojciszke, 2008a).

Again, no DCT work examined the influence of body posture on intra-personal dimensional comparisons. If dimensional comparisons work in such a situation, then there should be an interaction of agency and communion for self-ratings in a power versus a submissive/neutral posture.

5 | PRESENT RESEARCH

We conducted three studies in which we invited pairs of participants to ask each other questions while adopting different body postures (expanded vs. restricted; expanded vs. neutral; Carney et al., 2010; Park et al., 2013; see Figures 1 and 3) allegedly as a means to study the impact of body posture on memory performance. Where one person adopted an expanded posture, the other displayed a restricted (Experiments 1 and 2) or neutral (Experiment 3) posture. Hence, we always manipulated both postures in order to avoid other dynamics in face-to-face interactions (cf. Tiedens & Fragale, 2003). At the end of the interaction, both participants evaluated each other on the Big Two before recalling their answers. We tested hypotheses derived from the above-outlined theories.

Hypothesis 1 focuses on the ratings, about the self and about the other, as a function of the rater being in an expanded or in a restricted posture. Specifically, we predict that participants in an expanded posture, who are in front of another participant taking a restricted posture, will rate the self higher on agency (H1a) and lower on communion (H1b) than participants in a restricted posture will. Also, participants in an expanded posture will rate the other lower on agency (H1c) and higher on communion (H1d) than will participants in a restricted posture.

Hypothesis 2 concerns the ratings, by a person in an expanded and by a person in a restricted posture, as a function of the target being the self or the other. Specifically, participants taking an expanded posture, who are in front of another participant taking a restricted posture, will rate themselves higher on agency (H2a) and lower on communion (H2b) than the other. Participants taking a restricted (or neutral) posture, who are thus in front of another participant taking an expanded posture, will perceive themselves lower on agency (H2c) and higher on communion (H2d) than the other.

Finally, Hypothesis 3 compares the ratings about the self as a function of the dimension. That is, we predict that people in an expanded posture rate their own agency higher than their communion (H3a) and people in a submissive posture rate their own agency lower than their communion (H3b).

6 | EXPERIMENT 1

In Experiment 1, participants learned that we were interested in the effects of body posture on memory performance. They had to adopt a specific posture and keep this posture during a six-minute session.

One posture (see Figure 1, left part) signals power (the expanded posture: sitting comfortably on a chair, leaning backwards, putting one's feet on the table in front) whereas the other (see Figure 1, right part) signals submission (the restricted posture: sitting less comfortably, hanging shoulders, hands crossed, legs closed).

6.1 | Method

6.1.1 | Pretest

We conducted a pretest with six students to test the memory task. They received a list of questions (for example, first name of your mother, number of siblings, name of the street in which the participant lives, what was your first pet, etc.) that they had to ask each other. They learned that they had to keep the answers in mind and to remember them later as correctly as possible. The pretest showed that 34 questions were enough to fill a six-minute interaction. On average, pretest participants remembered 22 answers. None remembered all answers.

6.1.2 | Power considerations

In light of the fact that no research to date examined the issues studied here, we opted for a medium-sized effect. Given our three-way repeated measures design, we relied on PANGEA app (<https://jakewestfall.shinyapps.io/pangea/>) to compute the number of dyads needed to achieve a power of 80% to detect a medium effect three-way interaction with a .05 alpha two-tailed criterion. The minimum required number of dyads suggested by PANGEA was 40. We also turned to GPower (Faul, Erdfelder, Lang, & Buchner, 2007), which indicated that 36 dyads would secure a power of 95% to detect any difference among the eight means. Given the availability of participants and because we wanted to maximize our chances, we ran 46 dyads. Data collection was not continued after analyses.

6.1.3 | Design and participants

The experiment had a 2 (condition: expanded posture vs. restricted posture) \times 2 (self vs. other) \times 2 (Big Two dimension: agency vs. communion) repeated measures design. Participants were 92 German university students ($M_{\text{age}} = 24.07$, $SD = 4.74$; 62 female, 30 male). Two experimenters approached them on campus and invited them to take part in the study after making sure that the dyad comprised students who were not previously acquainted with each other. Participants received sweets in exchange for participation. We randomly assigned participants to one of the postures. The dyads were composed of women ($N = 16$ dyads) or of both women and men (15 dyads woman in the power posture; 15 dyads man in the power posture). Order of ratings (self first, other first) was counterbalanced. The unit of analysis was the dyad.

6.1.4 | Procedure and measures

After arriving at the lab, participants took their seat face-to-face at the long side of a 43 cm high (75 cm wide, 150 cm long) table. They first answered sociodemographic questions (gender, age). Then they received written instructions explaining that the study would test the impact of body posture on memory. They had to ask each other several questions while holding a particular posture. Later they should recall as many answers as possible. After these instructions, participants saw the picture of their respective posture (see Figure 1). One participant took an expansive feet-on-table posture ("power posture"), the other took a constricted sitting posture ("submissive posture"). Then they received a list with the 34 questions developed in the pretest. They exchanged their answers during a six-minute period while holding their postures. Once the six-minute period was over, participants took seats at separate tables and then—ostensibly as a distraction task—had to rate themselves and the other on a number of items. We also asked participants if they had liked their partner and if the testing situation had been agreeable (7-point rating scales). Then they wrote down the answers that they could remember. Next, we asked half of the participants if they had any suspicion about the purpose of the study. Finally, participants were thanked, debriefed, and dismissed. We mention all measures taken in the present and the following experiments.

Agency (for example, *not dynamic*–*very dynamic*) and communion (for example, *not friendly*–*very friendly*) of the self and the other person was assessed by 8 items each. Each item was rated on a 7-point semantic differential scale from $-3 = \text{very}$ (for example, *not dynamic*) and $3 = \text{very}$ (for example, *very dynamic*). The answers were later recoded to a scale from $1 = \text{not at all}$ to $7 = \text{very much}$, so that higher values correspond with a more positive expression of the trait. The scales had been developed and used in previous research. Agency and communion items load on two different factors as demonstrated in both exploratory and confirmatory factor analyses (see Abele et al., 2016). In the present study, the scales had good reliabilities (Communion self/other, Cronbach's $\alpha = .79/.78$; Agency self/other $\alpha = .79/.83$). A full list of the items used is given in the Appendix.¹

6.1.5 | Method of analysis

In light of the within-participant nature of our manipulation and our measures, we turned to a repeated-measures analysis (see also Kervyn et al., 2009; Terache et al., 2020). Alternatively, it is possible to rely on a mixed-model approach. However, the absence of missing values means that the results of a mixed-model analysis should be, and indeed were, essentially the same as those obtained via the more traditional repeated-measures analysis. In light of this, we decided to present the latter in the current

report. Of note, the fact that our manipulation only varies within dyads, in contrast to a mixed variable that is not totally between or within dyads, prevents us from turning to the Actor-Partner Interdependence Model (Cook & Kenny, 2005; Kenny, Kashy, & Cook, 2006) to examine the impact of the power pose on our dependent variable.

6.2 | Results and discussion

6.2.1 | Preliminary analyses

For 32 participants, we had recordings of the answers and could determine how many they had remembered correctly. Participants in the expanded posture condition ($M = 21.25$, $SD = 5.54$) correctly remembered as many answers as participants in the restricted posture condition ($M = 22.38$, $SD = 4.77$), $t(90) = 0.62$, *ns*. Participants in expanded posture ($M = 6.17$, $SD = 0.90$) did not differ in liking for the other from those in restricted posture ($M = 6.11$, $SD = 0.95$), $t(90) = 0.34$, *ns*. Also, there were no differences in ratings of agreeableness of the testing situation (expanded: $M = 5.56$, $SD = 1.29$; restricted: $M = 5.29$, $SD = 1.69$), $t(90) = 0.88$, *ns*.

We also inspected the answers to the open question on suspicion about the purpose of the study. None of the participants raised doubts about the pretended issue of body posture and memory performance.

6.2.2 | Main analyses

We conducted a 2 (condition: expanded posture vs. restricted posture) \times 2 (target: self vs. other) \times 2 (dimension: agency vs. communion) repeated measures ANOVA. The analysis revealed no effects of condition, $F(1,45) = 0.00$, *ns*, and target, $F(1,45) = 0.05$, *ns*, but a significant dimension effect, $F(1,45) = 80.36$, $p < .001$, $\eta^2 = 0.64$, 90% CI [0.49; 0.73]. Communion ratings ($M = 5.04$, $SD = 0.59$) were generally higher than agency ratings ($M = 4.66$, $SD = 0.50$). There were no two-way interactions but a highly significant three-way interaction between condition, target, and dimension, $F(1,45) = 9.71$, $p < .003$, $\eta^2 = 0.18$, 90% CI [0.04; 0.33] (see Figure 2, top panel).² To probe this three-way interaction, we conducted a series of separate 2×2 repeated measures ANOVAs.

We first ran separate analyses for self and other ratings. We submitted the self-ratings to a 2 (condition: expanded posture vs. restricted posture) \times 2 (dimension: agency vs. communion) repeated measures ANOVA. Next to the significant dimension effect, $F(1,45) = 23.24$, $p < .001$, $\eta^2 = 0.34$, 90% CI [0.16; 0.48], with higher communion than agency ratings, the dimension by condition interaction also came out significant, $F(1,45) = 5.44$, $p = .02$,

¹Consistent with in previous research (overview Abele & Wojciszke, 2014), agency and communion ratings were uncorrelated for self-ratings, and positively correlated for ratings of the other person. This applies to all three experiments reported here.

²The F -values ($F(1,45)$) for the two-way interactions were: condition by dimension 0.91, *ns*; condition by target 2.15, $p = .15$; dimension by target 0.93, *ns*.

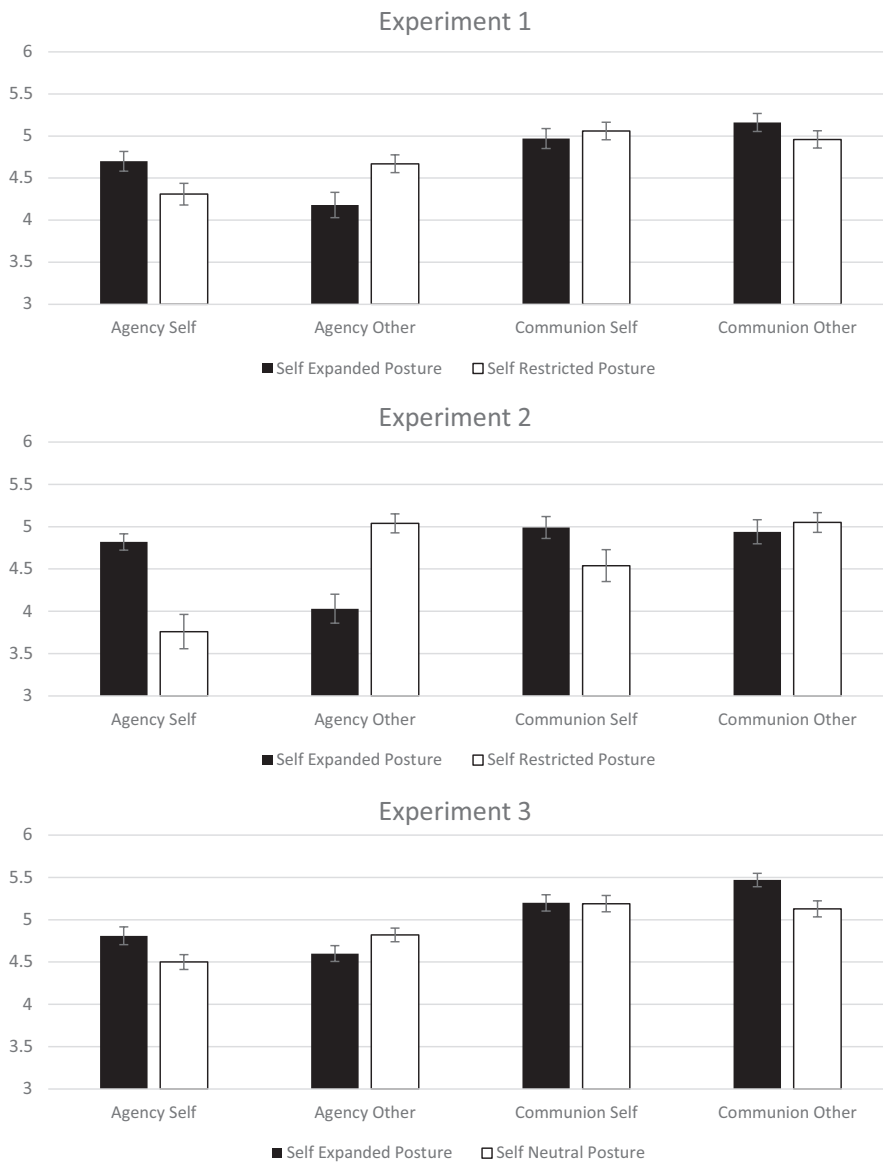


FIGURE 2 Agency and communion ratings for self and other as a function of posture of the self (top panel: Experiment 1; middle panel: Experiment 2; bottom panel: Experiment 3)

$\eta^2 = 0.11$, 90% CI [0.01; 0.26]. In line with H1a, participants in the expanded posture interacting with a restricted posture other rated their own agency ($M = 4.70$, $SD = 0.80$) higher than participants in the restricted posture interacting with an expanded posture other ($M = 4.31$, $SD = 0.87$), $t(45) = 2.07$, $p < .05$, $\eta^2 = 0.09$, 90% CI [0.00; 0.23]. Failing to support H1b, communion self-ratings did not differ between conditions (expanded: $M = 4.97$, $SD = 0.80$; restricted: $M = 5.06$, $SD = 0.70$), $t(90) = -0.64$, ns .

These analyses are also relevant for H3 predicting intra-individual compensation: Not supporting H3a, participants in the expanded condition did not rate their agency higher than their communion, $t(45) = -1.45$, $p = .15$. Seemingly supporting H3b, participants in the restricted posture rated their agency lower than their communion, $t(45) = 6.91$, $p < .001$, $\eta^2 = 0.52$, 90% CI [0.33; 0.63]. However, because all participants rated their communion higher than their agency and because communion self-ratings did not differ between conditions, we can hardly interpret this finding as supporting H3b.

We then submitted the other-ratings to the same mixed ANOVA. As before, the dimension effect was highly significant, $F(1,45) = 69.38$, $p < .001$, $\eta^2 = 0.61$, 90% CI [0.44; 0.70], with higher communion than agency ratings. The condition by dimension interaction was also highly significant, $F(1,45) = 9.59$, $p < .001$, $\eta^2 = 0.18$, 90% CI [0.04; 0.33]. Supporting H2c, participants in a restricted posture interacting thus with an expanded posture other rated the other's agency higher ($M = 4.67$, $SD = 0.71$) than participants in the expanded posture ($M = 4.18$, $SD = 1.02$), $t(45) = 2.47$, $p < .02$, $\eta^2 = 0.12$, 90% CI [0.01; 0.27]. As for H1d, participants in a restricted posture did not rate the other's communion lower ($M = 4.96$, $SD = 0.69$) than participants in the expanded posture ($M = 5.16$, $SD = 0.73$), $t(45) = 1.35$, $p = .18$, although the means were in the predicted direction.

Next, as a test of H2, we conducted separate analyses for the expanded posture and the restricted posture participants. A 2 (dimension: agency vs. communion) \times 2 (target: self-ratings vs. other-ratings) repeated measures ANOVA on expanded posture participants revealed the presence of the predicted dimension by



FIGURE 3 Power posture (left) and submissive posture (right) in Experiment 2 (for female and male participants; adapted from Park et al., 2013)

target interaction, $F(1,45) = 6.79$, $p < .01$, $\eta^2 = 0.13$, 90% CI [0.02; 0.28]. Supporting H2b, the difference was significant for agency, $t(45) = 2.34$, $p < .05$, $\eta^2 = 0.11$, 90% CI [0.01; 0.26]. However, this was not the case for communion, $t(45) = 1.42$, $p = .16$, although the means were in the direction predicted by H2b. The same 2×2 ANOVA for restricted posture participants also showed a significant dimension by target interaction, $F(1,45) = 6.93$, $p < .01$, $\eta^2 = 0.13$, 90% CI [0.02; 0.28]. Supporting H2c, the difference was significant and in the expected direction for agency, $t(45) = 2.02$, $p < .05$, $\eta^2 = 0.08$, 90% CI [0.00; 0.22]. Again, failing to support H2d, this was not the case for communion, $t(45) = 0.86$, *ns*.

6.2.3 | Testing for gender effects

Because agency and communion are related to gender stereotypes, with women more communal and men more agentic (Eagly, 1987), and because women may experience penalties when displaying dominance (Williams & Tiedens, 2016), we also ran the above analyses using gender composition (female dyads; mixed dyads with either woman or man being in the power posture) as a between-groups factor. Including gender composition did not moderate the above findings.³

³There was only one effect including gender composition, for example, gender composition \times posture \times self/other, $F(2,43) = 3.79$, $p = .03$, $\eta^2 = 0.15$. Whereas the other was always rated lower (mean of agency and communion) when the participant was in the power condition, there was one exception: Men in the expanded condition rated their female partner higher than men in the restricted condition.

To sum up, our data show that dyads with one participant displaying an expanded, that is, power, posture and the other a restricted, that is, submissive, posture show posture effects for self-ratings of agency, but not of communion. A similar pattern emerged for the perception of the other person. The posture again had only effects on the other's agency ratings, but not on the other's communion ratings. We observed very little interpersonal compensation for both participants in the power posture and participants in the submissive posture, with self–other differences emerging in the predicted directions only on agency. There was no intra-personal compensation. Finally, gender composition did not moderate results. Memory performance as well as liking for the partner and experiencing of the testing situation did not differ between conditions.

7 | EXPERIMENT 2

Experiment 2 was a conceptual replication of the previous study with more extreme postures: The expanded posture was even more relaxed than in Experiment 1 and the restricted posture was even more submissive than in Experiment 1. As an extension of Experiment 1, we recorded the questions and correct answers of all participants and could therefore determine all participants' memory performance.

7.1 | Method

7.1.1 | Participants and design

The experiment had a 2 (condition: expanded posture vs. restricted posture) \times 2 (target: self vs. other) \times 2 (dimension: agency vs. communion) repeated measure design with the first factor varying between participants and the remaining ones within them. We relied on roughly the same number of dyads as in Experiment 1. This time, participants were 82 students from a large German university ($M_{\text{age}} = 21.18$, $SD = 3.96$; 69 women, 13 men). We approached them in class where they could sign in for the experiment. We used two lists for signing in, so participants did not know who would be their partner and—as it was a lecture with more than 150 attendants—the dyads usually did not know each other. Participants received course credit for participation. The order in which participants answered the ratings (self first, other first) was counterbalanced. Participants were randomly assigned to one of the postures. The dyads were composed of women ($N = 28$ dyads) or of both women and men (5 dyads woman in the power posture; 8 dyads men in the power posture). Unit of analysis was the dyad. Data collection was not continued after analyses.

7.1.2 | Procedure

The procedure was the same as in Experiment 1. Participants took their posture, discussed the 34 questions while holding their

posture, rated themselves and their partners, and performed the memory test. Because Experiment 1 had shown that participants were not suspicious about the purpose of the research, we did not include a respective open question any more.

7.1.3 | Operationalization of body posture

We used the expansive-upright-sitting posture for power and the constricted-sitting posture for submissive (Park et al., 2013; see Figure 3 for female and male participants). Participants again held these postures for six minutes.

7.1.4 | Measures

Measures of agency and communion were the same as in Experiment 1. Reliabilities of the scales were good (Communion self/other $\alpha = .87/.81$, agency self/other, both $\alpha = .87$). We recorded both how many questions participants had covered during the interaction together with the correct answers and how many items they correctly remembered. We again asked participants if they had liked their partner and if the testing situation had been agreeable (7-point rating scales).

7.2 | Results and discussion

7.2.1 | Preliminary analyses

Participants discussed $M = 29.34$ items ($SD = 4.68$; 86.3%), and remembered $M = 22.05$ answers ($SD = 4.45$; 75.9%). We compared the total number of correctly remembered items and the relative proportion of correctly remembered items (relative proportion: number of correctly remembered items divided by the number of items participants had talked about) between conditions. There were no differences (power: $M_{total} = 22.02$, $SD_{total} = 5.02$; $M_{relative} = 75.3\%$, $SD_{relative} = 0.13$; submissive: $M_{total} = 22.07$, $SD_{total} = 3.85$; $M_{relative} = 76.4\%$, $SD_{relative} = 0.13$), $t_{total}(80) = 0.05$, ns , $t_{relative}(80) = 0.37$, ns . Supporting the more extreme manipulation of the two postures, participants in the restricted condition rated the agreeableness of the testing situation lower ($M = 4.51$, $SD = 1.78$) than those in the expanded condition ($M = 5.49$, $SD = 1.53$), $t(80) = 2.66$, $p < .01$, $d = 0.59$. There were, however, no differences in liking (expanded: $M = 6.02$, $SD = 1.17$; restricted: $M = 6.00$, $SD = 1.58$), $t(80) = 0.08$, ns .

7.2.2 | Main analyses

We conducted a 2 (condition) \times 2 (target) \times 2 (dimension) repeated measures ANOVA. There was again a highly significant dimension effect, $F(1,40) = 45.84$, $p < .001$, $\eta^2 = 0.53$, 90% CI [0.34; 0.65], with

higher communion ($M = 4.88$, $SD = 0.55$) than agency ratings ($M = 4.41$, $SD = 0.49$). The target effect was significant, $F(1,40) = 7.47$, $p = .01$, $\eta^2 = 0.16$, 90% CI [0.02; 0.32], with higher other-ratings ($M = 4.76$, $SD = 0.50$) than self-ratings ($M = 4.53$, $SD = 0.58$). The condition by target interaction was significant, $F(1,40) = 33.89$, $p < .001$, $\eta^2 = 0.46$, 90% CI [0.26; 0.59], but was further qualified by dimension in a highly significant three-way-interaction, $F(1,40) = 13.99$, $p < .001$, $\eta^2 = 0.26$, 90% CI [0.08; 0.42]. There were no other main effects or interactions, all $F_s < 1.03$, ns (Figure 2, middle panel).⁴ We again conducted a series of two-way ANOVAS to probe this three-way interaction.

We first ran separate analyses for each target (self vs. other). We submitted the self-ratings to a 2 (condition) \times 2 (dimension) repeated measures ANOVA. There was a highly significant condition effect, $F(1,40) = 14.39$, $p < .001$, $\eta^2 = 0.27$, 90% CI [0.09; 0.42], with higher ratings in the expanded than in the restricted condition. There was also a highly significant dimension effect, $F(1,40) = 16.65$, $p < .001$, $\eta^2 = 0.29$, 90% CI [0.11; 0.45], with higher communion than agency ratings. Supporting H1a, participants in an expanded posture, interacting thus with a participant in a restricted posture, rated themselves higher on agency ($M = 4.82$, $SD = 0.61$) than participants in a restricted posture interacting thus with a participant in an expanded posture ($M = 3.76$, $SD = 1.30$), $t(40) = 4.50$, $p < .001$, $\eta^2 = 0.34$, 90% CI [0.14; 0.49]. Contrary to H1b, they also tended to rate themselves higher on communion in the expanded condition ($M = 4.99$, $SD = 0.83$) than in the restricted condition ($M = 4.54$, $SD = 1.21$), $t(40) = 1.87$, $p = .07$, $\eta^2 = 0.08$, 90% CI [0.00; 0.23].

Regarding H3a, participants did not rate themselves higher on agency than on communion when adopting the expanded posture in the dyad, $t(40) = -1.34$, $p = .19$. Regarding H3b, they rated themselves lower on agency than on communion when adopting the restricted posture in the dyad, $t(40) = 3.71$, $p = .001$, $\eta^2 = 0.26$, 90% CI [0.08; 0.42]. Again, one can hardly interpret this finding as showing intra-personal compensation in the submissive condition, because the higher communion than agency self-rating was a general trend and because communion ratings were slightly higher in the expanded condition than in the restricted condition.

Turning to the other-ratings, the analogous ANOVA revealed a highly significant condition effect, $F(1,40) = 11.67$, $p < .001$, $\eta^2 = 0.23$, 90% CI [0.06; 0.39], with higher ratings in the restricted than in the expanded condition. There was also a highly significant dimension effect, $F(1,40) = 22.65$, $p < .001$, $\eta^2 = 0.36$, 90% CI [0.16; 0.51], with higher communion than agency ratings. We found a highly significant condition by dimension interaction, $F(1,40) = 14.08$, $p < .001$, $\eta^2 = 0.26$, 90% CI [0.08; 0.42]. Consistent with H1c, participants in a restricted posture rated their expanded posture partners higher on agency ($M = 5.04$, $SD = 0.72$) than participants in an expanded posture rated their restricted posture partner ($M = 4.03$, $SD = 1.10$), $t(40) = 4.68$, $p < .001$, $\eta^2 = 0.35$,

⁴The F -values ($F[1,40]$) for the remaining two-way interactions were: condition by dimension 1.03, ns ; dimension by target 0.01, ns .

90% CI [0.16; 0.50]. Failing to support H1d, there were no differences between conditions in how participants rated their partner on communion, $t(40) = 0.56$, *ns*.

Next, we turned to Hypothesis 2 and conducted separate analyses for the expanded posture and the restricted posture participants in the dyad. A first 2 (dimension: agency vs. communion) $\times 2$ (target: self-ratings vs. other-ratings) repeated measures ANOVA on participants taking the expanded posture in the dyad revealed the presence of a significant dimension by target interaction, $F(1,40) = 8.89$, $p < .001$, $\eta^2 = 0.18$, 90% CI [0.03; 0.34]. Whereas the difference was significant for agency, $t(41) = 3.91$, $p < .001$, $\eta^2 = 0.28$, 90% CI [0.09; 0.43], thereby supporting H2a, this was not the case for communion, $t(41) = 0.36$, *ns*, in contrast to H2b. The same 2×2 ANOVA for restricted posture participants also showed a significant dimension by target interaction, $F(1,40) = 8.32$, $p < .01$, $\eta^2 = 0.17$, 90% CI [0.03; 0.33]. In line with H2c, the difference for agency proved highly significant, $t(41) = -5.04$, $p < .001$, $\eta^2 = 0.39$, 90% CI [0.19; 0.53], with higher ratings of the expanded posture other ($M = 5.04$, $SD = 0.72$) than the restricted posture self ($M = 3.76$, $SD = 1.30$). The difference for communion also proved highly significant, $t(41) = -3.11$, $p < .001$, $\eta^2 = 0.19$, 90% CI [0.04; 0.36], but, running against H2d, with higher ratings of the expanded posture other ($M = 5.05$, $SD = 0.75$) than the restricted posture self ($M = 4.54$, $SD = 1.21$).

7.2.3 | Testing for gender effects

We again ran the above analyses using gender composition (female dyads; mixed dyads with woman vs. man being in the power posture) as a between-groups factor. Gender composition had no effect at all.

To sum up, Experiment 2 relied on a different—and indeed stronger (see ratings of agreeableness of testing situation)—operationalization of expanded posture versus restricted posture. The data replicated the findings of Experiment 1 with respect to the ratings on agency. Taking the expanded posture in the dyad led to higher perceptions of agency for the self both in comparison to taking the restrictive posture in the dyad and in comparison to the other person. Conversely, taking the restricted posture in the dyad led to lower perception of own agency again both in comparison to taking the expanded posture and in comparison to the other person. Experiment 2 additionally showed some unexpected yet interesting effects. Participants in a restricted posture, interacting with another participant in an expanded posture, produced lower self-ratings not only in agency but also in communion than participants in an expanded posture, interacting thus with a participant in a restricted posture. They also rated themselves lower on both agency and communion than they rated the other person. There were thus no signs of compensation here. Possibly the more extreme difference between both postures induced the submissive participants to rate themselves less favorably than in Experiment 1. Replicating the pattern observed in Experiment 1, we did not

find intra-individual compensation in the power posture condition. Finally, gender composition had no effect.

8 | EXPERIMENT 3

Experiment 3 was a replication of Experiment 1 and particularly Experiment 2 with regard to power posture. It was also an extension, as we asked participants not taking the expanded posture to adopt a more neutral body posture. Our goal was to examine whether the above pattern of findings would change with less of a difference between postures in the dyad.

8.1 | Method

8.1.1 | Participants, design, and procedure

The experiment relied on a 2 (condition: expanded posture vs. neutral posture) $\times 2$ (target: self vs. other) $\times 2$ (dimension: agency vs. communion) design with the first factor varying between participants and the remaining ones within them. In light of the fact that our manipulation was less strong than in Experiments 1 and 2, we decided to rely on more participants and opted for 60 dyads. Specifically, participants were 120 German university students ($M_{\text{age}} = 22.58$, $SD = 3.85$; 66 women, 54 men). We approached potential participants on campus and invited two persons who were not previously acquainted with each other to the laboratory. They received sweets in exchange for participation.

We randomly assigned participants to the postures and counterbalanced the order in which they answered the ratings (self first, other first). The procedure was the same as in Experiments 1 and 2. Because memory data had no influence on the measures of interest in the previous experiments, we did not register them in the present experiment. The dyads were composed of women ($N = 19$ dyads), men ($N = 13$ dyads), or of both women and men (11 dyads woman in the power posture; 17 dyads men in the power posture). Data collection was not continued after analyses.

8.1.2 | Operationalization of body posture

The expanded posture was the same as in Experiment 2. Participants in the neutral posture sat upright with their hands resting on their thighs and their eyes ahead. Gaze contact, however, was possible.⁵

⁵It might be argued that this operationalization is also "restricted". However, participants in the non-expanded posture experienced the situation as most agreeable in Experiment 3 ($M = 5.93$, $SD = 1.21$) and least agreeable in Experiment 2 ($M = 5.93$, $SD = 1.21$), $F(2,144) = 9.27$, $p < .001$, $\eta^2 = 0.11$. In contrast, participants taking the expanded posture showed no differences in ratings of agreeableness of the situation across experiments, $F(2,144) = 2.45$, $p < .09$, $\eta^2 = 0.03$. We interpret it such that the neutral posture in Experiment 3 was in fact experienced as neutral, and not as restricted.

8.1.3 | Measures

We measured agency and communion with the same items as in Experiments 1 and 2. Reliabilities were acceptable (Communion self/other, $\alpha = .81/.80$; Agency self/other, $\alpha = .74/.68$). We again also measured liking of the partner and agreeableness of the testing situation.⁶

8.2 | Results and discussion

8.2.1 | Analyses

We conducted a 2 (condition: expanded posture vs. neutral posture) \times 2 (target: self vs. other) \times 2 (dimension: agency vs. communion) repeated measures ANOVA. The analysis revealed a highly significant dimension effect, $F(1,59) = 106.14$, $p < .001$, $\eta^2 = 0.64$, 90% CI [0.51; 0.72]. Again, communion ratings ($M = 5.25$, $SD = 0.45$) were generally higher than agency ratings ($M = 4.68$, $SD = 0.70$). There was also a significant three-way interaction between condition, target, and dimension, $F(1,59) = 11.44$, $p < .001$, $\eta^2 = 0.16$, 90% CI [0.04; 0.30]. All other effects failed to reach significance, $F_s < 2.31$, $p > .13$.⁷ Figure 2, bottom panel, shows the agency and communion self- and other-ratings in the expanded and neutral postures. We then ran the same series of separate two-way analyses as before.

We first conducted separate 2 \times 2 repeated measures ANOVAs for each target. Regarding the self-ratings, there was a highly significant dimension effect, $F(1,59) = 35.78$, $p < .001$, $\eta^2 = 0.38$, 90% CI [0.21; 0.50], with higher communion than agency ratings. The dimension by condition interaction was marginally significant, $F(1,59) = 3.25$, $p < .08$, $\eta^2 = 0.05$, 90% CI [0.00; 0.16]. In line with H1a, participants in the expanded posture ($M = 4.81$, $SD = 0.82$) rated their agency higher than participants in the neutral posture ($M = 4.50$, $SD = 0.67$), $t(59) = 2.34$, $p = .02$, $\eta^2 = 0.09$, 90% CI [0.01; 0.21]. As for H1b, the communion self-ratings were not different between conditions, $t(59) = 0.17$, *ns*.

Again, the data failed to support H3a. Participants in the expanded posture did not rate themselves higher but lower on agency than communion, $t(59) = -2.63$, $p = .01$, $\eta^2 = 0.11$, 90% CI [0.01; 0.23]. In agreement with H3b, participants in the neutral posture rated themselves higher on communion than agency, $t(59) = 7.15$, $p < .001$, $\eta^2 = 0.46$, 90% CI [0.30; 0.58], once again a likely consequence of the dimension effect.

Regarding ratings of the other person, the dimension effect was highly significant, $F(1,59) = 59.13$, $p < .001$, $\eta^2 = 0.50$, 90% CI [0.34; 0.61], with higher communion than agency ratings. More importantly,

the condition by dimension interaction was significant, $F(1,59) = 13.82$, $p < .001$, $\eta^2 = 0.19$, 90% CI [0.06; 0.33]. Supporting H1c, participants in the neutral posture rated the other person somewhat higher on agency ($M = 4.82$, $SD = 0.62$) than participants in the expanded posture did ($M = 4.60$, $SD = 0.72$), $t(59) = 1.93$, $p < .06$, $\eta^2 = 0.06$, 90% CI [0.00; 0.17]. In line with H1d, participants in the expanded posture rated the other person higher on communion ($M = 5.47$, $SD = 0.62$) than participants in the neutral posture ($M = 5.13$, $SD = 0.73$), $t(59) = 2.93$, $p = .005$, $\eta^2 = 0.13$, 90% CI [0.02; 0.26].

Next, we conducted separate analyses for the expanded posture and the neutral posture participants. The 2 (dimension: agency vs. communion) \times 2 (target: self-ratings vs. other-ratings) repeated measures ANOVA for the expanded posture condition revealed the predicted dimension by target interaction, $F(1,59) = 5.85$, $p < .02$, $\eta^2 = 0.09$, 90% CI [0.01; 0.22]. This time, the difference failed to reach significance for agency, $t(59) = 1.34$, $p = .18$, *ns*, although the means were in the right direction. Interestingly, in support of H2b, there was a significant difference for communion, $t(59) = 2.88$, $p < .01$, $\eta^2 = 0.12$, 90% CI [0.02; 0.26]. In other words, participants in the expanded posture leaned toward rating the self relatively higher on agency while rating the other relatively higher on communion. The same 2 \times 2 ANOVA for neutral posture participants also showed a significant dimension by target interaction, $F(1,59) = 5.97$, $p < .02$, $\eta^2 = 0.09$, 90% CI [0.01; 0.22]. The difference was significant for agency, $t(59) = 3.08$, $p < .01$, $\eta^2 = 0.14$, 90% CI [0.03; 0.27], but definitely not for communion, $t(59) = 0.55$, *ns*, indicating that only H2c was supported.

8.2.2 | Testing for gender effects

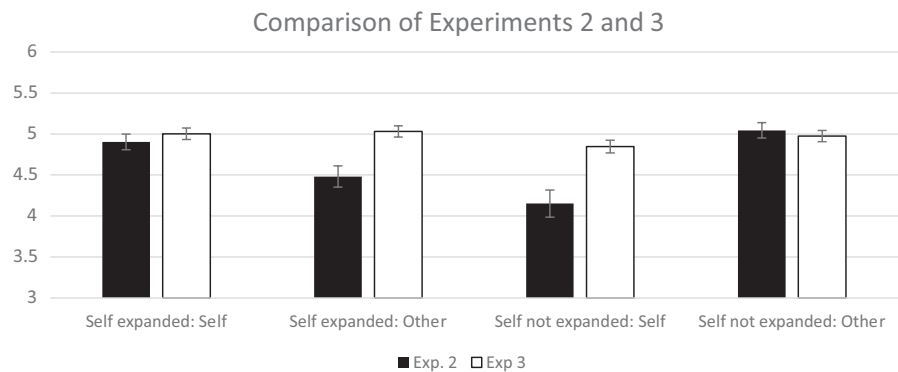
We also included gender composition (female dyads; male dyads; mixed dyads with woman vs. man being in the power posture) as a between groups factor into the above ANOVA. Gender composition did not moderate any of the above effects. However, there was an additional four-way interaction, $F(3,56) = 5.48$, $p < .01$, $\eta^2 = 0.22$, 90% CI [0.06; 0.34], indicating that the effects were stronger in male dyads and mixed dyads with men in the expanded posture than in female dyads and mixed dyads with women in the expanded posture.

To sum up, communion was again rated higher than agency. As for H1, participants rated the self higher on agency when in the expanded than in the neutral posture. No difference emerged on communion as a function of posture. In partial support of H2, participants in the expanded posture rated the other somewhat lower on agency and significantly higher on communion whereas participants in the neutral posture only rated the other higher on agency and made no difference between self and other on communion. Once again failing to support H3, we found no intra-individual compensation. Again, gender composition was no moderator. However, male dyads and mixed dyads with men in the expanded posture condition reacted more strongly than female dyads and mixed dyads with women in the expanded position.

⁶There were no differences between conditions for both measures, $t_{\text{agreeableness}} = 0.91$, *ns*; $t_{\text{liking}} = 0.01$, *ns*. We also measured self-esteem (Heatherton & Polivy, 1991) at the end of the experiment. There were no differences between conditions (expanded: $M = 3.62$, $SD = 0.63$; neutral: $M = 3.47$, $SD = 0.58$), $t(118) = 1.42$, $p = .16$.

⁷The *F*-values were: body posture, $F(1/59) = 2.31$, $p = .13$, *ns*; self/other rating, $F(1/59) = 2.24$, $p = .14$, *ns*; posture by dimension, $F(1/59) = 1.71$, $p = .19$, *ns*; posture \times self/other, $F(1/59) = 0.67$, *ns*; dimension by self/other, $F(1/59) = 0.15$, *ns*.

FIGURE 4 Ratings for self and other averaged across agency and communion in Experiments 2 and 3



9 | COMPARISON ACROSS EXPERIMENTS

To ascertain the reliability of our conclusions, we submitted the data from the three experiments to an Integrative Data Analysis procedure (Curran & Hussong, 2009), in line with the growing spirit of cumulative knowledge in psychology (for example, Cumming, 2014). We conducted a 3 (experiment: Exp. 1 vs. Exp. 2 vs. Exp. 3) \times 2 (condition: expanded posture vs. restricted/neutral posture) \times 2 (target: self vs. other) \times 2 (dimension: agency vs. communion) mixed-model ANOVA. Our interest was not only whether the three-way interaction and the associated effects would replicate across experiments but also whether experiments moderated any of the critical effects.

As expected, the three-way interaction came out highly significant and the specific experiment did not moderate this pattern. The analysis also confirmed the presence of the various effects reported above. Of importance, the experiment failed to moderate any of the effects with two notable exceptions. Indeed, both the experiment by target interaction and the experiment by target by condition interaction proved significant. Probing the three-way interaction as a function of experiment revealed that, in Experiment 2, participants in the expanded posture rated the self ($M = 4.91$) higher than the other ($M = 4.49$), while the opposite pattern held for participants in the restricted posture ($M = 4.15$ and $M = 5.05$, for self and other ratings, respectively). In contrast, the same two-way interaction failed to be significant in Experiments 1 and 3. This finding nicely reflects the impact of the extremity of the postures used in Experiment 2 and, in particular, the fact that the expanded posture led to the ascription of agency whereas the restricted posture led to its absence.⁸

Because Experiments 2 and 3 relied on exactly the same expanded posture but used either a restricted (Exp. 2) or a neutral (Exp. 3) posture, we further decided to compare these data in a more

focused manner. As such, this test informs our reasoning that displaying an expanded posture when interacting with a person in a restricted posture may have different effects on perception of both self and other than displaying this same expanded posture in front of a person in a neutral posture. We thus conducted the same mixed-model ANOVA as above, but now only with data from Experiments 2 and 3. This analysis revealed the presence of a significant effect of Experiment, $F(1,99) = 14.57$, $p < .001$, $\eta^2 = 0.13$, 90% CI [0.04; 0.23], with higher overall ratings in Experiment 3 ($M = 4.97$, $SD = 0.05$) than in Experiment 2 ($M = 4.65$, $SD = 0.06$). Moreover, the experiment (Exp. 2 vs. Exp. 3) by condition (expanded vs. restricted/neutral) by target (self vs. other) interaction proved significant, $F(1,99) = 26.13$, $p < .001$, $\eta^2 = 0.21$, 90% CI [0.10; 0.32]. As can be seen in Figure 4, the member of the dyad adopting the expanded posture received the same ratings across both experiments. This materializes in the expanded posture person judging the self or in the restricted/neutral person judging the other. In contrast, the person in the non-expanded posture triggered lower ratings in Experiment 2 than in Experiment 3. Again, this pattern shows both in the ratings of the self and in the ratings of the other. Such a pattern suggests that the difference of power matters but only for the person in the no power position. All other effects replicated those reported for the analysis involving all three experiments.

10 | GENERAL DISCUSSION

Research on the so-called power pose has suggested that body posture has some influence on feelings about the self (Brinol et al., 2009; Carney et al., 2010; Cuddy et al., 2018; Davis et al., 2017; Garrison & Schmeichel, 2016; Jonas et al., 2017; Park, Streamer, Huang & Galinsky, 2013; Park et al., 2013; Raney et al., 2015; Simmons & Simonsohn, 2017). In addition, work on nonverbal behavior has shown that people form impressions of others related to these other persons' body posture (Argyle, 1988; Hall et al., 2005, 2015). The present research identified three lingering issues in these fields of research. First, there are almost no studies with actual interpersonal interactions that go beyond looking at feelings about the self and examine the effects of different body postures on self-perception more generally as well as on the perception of the interaction partner. One notable exception is a study

⁸The F -values were: dimension, $F(1/144) = 219.59$, $p < .001$; body posture, $F(1/144) = 1.47$, $p = .24$, ns ; self/other rating, $F(1/144) = 6.33$, $p < .02$; posture by dimension, $F(1/144) = 3.53$, $p = .06$, ns ; posture \times self/other, $F(1/144) = 30.24$, $p < .001$; dimension by self/other, $F(1/144) = 0.42$, ns ; dimension by posture by self/other, $F(1/144) = 36.49$, $p < .001$; between effect experiment, $F(2/144) = 8.49$, $p < .001$; interactions within/between factors: two-way and three-way interactions with dimension and with posture, all $F < 1$; with self/other $F(1/144) = 3.11$, $p < .05$, three-way interaction with self/other and posture, $F(1/144) = 12.50$, $p < .001$; four-way interaction, $F(1/144) = 0.96$, ns .

by Tiedens and Fragale (2003), but these authors used a confederate as one of the dyad members. Second, there has been almost no attempt at linking research on the effects of body posture to the Big Two framework of social cognition and social evaluation. Such a link is critical because numerous studies have shown that the Big Two are the key dimensions on which people form their perception and evaluation of others (Abele & Wojciszke, 2014, 2018; Yzerbyt, 2018). And third, whereas there are quite a few studies showing compensation effects between the Big Two when comparing social groups, there is very little research on interpersonal (Kervyn et al., 2009; Terache et al., 2020; for a review, see Yzerbyt, 2018) and intra-personal compensation (for a review, see Helm & Möller, 2018). This is also important because the issue of the relationship between dimensions awaits clarification (see Abele et al., 2020).

The present research addressed these issues. In three experiments, we created a situation whereby two participants interacted for the sake of a memory task. Where one of them assumed an expanded, that is, power, posture, the other adopted a restricted, that is, submissive (Experiments 1 and 2) or a neutral posture (Experiment 3). We formulated our hypotheses by relying on three models in the Big Two literature (DPM: Abele & Wojciszke, 2007, 2014, 2018; DCM: Yzerbyt, 2016, 2018; DCT: Möller & Marsh, 2013; Helm & Möller, 2018). Combining the power posture literature and these Big Two models resulted in three hypotheses. First, we wanted to show that adopting an expanded or restricted/neutral posture would influence participants' perception of their own agency and communion as well as of the agency and communion of the other. Second, we wanted to test if there was interpersonal compensation in the perception of one's own and the other's agency and communion. Finally, we wanted to test if there was intra-personal compensation with higher agency than communion self-ratings when dyad members adopt an expanded posture and higher communion than agency self-ratings when they assume a restricted or neutral posture.

Throughout the three experiments, participants who displayed the expanded posture in the dyad rated themselves higher on agency than participants who adopted the restricted/neutral posture. This effect was very robust, thereby lending strong support to H1a. Similarly, the data pertaining to the agency ratings of the other participant in the dyad supported H1c in all three experiments. In all three cases, the other came across as less agentic in the eyes of the person adopting the expanded posture than in those of the person adopting the restricted posture. As for the data on communion, we found no support for our predictions except in Experiment 3 where expanded posture participants judged their interaction partner more to be communal than restricted posture participants did. Interestingly, using a stronger manipulation of body posture in Experiment 2 even produced a pattern that ran against H1b. Specifically, expanded posture participants rated themselves more communal than restricted posture participants.

Looking at data for the expanded posture participants, H2a received strong support in all three experiments. Indeed, participants saw themselves as more agentic than they saw their restricted

partner. The message was less clear for the communion ratings (H2b) as the means were in the predicted direction for Experiments 1 and 3 and showed no difference in Experiment 2. In the same vein, participants in a submissive or neutral posture produced the predicted ratings for self and other on agency (H2c) but not on communion (H2d).

Turning to the ratings at the intra-personal level, we found no evidence at all for lower self-ratings on communion than on agency among participants adopting an expanded posture (H3a). In sharp contrast, restricted posture participants systematically showed higher communion than agency self-rating (H3b). However, it should be stressed that communion ratings were higher altogether and one should thus remain very cautious about any conclusion that intra-personal compensation operates with respect to communion.

Our experiments involved dyads in which the expanded position was taken by both women and men, for example, female dyads, male dyads and mixed dyads. Although research has shown that women displaying power might be rated more negatively than men displaying power (Williams & Tiedens, 2016) and although agency and communion are still gender-tied (Eagly, 1987), the present findings were not moderated by the groups' gender composition. In our view, the fact that our participants were requested to take the respective postures and asked to do something specific (a memory task) likely reduced the impact of gender stereotypes.

10.1 | Theoretical implications

Our three objectives of the present research were (a) analyzing the effects of body postures in real interaction; (b) combining the body posture literature with the Big Two framework; and (c) analyzing relations between the Big Two on the level of both intra- and interpersonal comparisons.

10.1.1 | Real interactions

Our findings show that effects of body posture are robust, as indicated by the strong effect of expanded versus restricted or neutral posture on the perception of one's own and the other person's agency. At the same time, they are also context-dependent. First, as the comparison between Experiments 2 and 3 reveals, the differences in ratings of the power-posing participant as compared to the submissive- or neutral-posing participant were larger in dyads that combined expanded versus restricted postures than in those that combined expanded versus neutral postures. Second, those differences do not concern the expanded posture person in the dyad, whether with respect to the self-ratings or the ratings of the other participant. Rather, they concern their partner who displayed a restricted versus a neutral posture. Third, compensatory processes of the other's agency and communion are more evident in the ratings of expanded posture participants than in those of restricted or neutral posture participants. In other words, interpersonal compensation

seems easier if perceivers adopt an expanded posture rather than a restricted or neutral posture. Apparently, the latter participants had a hard time denying communion to their expanded posture interaction partners. Fourth, and in a related vein, the stronger manipulation of body posture in Experiment 2 triggered a lower self-perception of communion in the restricted posture condition, a pattern which was not observed in Experiment 1 with a less extreme manipulation of expanded versus restricted posture or in Experiment 3 with a manipulation involving a neutral rather than a restricted posture. In short, people in a very submissive posture rated themselves less favorably on both Big Two dimensions.

Taken together, these findings on context-dependency are theoretically important as they show that the perception (both self-perception and other-perception) by people in a dominant position seems to be relatively independent of the position of the interaction partner. This is apparently less the case for people in a subordinate position. Moreover, the strategy of compensating between both dimensions seems to be limited to persons in a higher position, as persons in a very low position tend to devalue themselves on both dimensions.

10.1.2 | Big Two framework and the relations between dimensions

Analyzing social interactions in terms of the Big Two makes sense because findings can be integrated into an overarching framework that has proven useful in different fields of psychology (for reviews, see Abele & Wojciszke, 2014, 2018; Abele et al., 2020; Fiske, 2015, 2018; Yzerbyt, 2016, 2018). Moreover, an analysis of the effects of body postures on self-perception and perception of others can fruitfully build on these dimensions because they cover most of the content of social evaluation. What do the present findings mean with respect to the theoretical models discussed above? Regarding the DPM (Abele & Wojciszke, 2007, 2014) we did not observe effects that were due to perspective, for example, self/actor versus other/observer. In all likelihood, the relatively extreme body postures and the standardized behavior (memory task) analyzed in the present experiments are strong situational cues that override actor/observer perspective effects. However, in accordance with Hypothesis 1, people proved sensitive to the different body postures. Previous research had already shown that power is an important moderator of perspective effects (Abele & Brack, 2013; Cislak & Cichočka, 2018). Future research could test additional moderators of perspective effects as postulated and found in the DPM. Of importance, the primacy of communion observed in the DPM also emerged in the present studies.

Turning to the DCT (Möller & Marsh, 2013; Helm & Möller, 2018) and its prediction of intra-personal compensation, we did not find any compensation between agency and communion in self-ratings on both dimensions. If anything, we found some indication of a contrary effect of general devaluation when participants were in the extreme restricted posture. Previous research was inconclusive regarding compensation at the level of the individual, because some studies found the effect (Helm et al., 2017; Helm & Möller, 2018),

while others did not (Abele et al., 2008a; Kervyn et al., 2009). Does this mean that intra-individual compensation between the Big Two never takes place? We do not think so. Again, the present experiments were highly standardized with respect to the participants' behaviors and this may have prevented intra-individual compensation from taking place. Moreover, the generally higher communion than agency ratings may have impeded the emergence of intra-individual compensation. Any definite answer to the question of intra-individual compensation on the Big Two thus seems premature at this stage and additional work is required to understand the conditions under which self-ratings would be likely to compensate.

Regarding the DCM (Kervyn et al., 2009; Yzerbyt, 2018; Yzerbyt et al., 2005) and its prediction of interpersonal compensation, this series of experiments suggests that compensation may emerge more readily under certain circumstances than others. For instance, participants in an expanded posture assigned less agency and tended to assign more communion to the other than participants in a submissive (or neutral) posture did (except in Experiment 2 where there was no difference on communion). In addition, participants in the power posture assigned more agency to themselves than to their partner while granting their partner some superiority on communion (again with the exception of Experiment 2). This general pattern fits well with other work suggesting that high-ranking people are tempted to grant low-ranking people higher levels of communion as a result of some sort of *noblesse oblige* rationale (Cambon & Yzerbyt, 2018; Yzerbyt & Cambon, 2017; Yzerbyt et al., 2008). In all likelihood, the generally higher ratings on communion than on agency may have precluded our evidencing compensation as neatly as predicted. One obvious reason for this pattern may stem from the fact that, in the context of interpersonal judgments and in contrast to what happens in intergroup contexts, it is difficult to deny communion to oneself or to one's partner. Future research should allow us to shed light on this fascinating issue.

10.2 | Practical implications

Research on body posture has been looked at critically during the last years, possibly because some early body posture findings could not be replicated (Davis et al., 2017; Garrison & Schmeichel, 2016; Ranehill et al., 2015; reviews see Cuddy et al., 2018; Cuddy et al., 2018; Jonas et al., 2017; Simmons & Simonsohn, 2017). Still, the present findings suggest that one should not underestimate the effects of body posture. In particular, the people in a restricted posture may suffer from coming across and rating themselves as less agentic. We even found that, in extreme cases, these persons may rate the self as less communal than persons in a power posture. Conversely, persons in an expanded posture can further bolster their self-esteem by showing "generosity" under the form of compensation when rating their interaction partner. We do not think that these effects will remain after persons have changed their posture (see Tiedens & Fragale, 2003; see also Experiment 3: no effects on self-esteem). As the same time, if such postures are predetermined, for instance, by

way of spatial arrangements (chairs of different height, sitting behind or in front of a desk, etc.) that echo specific social roles, then posture effects may occur repeatedly and may indeed have lasting effects on perception of self and others.

10.3 | Limitations and future direction

Informative as they may be, the present findings also suffer from a number of limitations. As a first issue, it is possible that demand characteristics influenced the findings: Taking an expanded versus a restricted or neutral posture might induce participants to suspect that the focus is not on memory performance but rather on body posture and social perception. We note, however, that our participants did not express any suspicion (see Experiment 1) and that the cover story was generally accepted. In addition, the fact that memory performance did not vary with body posture suggests that participants in both positions invested a similar level of effort to work on the task.

Second, one may wonder whether the different body postures were also differently related to gaze aversion, for instance, the restricted posture in Experiment 2. Of course, participants in this posture were less able to look at their interaction partner than vice versa. However, in all our experiments, participants looked at each other when they entered the lab and when they left. During the interaction proper, they either watched the list of 34 questions to be asked and remembered or—after having finished the question asking and answering procedure—looked at the questionnaires they had to fill out. For all these reasons, it is reasonable to conclude that different amounts of gaze did not influence the findings.

A third limitation is that all three experiments relied on variations of the same general procedure in order to manipulate the different postures of the interaction partners. To be sure, the present data confirmed the success of our posture manipulation (Carney et al., 2010; Park et al., 2013). As such, the message adds to the more general literature concerning the impact of this body information, for both the actors and the observers (Cuddy et al., 2018). Of course, it would be important to replicate the findings in the context of other naturalistic encounters. Additionally, looking into the dynamic nature of the relations between the dimensions would also be interesting. For instance, what happens with people's perceptions of themselves and others over the course of a work collaboration in which one of the two partners demonstrates superiority on the vertical dimension? How would the other adapt (cf. Tiedens & Fragale, 2003). How would the perception of self and other change in the process of mutual reacting on body postures? Would the first impression be strongest? Could later information override a first impression? Looking at pre- and post-interaction ratings of the self and the partner as well as on process data during the interaction would definitely shed new light on the relations between perceptions of agency and communion.

A fourth limitation has to do with the fact that our various manipulations concerned expanded/restricted/neutral postures, and, hence, what can be seen as the vertical dimension (Abele et al., 2020). Clearly, it would be informative to see whether the same pattern emerges

when one manipulates the horizontal dimension (for a first experiment in the context of a minimal group paradigm, see Kervyn et al., 2009).

A final issue concerns the facets of the Big Two (Abele et al., 2008b; Abele & Hauke, 2019; Abele et al., 2016). In all three experiments, our measures tapped the agency-assertiveness and the communion-friendliness facets, but not the agency-ability and communion-morality facets. Clearly, thus, an important goal for future research would be to examine the impact of body posture on the different facets of the vertical and horizontal dimensions.

10.4 | Conclusions

To conclude, the present efforts tell us a great deal about the way body posture relates to intra- and inter-personal perceptions on the Big Two in two-person encounters. The main message is that the degree of power manifested in body posture readily translates into perceptions of agency/competence (vertical dimension) but also into perceptions of communion/warmth (horizontal dimension), albeit in a more subtle way. These processes are dependent on the nature of one's posture (expanded vs. restricted) and on the extremity of differences between postures. People with a restricted posture may readily think negatively about the self and people in an expanded posture can be "generous" by ascribing less agency but also more communion to neutral posture others than they do to the self.

In our opinion, given the importance of these questions for everyday interactions, researchers should invest more effort to unveil the relations between body posture and judgments on the Big Two for both self and others. This certainly comes across as a fascinating agenda for future work.

ETHICS STATEMENT

All studies reported in this article have been performed according to APA ethical standards for the treatment of human subjects. Since data collection was anonymous and involved no identifying information and no medical treatment, no ethics approval for the study was needed according to the guidelines of our university. Participants were informed that their participation was voluntary, that they could cancel their participation at any time, and that their data would be treated anonymously. The informed consent of the participants was implied through participation.

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CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as potential conflict of interest.

DATA AVAILABILITY STATEMENT

The data can be accessed via PsychArchives: <http://dx.doi.org/10.23668/psycharchives.2693>.

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APPENDIX

Agency and Communion Items used in Experiments 1-3

Agency	Communion
Dynamic	Friendly
Never gives up easily	Able to respond to others
Independent	Gentle
Has leadership abilities	Helpful

Agency	Communion
Assertive	Aware of feelings of others
Self-confident	Understanding of others
Feels superior	Caring
Stands up well under pressure	Warm in relations with others