

Dear Dr. Chris Chambers,

We are pleased to submit a revision of our manuscript “Does alleviating poverty increase cognitive performance? Short and long term evidence from a randomized controlled trial” to PCI RR.

We would like to thank again for the constructive comments and helpful suggestions. Below you can find a point-by-point response to all comments in bold.

To support the review process, we have submitted two versions of the updated manuscript. One pdf with the final text, and one docx, where the changes are tracked.

We look forward to your comments.

Kind regards,

Barnabas Szaszi on behalf of the author team

### Reviewer reports

Reviewer #1:

Thank you very much for your response and explanations. I've read the paper and reviewed the supplementary files. I can state that my major concerns have been successfully addressed. The paper is now more clear and easier to follow and, importantly, its transparency has been increased. Great job! I'd like you to clarify one more thing – what will be the (ultimate) output of the multiverse analysis? I think it's important to have this included in Stage 1, so could you please add this information into the RR?

**Thank you for the question. We have updated the corresponding text in the manuscript as follows:**

**“The detailed results of the multiverse and the mediation analyses will be published in the Appendix and only a summary of the results will be reported in the main text. Regarding the multiverse analysis, we will provide a summary about which analytical choices and dependent variables lead to different or same inferences as the main analysis (better performance vs. inconclusive results vs. worse performance). Our aim will be to reveal the robustness and the sensitivity of the results to different analytical choices.”**

A minor note – I've noticed a few typos scattered throughout the text (e.g., space missing between words, “section:s”, etc.). Please take a look at that.

Thank you.

All the best,

Matus Adamkovic

**Thank you! We checked the manuscript for spelling, and made changes where required.**

## **Reviewer #2**

I have now conducted a review of this revised manuscript and thank the authors for their overall attentiveness to my comments. Whilst the manuscript has improved considerably, and the majority of my comments have been addressed, some are still outstanding and require attention. Of main concern is the number of planned analyses in the report, with the authors proposing a primary analysis, a multi-verse analysis, and a mediation analysis - will all of these analyses be reported in one manuscript, supplementary materials, and/or multiple manuscripts?

**See our response below.**

Are the authors aware that a Stage 1 manuscript cannot change in the revisions of a Stage 2 manuscript, meaning that word count could not be cut down post-hoc?

**Yes.**

Also, there is some inconsistency with regards to the described Robustness Regions, which needs to be addressed.

**See our response below.**

I now outline the concerns addressed, those outstanding, and some minor comments relating to proofreading.

Concerns addressed:

My first main concern related to the terminology of 'cognitive functioning/performance' used in the manuscript when the executive functions of inhibition, shifting, switching, and working memory have been measured, and the aggregated index of these measures into a primary outcome of cognitive functioning. The reviewers have now addressed this concern by revising the terminology and including an exploratory multi-verse analysis which can tease apart performance differences in the different tasks (as well as still conducting the primary analysis on cognitive functioning).

A second concern was regarding the potential for procedural flexibility with a stopwatch being used rather than computerised tasks of cognitive performance. The authors have confirmed that this was due to limits on technological resources in the testing environment and have included this clarification in the revised manuscript. Indeed, that this study was conducted in the field is a strength to the methodological design.

A third concern was that additional details were required to ensure that the methodology is replicable, with synergy between the open materials and the reported measures. The authors have now attentively revised the manuscript so that this is clear. The materials and analysis scripts are uploaded to the OSF.

Concerns raised in revisions and/or outstanding:

1. My main concern regards the number of planned analyses in this Stage 1 manuscript - a primary analysis, multi-verse analysis, and mediation analysis are proposed. Will all of

these analyses be reported in one manuscript, supplementary materials, and/or multiple manuscripts?

**Yes, the results of all these analyses will be reported in the present paper. We have improved now our description on how we will report the results:**

**“In the primary analyses, we will test the two confirmatory hypotheses outlined below. The conclusions of the paper will be based on the outcome of these primary analyses and its results will be reported in the main text of the manuscript. “ ...**

**“The secondary analysis will consist of two exploratory parts. First, we will assess the robustness of the results of the primary analysis using a multiverse approach (see below for details). Second, we will conduct multiple mediation analyses to understand the driving mechanism behind the observed effects in the primary analysis.**

**The detailed results of the multiverse and the mediation analyses will be published in the Appendix and only a summary of the results will be reported in the main text. Regarding the multiverse analysis, we will provide a summary about which analytical choices and dependent variables lead to different or same inferences as the main analysis (better performance vs. inconclusive results vs. worse performance). Our aim will be to reveal the robustness and the sensitivity of the results to different analytical choices.”**

Relatedly, for the multi-verse analysis there are a total of 17 dependent variables (Arrow switching – accuracy; Arrow switching- RT; Arrow switching- Inverse efficiency index; Arrow inhibition – accuracy; Arrow inhibition - RT; Arrow inhibition - Inverse efficiency index; Arrow attention – Accuracy; Arrow attention – RT; Arrow attention - Inverse efficiency index; Arrow tasks response time index; Arrow tasks accuracy index; Forward Digits – accuracy; Backward digits - accuracy; Digit span index; Maze – accuracy; Maze - total completion time; Executive function index). Here you plan to analyse multiple indices of the same task (e.g., accuracy and reaction time): could you not focus on one index for each, thus reducing the number of dependent variables being entered into this analysis? I believe this would make your analyses more stringent, allowing you to better assess support for your hypotheses.

**Yes, among others, in the multiverse section, we plan to analyze multiple indices of the same task: accuracy, reaction time, and inverse efficiency index. The point of running multiverse analysis (with several different indices in different settings) is to reveal the robustness (and the sensitivity) of the results to these analytical choices. We would prefer to keep all the analyses in the multiverse section because they enable the readers to gain additional knowledge on how the treatment affects the different indices and about the limitations of the study.**

2. Referring back to a comment from my initial review, from the Introduction and Abstract it is not clear that this is a secondary data analysis/re-analysis of Blattman et al. (2017). This should be clarified from the outset and would only require a minor amendment (for example, the sentence “To do so, we leverage a cash transfer-based poverty alleviating program” could be extended to state “by analysing pre-existing data from Blattman et al.”).

**We have now rewritten the corresponding sentence:**

**“To do so, we analyze pre-existing data from a cash transfer-based poverty alleviation program (Blattman et al. 2017).”**

3. Please check consistency between the reference to the mini-meta analysis used to inform power calculations on Page 12 and the later description on Page 16. Page 12 states that you will “report Robustness Regions for each Bayes factor with two extreme priors ( $b = 0.09$ ,  $b = 1.57$ ), with the half of smallest and twice of the largest effect sizes from the mini-meta analysis described below”, however Page 16 then states that you will “repeat all the analysis with three different priors: the effect size used in the primary analysis ( $b=0.34$ ), as well as the smallest ( $b=0.18$ ) and the largest ( $b=0.79$ ) effect sizes from the mini meta-analysis described above”. Note that the first mention states, “half of the smallest” and “twice of the largest” (which I query separately below), but then later you state “smallest” and “largest” whilst referring to different values.

**Thank you for finding this. We have now corrected the sentence on Page 16 as follows:**

**“We will repeat all the analysis with three different priors: the effect size used in the primary analysis ( $b=0.34$ ), as well as the half of the smallest effect size ( $b=0.09$ ) and twice of the largest ( $b=1.57$ ) effect size from the mini meta-analysis described above.”**

There are also a few grammatical and issues of sentence structure, as follows:

1. Should ‘registered report’ not be capitalised (Registered Report)?

**We have changed every occurrence to Registered Report.**

2. Should there be hyphens in “short and long term” throughout (short- and long-term)?

**We have changed every occurrence to short- and long-term.**

3. I don’t think the word ‘approximately’ should be abbreviated in the Abstract.

**We write now ‘approximately’ in the Abstract instead of ‘approx.’.**

4. Abstract: “we will use an experimental setting to, and test...”. What do you mean by this? The data are already collected so this study represents a re-analysis of pre-existing data (see my related comment above). Do you mean that you will reanalyse an experimental manipulation (cash transfer) implemented by Blattman et al. 2017?

**What we mean here is that the main addition of our work to literature is that we test our hypothesis in a randomized experimental setting in contrast to previous work which was built on correlational data. To better reflect this, we have now changed to the text saying that “Extending prior literature, we will test in a randomized controlled trial both the short-term and the long-term impact of the treatment on cognitive performance and also explore the role of potential mechanisms driving the effect.”**

5. Page 3, “as compared with”, please remove “as” to aid readability.

**Corrected.**

6. Page 3, please correct “Whicherts” to “Wicherts”.

**Corrected.**

7. Page 5, “by doing these” – do you mean “by doing this”?

**We have deleted now the corresponding part as it was confusing.**

8. Page 5, “and the focused their paper on how therapy and unconditional cash transfers should affect criminal and violent behavior.” – please revise this sentence paying attention to “and the focused their”.

**We have now deleted the word ‘the’ from the sentence as it was unnecessary and confusing.**

9. Page 8, “(as well as 28 percent into therapy only (n = 277), and 25 percent into the joint treatment arm (n = 249)).” Add to this “not analysed here” to clarify that these data are not analysed in the present study.

**We have now added the following: “Note that the therapy only and joint treatment arms are not analyzed in the present study.”**

10. Page 8, “As reported in detail in Blattman et al. 11, the treatment is largely balanced along the covariates”. Can you add “reported below” to this sentence so that the reader knows that these covariates are described later? Without this I am left wondering what the covariates are.

**We have added “reported below” now.**

11. Is there a reference for the ‘arrows tasks’? Is this an established task?

**Yes. We have now added the following citation to the manuscript:**

**Korkman, M., Kirk, U., & Kemp, S. (2007). NEPSY II: clinical and interpretive manual. (2nd ed ed.) Harcourt Assessment, PsychCorp.**

12. Page 11, “All task materials are available in the Appendix” only needs to be stated once (which it is on Page 10). Also, rather than referring to the Appendix, is it not best to refer to the Open Science Framework project page with the direct OSF link?

**We have now changed the text accordingly.**

12. Page 12, “with the half of smallest and twice of the largest effect sizes from the mini-meta analysis described below”. The terms “half of the smallest” is very difficult to follow – could this be clarified? Please refer back to my major point 3 when revising this.

**To increase clarity, we write now that the “half of the smallest effect size”.**

13. Page 12, “an intention-to-treat Bayesian regression analysis in the short term and in the long term separately” – can you clarify “short term” and “long term” here by including the term ‘phase’ (i.e., “in the short term and in the long term phase separately”).

**We have changed the text accordingly.**

14. Page 13, Could you include a rationale for the control characteristics included in the model – are these all found to influence cognitive performance?

**We have now added the rationale to the text. Yes, we believe that these characteristics can potentially influence cognitive performance.**

15. Page 15, “The results showed the rates of misleading evidence were < 1% both of the hypotheses as well.” This sentence doesn’t read quite right – “for both of the hypotheses”?

Dr Charlotte Pennington

**We have now changed the text accordingly. And thank you again for the thorough review of our manuscript!**