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Powerful postures do not lead to risky behaviors

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Abstract

Recent research has found that a specific manipulation of body postures can influence psychological states associated with power, including an individual's feeling of power and risk-taking tendency, but the results vary. The purpose of this study is to replicate previous studies. A pilot experiment examined the validity of 10 postures extracted from multiple former studies. Only 4 postures were consistent with former studies. Experiment 1 replicates the study conducted by Carney, Cuddy, and Yap (2010). The results revealed that posture manipulations did not affect the participants' risk-taking tendency. Experiment 2 is a preregistered experiment to replicate the study of Carney et al. (2010). Different from Experiment 1, data were analyzed with a Bayesian approach. The results of the former study again failed to be replicated, which indicates that the posture manipulations could not yield any effect on both power feelings and individuals' risk-taking tendency. Thus, we concluded that (a) holding a specific series of body posture perceived as high or low power does not affect individuals' feeling of power, and (b) holding a specific series of body posture perceived as high or low power does not affect individuals' risk-taking tendency.

Power has been studied for many years in the disciplines of sociology and psychology. Throughout former studies, many researchers have defined power from different aspects. Some considered power as authoritarianism (Adorno, Frenkel-Brunswik, Levinson, & Sanford, 1950). Some argued that power is control (Pfeffer, 1992) and dependence (Emerson, 1962; Mintzberg, 1983). In these cases, power is conceived more as an attribute of a character in a specific context. But psychologists argue that power is also a psychological state of an individual. From the view of psychology, power is a psychological state; it is defined as the ability to control resources of one's own and others, without social interference (Galinsky, Gruenfeld, & Magee, 2003; Keltner, Gruenfeld, & Anderson, 2003). Thus, psychology studies have focused more on individuals' feeling of power and its downstream consequences. Published empirical studies include questionnaire measurement and mind-set priming.

In multiple studies, many paradigms have been developed to manipulate power. Chen, Lee-Chai, and Bargh (2001) primed power with power-related words in a word-search puzzle task. Galinsky et al. (2003) primed power with an episodic recall task. Participants were asked to write down a specific experience in which they had or had no power over others. Inspired by embodied cognition, recent researchers found that power can also be manipulated by holding a series of specific body postures (Carney, Cuddy, & Yap, 2010). In the study by Carney et al. (2010), researchers assumed that holding specific body postures for 2 minutes could manipulate individuals' sense of power and thus yield an effect on the risk-taking tendency, the self-reported feeling of power, and specific hormone levels. Participants (undergraduate students) were told to hold expansive or closed postures for 2 minutes; after the manipulation, risk-taking behavior, self-reported feeling of power and hormone levels were measured. Also, while holding the postures, participants were asked to watch a series of neutral faces as a "filler task". The results showed a significant difference between high- and low-power groups on the three different measures. Along with multiple studies focused on posture manipulations, these findings suggest that posture is a valid way to manipulate power. Further studies have replicated the findings and discussed a series of mediators and moderators that can affect the results, such as culture norms (Huang, Galinsky, Gruenfeld, & Guillory, 2011) and different instructions given to participants before the experiment (Cesario & McDonald, 2013), but the results were inconsistent (Carney, Cuddy, & Yap, 2015). The following replication studies could not obtain the same result: Bailey, Lafrance, and Dovidio (2017); Cesario and Johnson (2018); Garrison, Tang, and Schmeichel (2016); Keller, Johnson, and Harder (2017); Ranehill et al. (2015); Ronay, Tybur, Huijstee, and Morssinkhof (2017). These findings are confusing, because while some researchers examined the effect and explored its mechanism, others could not replicate them. Simmons and Simonsohn (2017) conducted a P-Curve analysis on the "power pose effect" and concluded

that it was lacking in empirical support. Later, Cuddy, Schultz, and Fosse (2018) conducted their own P-Curve analysis by including more diverse and comprehensive published studies and concluded that the power pose effect possesses evidential value. Therefore, it is necessary to collect more evidence before drawing any universal conclusions.

Having the experience of being powerful or powerless in a particular situation generates an effect on both cognition and behavior (Keltner et al., 2003). Former studies indicate that having powerful feelings affects individuals' risk-taking behaviors. In a lottery game, participants with high power believe that they have a higher probability of winning and therefore they tend to make more risky choices (Fast, Gruenfeld, Sivanathan, & Galinsky, 2009). A higher power was also found to lead to more optimistic expectations in risk-taking tasks (Anderson & Galinsky, 2006). Results from multiple studies also support the same conclusion: power can yield an effect on the risk-taking tendency (Brinol, Petty, Valle, Rucker, & Becerra, 2007; Inesi, 2010; see also Morrison, Rothman, & Soll, 2011). Although researchers explain their conclusions from different aspects and views, all their studies support the conclusion that a higher feeling of power tends to exhibit more risky behaviors: even when power was manipulated in different tasks and risk-taking behaviors were measured in different ways, this result remained stable.

The present study

Although past researchers have focused on the same body postures to deploy their experiments, their procedures have differed substantially. For instance, Park, Streamer, Huang, and Galinsky (2013) asked participants to hold one particular body posture for 3 minutes, while Carney et al. (2010) instructed them to hold two body postures for 1 minute each. In the study by Huang et al. (2011), the instructions were provided by the experimenters, while in Ranehill et al.'s (2015) study, participants received instructions through computers. In the study by Bailey et al. (2017), the materials of the filler task while holding postures is a series of pictures of postures held by models, while the original study used a series of neutral faces. Thus, the procedures used in these studies differed. Under this premise, we carried out a series of experiments to conceptually replicate the study of Carney et al. (2010). Before replicating this study, we performed a pilot study to verify the validity of the postures studied by previous researchers. According to Park et al. (2013), body postures may not naturally express power due to different cultural backgrounds. For instance, some postures (i.e. a feet-on-desk posture) are perceived as powerful in a Western culture background while it can be perceived as rude under some implicit and restraint culture backgrounds. Thus, a scale was used to identify whether a specific body posture is consistent with a specific cultural norm or value, which is cultural consistency, according to Park et al. (2013). Therefore, we collected almost all postures that had been used in previous studies and developed 10 pictures of 10 different body postures. Based on the criteria, we chose two high-power postures and two low-power postures for the following two studies. Details and data can be accessed in the supplementary material.

EXPERIMENT 1

In the study of Carney et al. (2010), three dependent variables were measured: manipulation check (power feeling), hormone levels and risk-taking behaviors. All three variables were significantly affected after posture manipulation. Experiment 1 was a conceptual replication of Carney et al.'s study (2010) using the four selected postures from the pilot study. In this study, we hypothesized that based on the work of our pilot study, individuals' risk-taking tendency can be affected by the manipulation of body postures. Different from the original study, only a risk-taking tendency measure was included as a dependent variable in Experiment 1. Notably, Experiment 1 is not a preregistered experiment.



Figure 1. High power postures.

Method

Participants

Sixty undergraduate students (15 male, 45 females; $M_{age} = 18.93$, range = 18–22) were recruited and assigned to the high-power ($N = 29$) or low-power ($N = 31$) postures groups. All participants volunteered to be a part of this experiment without major and grade requirements. They received ¥3 after the completion of all the tasks. All participants had normal visual acuity and none had any medical history or psychological disorders according to self-report. Written informed consent was given prior to the experiment. The experimental protocol was approved by the local Ethics Committee at Qufu Normal University.

Materials

Postures

Posture manipulation requires participants to hold either two high-power postures or low-power postures for 2 minutes in total. The experimenter was allowed to give both verbal and body guidance during the manipulation. All body postures were selected based on the results of the pilot study. The postures in Experiment 1 are shown in Figures 1 and 2.

The gambling task

After completing the power manipulation, participants were asked to perform a paper-and-pencil gambling task. The task consists of 10 different hypothetical scenarios of investments. Participants were asked to choose between two different investment choices: one with larger earning potential but riskier and one with normal earning but relatively safe. Following each scenario, participants were asked to rate the item "To what extent would you like the investment you choose" from 0 (*prefer option A*), 3 (*neutral*) to 5 (*prefer option B*). The total score of the five tasks (0 = no gamble, 1 = gamble) represents the participants' risk-taking tendency.

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Figure 2. Low-power postures.

Invalid data (chose option A but rated prefer option B, or chose option B but rated prefer option A) will be excluded. The earning for each investment varied from ¥50 to ¥500; the percentage of the probability to earn money in each task also varied as follows: 10–90%, 20–80%, 30–70%, 40–60%, and 50–50% (Harbaugh, Krause, & Vesterlund, 2002). The full version of the task can be accessed in the supplementary material.

Procedure

According to research, body changes affect the mind only when it is in context (Cesario & McDonald, 2013). Therefore, Cesario and McDonald (2013) suggest that the instructions provided to the participants before the power manipulation are important. Thus, we adopted the instructions used by Cesario and McDonald. Participants were randomly assigned to conditions and guided into the behavioral observation room. They were manipulated one at a time. Each participant entered the room and was told that the study concerned "how people remember and maintain different physical positions and how they form impressions of others". The experimenter then helped participants pose in a specific posture by providing verbal instructions, or lightly touching their arms and legs if needed (e.g., "Please sit on the chair and naturally hang your arms between your legs, then clamp your legs"). The experimenter then left the room after giving the instructions. Another experimenter observed and recorded the participants holding the postures through one-way glass. Any data from participants who failed to maintain postures was excluded from further analysis. All participants learned the postures correctly and held them correctly. They were randomly assigned to hold either two high-power or two low-power postures for 1 minute each. While holding the postures, participants were shown a series of neutral faces with an iPad as a filler task. Participants were instructed: "Imagine the faces shown on the iPad as a real person." The faces were extracted from the Chinese Facial Affective Picture System after receiving authorization. In this study, the iPad was placed on a table that was about 0.9 m high. After posture manipulation, participants were then asked to finish the gambling task.

Data analysis

The null hypothesis significance testing (NHST) approach was applied in Experiment 1 and data analysis was performed using SPSS software (version 19.0, SPSS Inc., Chicago, IL, USA). The threshold of the alpha level was set at .05.

Results

Two datasets were excluded because the participants did not keep still during posture manipulation. The results show no significant differences between the high-power ($M = 3.59$, $SD = 2.\ 338$) and low-power groups ($M = 3.10$, $SD = 1.795$), $t(58) = 0.91$, $p = .37$, Cohen's $d = 0.24$, 95% CI [-0.27, 0.74]. This indicates that the manipulation of holding powerful or powerless postures did not affect individuals' risk-taking tendency.

Discussion

Experiment 1 was designed on the basis of previous research. We also deployed a pilot study to ensure the validity of the postures. However, the results indicate that posture manipulation failed to affect the participants' risk-taking tendency; that is, the results of former research failed to be replicated, although participants in the high-power group rated slightly higher on risk-taking measures than participants in the low-power group. Experiment 1 also had its disadvantages. First, the sample size was determined based on former research other than a power analysis; second, as a replication study, we did not preregister Experiment 1 on the Open Science Framework or any other website. As an improvement, we further designed Experiment 2 to investigate the topic.

EXPERIMENT 2

This experiment was a preregistered study (https://osf.io/upmv5/). Different from Experiment 1, Experiment 2 contains two dependent variable measurements: a self-reported power feeling measure and a gambling task. As mentioned in the original study, the measure of self-reported power feeling acts both a rule of the dependent variable and as a "manipulation check item". This can distinguish a failed independent variable manipulation from other negative results. Furthermore, studies have mentioned that the eye gaze direction during posture manipulation is an affecting factor (Garrison, Tang& Schmeichel, 2016). Thus, we also controlled gaze direction in Experiment 2. Marsman and Wagenmakers (2017) suggest that Bayesian statistics can express research confidence for a parameter being in any range; and it can express the evidence for or against hypotheses on a continuous scale, and monitor the evidential trajectory in real time as the data accumulate. Pivoting from former suggestions, we also adopted the Bayesian approach in Experiment 2 to make up for the deficiency of NHST in Experiment 1 to some extent.

Method

Participants

A power analysis before the experiment indicated that a sample size of 72 was suitable for this study. In total, 72 undergraduate students (21 male, 51 females; $M_{age} = 19.83$, range = 18–22) were recruited and randomly assigned to the high-power ($n = 36$) or low-power ($n = 36$) posture groups. All participants had normal visual acuity and none had any medical history or psychological

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disorders, according to self-report. Participants were recruited without major or grade requirements. Written informed consent was provided prior to the experiment. The experimental protocol was approved by the local Ethics Committee at South China Normal University.

Materials

The postures and risk-taking measurements were the same as Experiment 1. Additionally, we also added a self-report item to measure participants' power feeling at the end of the experiment. Participants indicated how "powerful" they felt at the moment on a scale from 1 (*not at all*) to 7 (*a lot*).

Procedure

Experiment 2 had the same procedure in Experiment 1, except for the filler task as previously discussed. In order to control the participants' gaze directions, the iPad was put on a carton and then the carton was put on the desktop to keep participants' gaze direction horizontal when they were holding a standing posture. This step is operated by the experimenter. Thus, the participants' gaze directions were kept horizontal in all conditions.

Data analysis

Two datasets were excluded because the participants failed to maintain postures during posture manipulation. We used a two-sided Bayesian hypothesis test (with a default Cauchy prior width of $r = .707$ for an effect size on the alternative hypothesis). The analysis is achieved with JASP 0.9.2.0 (JASP Team, 2016; jasp-stats.org). According to Wagenmakers, et al. (2015), the results show a medium-sized (1/10–1/3) support for H0. This indicates that posture manipulation yielded no effect on both power feelings and risk-taking behavior. According to the discussions and suggestions about reporting the Bayes factor in psychological studies (Appelbaum et al., 2018; Hu, Kong, Wagenmakers, Ly, & Peng, 2018; Kruschke, 2014; Marsman & Wagenmakers, 2017), the analysis and reporting statistics of this study will follow Marsman and Wagenmaker (2017).

Results

Main results

The results of an NHST analysis based on the data from Experiment 2 shows no difference in risk-taking tendency between the high-power ($M = 4.15$, $SD = 0.24$) and low-power groups ($M = 3.97$, $SD = 0.19$), t (70) = - 0.57, $p = .57$, Cohen's d = -0.14, 95% CI [-0.79, 0.44]. The results supported the same conclusion of Experiment 1, that power postures do not affect individuals' risk-taking tendency. As stated, we also ran a Bayesian analysis based on the same data. For participants' self-reported power feelings, the Bayes factor is $BF_{10} = 0.30$, indicating that the observed data provided medium evidence to support the null hypothesis, which suggests that there is no significant difference in self-reported power feelings between different posture manipulations. A similar $BF_{10} = 0.24$ was observed for participants' risk-taking tendency measure. In sum, the results of Experiment 2 indicate that the manipulation of holding powerful or powerless postures does not affect individuals' risk-taking tendency.

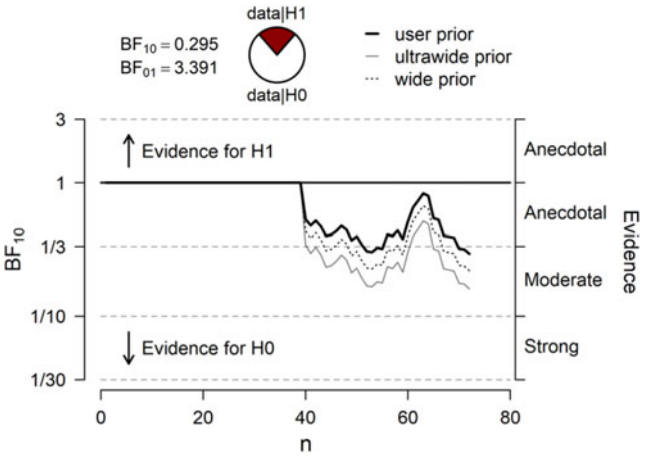


Figure 3. The development of the Bayes factors for the self-reported power feeling. Note: Figure adapted from JASP, jasp-stats org.

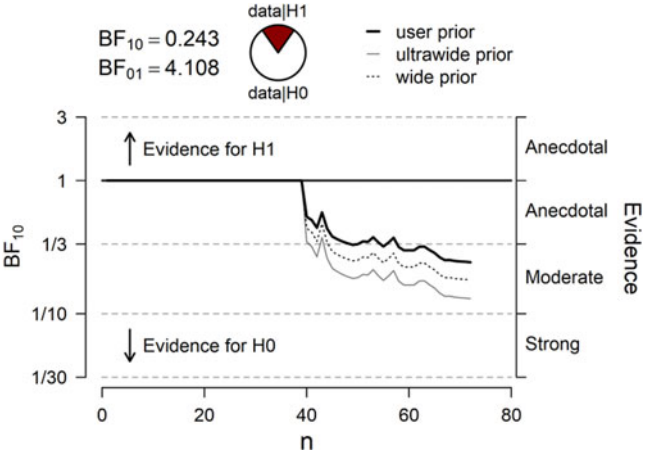


Figure 4. The development of the Bayes factors for the risk-taking tendency. Note: Adapted from JASP, jasp-stats.org.

Exploratory analysis 1: Sequential analysis of the Bayes factor

Figures 3 and 4 shows the development of the Bayes factor as a function of the number of participants that were tested. According to Hu et al. (2018), this result shows medium to strong evidence for the null hypothesis that there is no difference between high- and low-power posture manipulations. Furthermore, as the number of participants grows, the Bayes factor increasingly supports the null hypothesis.

Exploratory analysis 2: Assessing robustness

The dot on Figures 5 and 6 indicates that as the scale parameter r increases (i.e. the prior becomes progressively wider), the Bayes factor increasingly favors the null hypothesis. In addition, it is evident that, even under the prior setting that most favors the alternative hypothesis, the Bayes factor is still indicating ambiguous evidence.

Discussion

Experiment 2 was a preregistered experiment with a strict sample size based on a power analysis and a different statistical approach.

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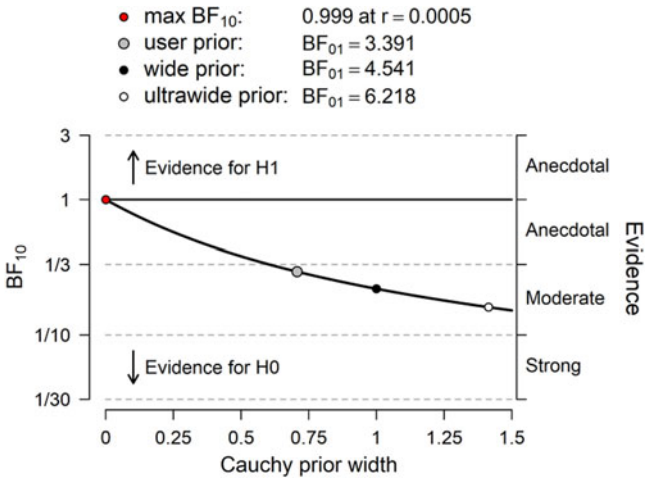


Figure 5. Bayes factor robustness check of self-report power feeling.
Note: Adapted from JASP, jast-stats.org.

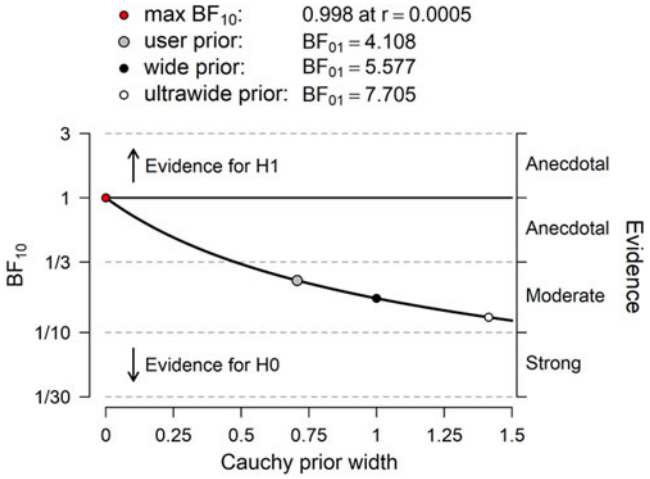


Figure 6. Bayes factor robustness check of risk-taking tendency.
Note: Adapted from JASP, jasp-stats.org.

However, the results of Experiment 2 still supported the non-significant conclusion of Experiment 1. The results proved that postures do not affect either power feeling or risk-taking behaviors. Based on the results, we concluded that holding a specific series of body postures perceived as high or low power does not affect either individuals' feeling of power or their risk-taking tendency.

General discussion

We aimed to replicate the study of power postures reported by Carney et al. (2010). On the experiment design level, we reviewed multiple former experiments of power postures. Many factors that may influence the results were controlled for conditions; for example, experimental instruction (Cesario & McDonald, 2013), gaze direction (Garrison et al., 2016), and cultural background difference (Huang et al., 2011. Our pilot study proved that particular body postures, as a body language, were consistently rated as high or low on power. On the data analysis method level, we adopted null hypothesis significance testing and the Bayesian approach. However, the results of our experiment failed to replicate former findings, despite two attempts. The results of this study, along with former failed-to-replicate studies, suggest that the effect that powerful postures affect individuals' actual power is a false positive result. However, there is no simple decisive rule for declaring success or failure in replication or for detecting positive results (Benjamin et al., 2018; Camerer et al., 2018; Open Science Collaboration, 2015). Any research on exemplary quality may have irreproducible empirical findings because of random or systematic error (Open Science Collaboration, 2015). We can only conclude that postures yield no effect based on present works, and the crucial factor regarding posture and behavior is still unknown. Future research should continue to explore whether a potential factor lies between posture and risk-taking behavior.

Previous researchers have tried to explain the effect by embodied cognition, that is, changes in our body can yield an effect on our cognition. However, the main proposition of embodied cognition is that cognition lies in the body, and the body lies in the context (Gabbay, Woods, & Thagard, 2006). Embodiment mainly concerns the relationship between mind, body, and context. Researchers claim that context is an important part of the embodiment. Cesario et al. (2013) changed the instruction given to participants during posture manipulation. We believe this is an important operation to build a context while participants are posing. However, the results from previous studies failed to be replicated in our study. From the perspective of embodiment, it is inappropriate to discuss mind and behavior without context. Power, as an important dynamic social factor, lies in the relationship among individuals. Under this premise, future studies may focus on field studies in which the study variables are examined in a specific context.

Previous studies have also mentioned how different postures yield an effect on participants' hormone levels and described how high-power postures can cause a significant increase in the testosterone level and a decrease in the cortisol level. We did not collect participants' saliva samples in our study. However, evidence from the field of physiology has already proven that cortisol can act within minutes to help us respond to stressful situations and that relaxation can be accompanied by a decrease in cortisol levels. But the same is not observed regarding testosterone levels. The result of a previous study (Van Honk et al., 2016) showed that when women's testosterone levels were manipulated to high levels, fear, anger, and risk-taking behaviors were affected — but these changes occurred after hours, not within minutes. Thus, there is still a more to discuss regarding hormone changes. It would be interesting to explore whether hormone levels are the key factor to determine the embodied effects of power postures or whether the hormone change is a false positive result, as observed in the previous findings.

In addition, our study also helped to alleviate the replicability issue by preregistering the study and sharing our data and materials on the Open Science Framework. As suggested by former researchers, open data can contribute to a reduction in the freedom of researchers and reduce questionable manipulations to reduce false positives, while preregistration can reduce problematic manipulations of researchers, restrict experimental freedom and openly publish major research findings to reduce publication bias (Hu et al., 2016). Accumulating evidence is the scientific community's method of self-correction and is the best available option for achieving that ultimate goal: truth (Open Science Collaboration, 2015). However, how we proceed in open science will require a change in mindset and a lot more openness, including "open data, open collaboration, and above all, open minds" (Ong, 2016, p. 6). To further address the replication issue, more open studies are needed.

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Limitations

We conducted two experiments to explore the effect of body posture. However, it was only a conceptual replication of research on the power pose effect. We copied the posture manipulation procedure from Carney et al. (2010) but with a few modifications. The sample was comprised of undergraduate students. As discussed, we did not collect hormone levels as a dependent variable. Moreover, we replaced a posture that is regarded as rude in the Chinese culture. Throughout our studies, the results indicated that body postures do not affect either power feelings or risk-taking tendency ($p > .05$ and BF01 between 1/3 to 1/10). Also, the sample size varied between the two studies due to specific conditions.

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Supplementary material. To view supplementary material for this article, please visit https://doi.org/10.1017/prp.2019.17

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Conflict of interest. None.

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Note. All data and materials have been made publicly available on Open Science Framework and can be accessed at https://osf.io/a367x/?view_only=581a656bedfb4b5dbaca3e16b4fe860b

References

Adorno T.W., Frenkel-Brunswick E., Levinson D.J. and Sanford R.N. (1950). *The Authoritarian Personality*. Oxford, England: Harper.

Anderson C. and Galinsky A.D. (2006). Power, optimism, and risk-taking. *European Journal of Social Psychology*, **36**, 511–536.

Appelbaum M., Cooper H., Kline R.B., Mayowilson E., Nezu A.M. and Rao S.M. (2018). Journal article reporting standards for quantitative research in psychology: The APA Publications and Communications Board Task Force Report. *American Psychologist*, **73**, 3–25.

Bailey A.H., LaFrance M. and Dovidio J.F. (2017). Could a woman be superman? Gender and the embodiment of power postures. *Comprehensive Results in Social Psychology*, **2**, 6–27.

Benjamin D.J., Berger J.O., Johannesson M., Nosek B.A., Wagenmakers E.-J., Berk R. ... **Johnson V.E.** (2018). Redefine statistical significance. *Nature Human Behaviour*, **2**, 6–10.

Brinol P., Petty R.E., Valle C., Rucker D.D. and Becerra A. (2007). The effects of message recipients' power before and after persuasion: a self-validation analysis. *Journal of Personality and Social Psychology*, **93**, 1040–1053.

Camerer C.F., Dreber A., Holzmeister F., Ho T.-H., Huber J., Johannesson M., ... **Wu H.** (2018). Evaluating the replicability of social science experiments in *Nature* and *Science* between 2010 and 2015. *Nature Human Behaviour*, **2**, 637–644.

Carney D.R., Cuddy A.J. and Yap A.J. (2010). Power posing: Brief nonverbal displays affect neuroendocrine levels and risk tolerance. *Psychological Science*, **21**, 1363–1368.

Carney D.R., Cuddy A.J. and Yap A.J. (2015). Review and summary of research on the embodied effects of expansive (vs. contractive) nonverbal displays. *Psychological Science*, **26**, 657–663.

Cesario J. and McDonald M.M. (2013). Bodies in context: Power poses as a computation of action possibility. *Social Cognition*, **31**, 260–274.

Cesario J. and Johnson D.J. (2018). Power poseur: Bodily expansiveness does not matter in dyadic interactions. *Social Psychological and Personality Science*, **9**, 781–789.

Chen S., Lee-Chai A.Y. and Bargh J.A. (2001). Relationship orientation as a moderator of the effects of social power. *Journal of Personality and Social Psychology*, **80**, 173–187.

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

Emerson R.M. (1962). Power-dependence relations. *American Sociological Review*, **27**, 31–41.

Fast N.J., Gruenfeld D.H., Sivanathan N. and Galinsky A.D. (2009). Illusory control: A generative force behind power's far-reaching effects. *Psychological Science*, **20**, 502–508.

Gabbay D.M., Woods J. and Thagard P. (2006). *Philosophy of Psychology and Cognitive Science*. Amsterdam, the Netherlands: Elsevier.

Galinsky A.D., Gruenfeld D.H. and Magee J.C. (2003). From power to action. *Journal of Personality and Social Psychology*, **85**, 453–466.

Garrison K.E., Tang D. and Schmeichel B.J. (2016). Embodying power: A preregistered replication and extension of the power pose effect. *Social Psychological & Personality Science*, **7**, 623–630.

Harbaugh W.T., Krause K. and Vesterlund L. (2002). Risk attitudes of children and adults: Choices over small and large probability gains and losses. *Experimental Economics*, **5**, 53–84.

Hu C.-P., Wang F., Guo J., Song M., Sui J. and Peng K. (2016). The replication crisis in psychological research. *Advances in Psychological Science*, **24**, 1504–1518.

Hu C.-P., Kong X.-Z., Wagenmakers E.-J., Ly A. and Peng K. (2018). Bayes Factor and Its Implementation in JASP: A Practical Primer (in Chinese). *Advances in Psychological Science*, **26**, 951–965.

Huang L., Galinsky A.D., Gruenfeld D.H. and Guillory L.E. (2011). Powerful postures versus powerful roles: Which is the proximate correlate of thought and behavior? *Psychological Science*, **22**, 95–102.

Inesi M.E. (2010). Power and loss aversion. *Organizational Behavior and Human Decision Processes*, **112**, 58–69.

JASP Team. (2016). JASP [Computer software]. Retrieved from https://jasp-stats.org/

Keller V.N., Johnson D.J. and Harder J.A. (2017). Meeting your inner super (wo) man: Are power poses effective when taught? *Comprehensive Results in Social Psychology*, **2**, 106–122.

Keltner D., Gruenfeld D. H. and Anderson, C. (2003). Power, approach, and inhibition. *Psychological Review*, **110**, 265–284.

Kruschke J. (2014). *Doing Bayesian Data Analysis: A Tutorial With R, JAGS, and Stan*. Waltham, MA: Academic Press.

Marsman M. and Wagenmakers E.J. (2017). Bayesian benefits with JASP. *European Journal of Developmental Psychology*, **14**, 545–555.

Mintzberg H. (1983). *Power In and Around Organizations*. Englewood Cliffs, NJ: Prentice Hall.

Ong M.B.H. (2016). Biden designates NCI's genomic data commons as foundation of moonshot. *The Cancer Letter*, **42**, 1–8.

Open Science Collaboration. (2015). Estimating the reproducibility of psychological science. *Science*, **349**, 4716.

Park L.E., Streamer L., Huang L. and 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**, 965–971.

Pfeffer J. (1992). *Managing with power*. Cambridge, MA: Harvard Business School Press.

Ranehill E., Dreber A., Johannesson M., Leiberg S., Sul S. and 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**, 653–656.

Ronay R., Tybur J.M., van Huijstee D. and Morssinkhof M. (2017). Embodied power, testosterone, and overconfidence as a causal pathway to risk-taking. *Comprehensive Results in Social Psychology*, **2**, 28–43.

See K.E., Morrison E.W., Rothman N.B. and Soll J.B. (2011). The detrimental effects of power on confidence, advice taking, and accuracy. *Organizational Behavior and Human Decision Processes*, **116**, 272–285.

Simmons J.P. and Simonsohn U. (2017). Power posing: P-curving the evidence. *Psychological Science*, **28**, 687–693.

Van Honk J., Will G.J., Terburg D., Raub W., Eisenegger C. and Buskens V. (2016). Effects of testosterone administration on strategic gambling in poker play. *Scientific Reports*, **6**, 18096.

Wagenmakers E.J., Beek T.F., Rotteveel M., Gierholz A., Matzke D., Steingroever H. . . . **Gronau Q.F.** (2015). Turning the hands of time again: A purely confirmatory replication study and a Bayesian analysis. *Frontiers in Psychology*, **6**, 494.

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