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17th October 2022

PCI Registered Report: Stage 1 Resubmission, Round 3

Dear Recommender Chris Chambers and PCI Review Panel,

Please find submitted the revised Stage 1 manuscript (round 3) '*Does childhood adversity alter opioid drug reward? A conceptual replication in outpatients before surgery*'.

In line with Zoltan Dienes' helpful comments regarding the Bayesian analyses, we have now removed the Bayesian modelling from the planned analyses. Given that this cannot be used to address power, and that the results of these analyses will not influence the conclusions, we will instead consider these for exploratory analyses in the Stage 2 Manuscript.

We hope that the manuscript is now ready for In Principle Acceptance, and again would like to thank the Reviewers for taking the time to provide insightful comments.

Kind regards,

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Author's Reply:

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by Chris Chambers, 17 Oct 2022 08:56
Manuscript: **https://osf.io/xr2vb/?view_only=4238d2ee3d654c4f908a94efea82a027** version v3

Minor revision

 As promised, I returned the manuscript to Zoltan Dienes for a final evaluation. He offers some remaining suggestions for streamlining the analysis plan. The idea to include the Bayesian analyses at Stage 2 as exploratory analyses (and therefore remove them from the Stage 1 manuscript) strikes me a sensible compromise give their lack of diagnosticity. However, I will leave you to consider these points and respond/revise. Provided you are able to respond comprehensively, we should be able to award in-principle acceptance without further in-depth review.

> *Thank you both for the final points and consideration on the manuscript. We agree that to remove these analyses and consider them exploratory would be suitable, particularly given that they will not be used to influence conclusions. We hope we have now addressed Zoltan Dienes' remaining points below.*

Reviews

Reviewed by Zoltan Dienes, 17 Oct 2022 07:51

The authors have responded very thoroughly to my comments. I understand their attraction to Bayesian modelling - as a Bayesian myself - but I think the combination of frequentist and Bayesian approaches in the way suggested doesn't quite work. The Bayesian model is interpreted effectively as a significance test: Whether 0 is in or outside an (100-X)% interval is the same as being significant at the X% level (see https://psyarxiv.com/bua5n/ pp 6-8). Further, power analyses tell one if a study is underpowered or not; so that is already apparent from the frequentist analyses, and the Bayesian analysis does not add to that. Incidentally, just one point of phrasing: The authors refer to a "true non-significant" result. Significance or non-significance is a property of a particular test applied to a particular sample, not a property of the population. So what the authors mean is a "true H0".

Using the original study as a prior means the Bayesian posterior is a type of meta-analysis. That's good, but does not tell us whether this study is underpowered.

I would remove the Bayesian analyses from the pre-registration, as they do not actually influence conclusions; but the authors would of course be free to add them in an exploratory analysis section in the Stage 2, e.g. to get meta-analytic posterior estimates (though I wouldn't see if 0 is in or outside an HDPI, see previous ref).

Thank you for providing clarification and insight on the Bayesian modelling. We understand your points and thank you for also signposting to additional resources regarding Bayesian modelling. We agree with your points, and have now removed the Bayesian analyses from the pre-registered analyses (changes summarised below). We will consider these analyses for the exploratory section of the manuscript. Additionally, we will ensure use true H0 opposed to "true non-significant" for improved clarity in future.

Page 8: ~~Bayesian posterior probabilities were calculated for non-significant results, using the 'rstan' (31) and 'rethinking' packages (32). Quadratic approximation was used to calculate the posterior probabilities [outcome$_i$ ~ Normal(μ_i, σ)] for the centered linear relationships with CTQ score [$\mu_i = \alpha + \beta(CTQ_i - \bar{x})$]. Priors were constructed using the means, standard deviations and slopes from the previous study (12) and were tested using prior predictive simulations, with drug liking: α ~ Normal(30,15), σ ~ Uniform(0,20) and β ~ Normal(0,1); and feeling good (measured as euphoria in the previous study): α ~ Normal(20,10), σ ~ Uniform(0,10) and β ~ Normal(0,1). The posterior mean and 95% highest posterior density intervals (HPDI; the narrowest interval containing 95% of the probability mass) for betas were reported. Posterior predictive checks were also conducted to assess the reliability of the Bayesian models. The Bayesian estimates were interpreted as supporting a potential effect to be examined in a higher-powered study if the 95% HPDI for beta did not overlap with 0, and the most plausible beta given by the posterior mean.~~

Page 9: ~~(ii) calculating the posterior probabilities using a Bayesian framework;~~ (i̶ii) using the Holm-Bonferroni alpha correction on the confirmatory tests; (i̶iiv̶)