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A Negative Effect of a Contractive Pose is not Evidence for the Positive Effect of an ExpansivePose: Comment on Cuddy, Schultz, and Fosse (2018)

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Abstract
Cuddy,Schultz and Fosse (2018) present the results of p-curve analyses that are interpreted as providing "clear evidential value for power posing effects". This commentary highlights that the vast majority of the studies included in the p-curve analyses were not designed in a way that could speak to the efficacy of power poses relative to a normal or neutral pose. Further, I discuss how the few studies that were designed to shed light on this issue indicate that any overall effect of physical pose on feelings of power, emotions, affect, and self-evaluations is almost entirely due to the negative effect of a contractive pose and not any positive effect of expansive power poses.

Disciplines
Applied Behavior Analysis | Cognition and Perception | Health Psychology | Psychology | Theory and Philosophy

Comments
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A Negative Effect of a Contractive Pose is not Evidence for the Positive Effect of an Expansive Pose: Commentary on Cuddy, Schultz, and Fosse (2018)

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Cuddy, Schultz, and Fosse (2018) present the results of a p-curve analysis of the literature on postural feedback and conclude that this analysis provides "… strong evidential value for postural feedback (i.e., *power-posing*) effects and particularly robust evidential value for effects on emotional and affective states" (p. 1). The authors also claim that their results represent "…strong evidential value for a precisely specified outcome, feelings of power" (p. 7). These inferences appears to be invalid for relatively simple methodological reasons.

An experiment in which expansive poses (i.e., power posing) are contrasted with contractive poses (e.g., slouching) can result in an inference of an overall effect of posture as a result of an effect of expansive poses, an effect of contractive poses, or a combination of these two effects. However, studies that compare an expansive pose with a contractive pose but do not also include either a neutral pose (i.e., control condition) or baseline measurements of the dependent variable cannot make inferences about whether any observed differences between conditions is due to the effect of expansive poses, the effect of contractive poses or some combination of the two. Unfortunately, much of the literature on postural feedback is characterized by this methodological flaw. That is, the majority of the effects and associated p-values used to conduct the p-curve analysis are based on experimental designs or analyses that lack either a control condition or baseline measurement of the dependent variable. These studies can speak to whether posture in general has an impact on the dependent variable, but they cannot speak to the value of an expansive posture relative to a normal posture. As such they should not have been included in a p-curve analysis purporting to examine the benefits of expansive poses.

Consider by way of illustration the fifteen studies used to arrive at the primary conclusion drawn by Cuddy et al. (2018) that "…an expansive posture is a universal expression of power, and adopting such a pose leads people to feel more powerful" (p. 7). Four of the fifteen studies

were excluded from the p-curve analysis because the reported p-values were >.05, and ten of the eleven included studies lacked a neutral posture control group or baseline measurement of feelings of power. As such these ten studies should not have been included in an examination purporting to examine the benefits of adopting an expansive pose relative to a neutral pose.

There are at least four other serious problems with the analysis purporting to show that adopting an expansive pose increases feelings of power. First, the only study that did include a neutral posture control group and reported a p-value <.05 (Ceunen, Zaman, Vlaeyen, Dankaerts & Van Diest, 2014) found a *negative* effect of power posing on feelings of power relative to the control condition. That is, the only study designed in a way that could distinguish between the effects of an expansive pose and the effect of a contractive pose found a negative effect for an expansive pose on feelings of power relative to a neutral pose. Second, Cuddy et al. also included the data reported by Garrison, Tang and Schmeichel (2016) as supportive of the value of adopting an expansive pose despite the fact that Garrison et al. explicitly note that participants adopting the expansive pose reported significantly *lower* levels of feelings of power than participants who adopted a contractive pose. Third, Cuddy et al. also include an inferential statistic reported by Rotella and Richeson (2013, experiment 1) that yields an exact p-value of p=0.00000297 but this p-value is based on a comparison that does not just include feelings of power but also feelings of guilt and shame. When the p-value is calculated for the feelings of power variable on its own the p-value is p=0.0005 which is more than 150 times as large. Finally, Cuddy et al. include three p-values reported by Park et al. (2013). The first two of these (from experiments 2a and 2b) represent main effects for pose in a pose x country ANOVA (no significant interactions are noted). In experiment 3 Park et al. note no significant main effect for pose but do note a significant pose x country interaction, and Cuddy include the p-value for the

interaction effect in the p-curve analysis despite the fact that this does not represent the effect of adopting an expansive pose. Because of these four serious errors the inference that the p-values reported by the eleven included studies is supportive of a positive effect of expansive poses on feelings of power is entirely unsupported.

I note that for the "feelings of power" dependent variable there is only one study that could speak to whether the overall effect of posture is due to the claimed positive effect of an expansive pose, a negative effect of a contractive pose, some combination of the two, or even a negative effect of an expansive pose. A similar problem is evident for the other examined dependent variables. That is almost all of the studies considered by Cuddy et al. were not designed in a way that allowed these effects to be distinguished from each other. However, in addition to the study described by Ceunen et al. (2014), there are three other studies that were included in the p-curve analysis that could distinguish between these effects. All three strongly suggest that any overall effect of posture on the dependent variable is primarily driven by the negative effect of adopting a contractive pose – rather than the claimed positive effect of an expansive pose.

Zabetipour, Pishghadam, and Ghonsooly, (2015) compare the effect of three poses: a) participants' ordinary posture, b) an expansive pose, and c) a contractive pose, and find a significant effect of pose on mood ($F[2,42]=13.689$, $p<.001$). This effect and the associated p-value was included in the p-curve analyses. However, this overall effect is primarily due to the negative effect of the contractive pose (mean mood=107.00, SD=24.41) relative to the ordinary posture (mean=168.33, SD=36.85), rather than any positive effect of the expansive pose (mean=160.73, SD=41.48). Indeed, the average mood in the expansive pose condition is lower than in the ordinary pose condition.

Veenstra, Schneider, and Koole (2017) also compared the effect of three poses: a) a comfortable body position that was treated as the control condition, b) a contractive pose, and c) an expansive pose. Veenstra et al. reported a significant effect of posture on mood recovery ($F[2,223]=5.98$, $p=.003$) ,and this effect and the associated p-value was included in the p-curve analyses. As was the case for the paper by Zabetipour et al., this overall effect was almost entirely due to the negative effect of the contractive posture. Indeed, Veenstra et al. note (p. 1366) that "Together, these results indicate that adopting a stooped posture resulted in less mood recovery than adopting a straight or control posture".

A somewhat similar effect is also evident in the study described by Rossberg-Gempton and Poole (1993), which has the lowest of all the p-values included in the p-curve analysis. Participants were randomly assigned to either a contractive pose condition or an expansive pose condition and eight different moods were measured both prior to and after the pose manipulation. The authors report a significant posture by emotion interaction ($F(7,140)=1927$, $p<.0001$) and this effect and the associated p-value was included in the p-curve analysis. Figure 1 (p. 78) of the Rossberg-Gempton and Poole paper indicates that this effect is primarily due to large increases in negative mood states ("sad", "angry", "disgusted") relative to baseline and large decreases in positive mood ("happy", "agreeable", "interested") relative to baselines that were reported by participants in the contractive pose condition. The changes reported by participants in the expansive pose condition were low across seven of the eight moods. In other words, a contractive pose had a strong negative effect on mood while the effect for the expansive pose was small.

Conclusion

The majority of the effects and associated p-values used to conduct the p-curve analyses reported by Cuddy et al. (2018) are based on experimental designs that lack either a control condition or baseline measurement of the dependent variable. These studies can speak to whether posture in general has an impact on the dependent variables, but they cannot speak to the value of an expansive posture relative to a normal posture. As such they should not have been included in a p-curve analysis purporting to examine the benefits of expansive poses. Indeed, the few studies that do contain a control condition or baseline measurements of the dependent variable suggest that the overall effect of posture is primarily due to a negative effect of contractive poses rather than the claimed positive effect of expansive poses.

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