**Peer Review and Communication History**

**MS Title:** Strategic Thinking: A Random Walk into the Rabbit Hole

**Author Names:** David J. Grüning,\* Joachim I. Krueger,

**Submitted:** Jan 30, 2020

**Editor First Decision: Revise & Resubmit**

May 13, 2020

Dear David J. Grüning,

Thank you for submitting your paper “Strategic Thinking: A Random Walk into the Rabbit Hole” to Collabra: Psychology. I have now received two out of three requested reviews. I am sorry for delaying my response; I wanted to give the third reviewer a chance to come back with a review as well. This has not happened, but given the consistency between the two current reviews and my own reading of the paper, I am comfortable with making the decision without further delay and without a third opinion.

The reviewers had mostly positive reactions to your manuscript. I agree that your manuscript has important strengths and also that there are some minor issues that need to be addressed. I therefore strongly encourage you to submit a revised version for further consideration at Collabra: Psychology. Please note that in-principle acceptance (IPA) and progression to Stage 2 is not guaranteed and any revision may be sent back to the referees for further review. You should, therefore, include a document specifying the changers you have implemented or providing a suitable rebuttal.

The reviewers did an outstanding job in their reviews. I will highlight issues I think are particularly salient here.

Major revisions: None

Minor revisions:

1. Both reviewers made valid comments about missing refs – see R1’s comment 2, and R2’s comment: “The current manuscript should include a review of similar experiments, and attempt to integrate their results, to better explain what the new data adds to the current knowledge.”
2. You might want to consider following R2s helpful advice about what part of the current Introduction can be slightly shortened.
3. As requested by R1, comment 5, please clarify what precisely you mean when stating that: “actively guessing a number is a strategy that weakly dominates randomization”
4. As requested by R2, please clarify the argument that: “The player who is the first to redefine the game can take the advantage”.
5. I tend to agree with R1’s suggestion about the numbering of experiments (Comment 1), and with R2s suggestion about changing the way you present the Figures, and commend you to consider following these suggestions.
6. Please fix all typo’s – R1 comments 7 & 8, and respond to R2’s comment about a missing “I think” in Figure 1.
7. I leave it to you to decide whether or not to follow R1’s additional recommendations provided in comments 3, 4, 6, and 10.

In summary, I think this is a promising manuscript and hope you will revise it for further consideration at Collabra: Psychology. I look forward to receiving your revision.

Please ensure that your revised files adhere to our author guidelines, and that the files are fully copyedited/proofed prior to upload. Please also ensure that all copyright permissions have been obtained. This is the last opportunity for major editing, therefore please fully check your file prior to resubmission.

If you have any questions or difficulties during this process, please contact us at the editorial office editorialoffice@collabra.org.

We hope you can submit your revision within the next six weeks. If you cannot make this deadline, please let us know as early as possible.

Sincerely,

Simone Moran

# Reviewer 1

##### Open response questions

### **Please write your review here. The author(s) will see this review. Your identity will not be revealed to the authors unless you also include your name (i.e., sign your review) in this box. It is up to you whether to reveal your identity or not, either is fine.**

Review of Strategic Thinking: A Random Walk into the Rabbit Hole

The paper is a pleasure to read. With a lengthy but well-written introduction it lays out the concept of k-level reasoning and its pitfalls in a clear and engaging manner that can speak to a wide audience.

The experiments presented are beautifully simple, the results clear, and the analyses appropriate. The discussion too is comprehensive and well written and the conclusion offers a topic for debate (on whether and how to study cheating in competition).

As such, I believe that the paper merits publication.

Still, I do have a list of comments and suggestions, which would require a minor revision:

1. It is not clear why the first two experiments each received a number (1, 2) and the two later experiments received a single number (3a, 3b). If there is a reason, it should be specified (same participants? Same sessions?); if there is none, I recommend calling them experiments 3 and 4. The correspondence to 1 and 2 will be less confusing.
2. When referring to the finding of participants produce non-equal frequency distributions, the paper by Rubinstein, Tversky and Heller (1997) merits citation. To the best of my knowledge, they were the first to initiate this line of research.
3. I am not sure that ‘homeliness contest’ is a suitable expression; I recommend looking for another, perhaps by consulting colleagues.
4. When reading the results of Experiment 1 (and 3a) I was wondering whether it wouldn’t have been clearer if the interaction was presented before the main effects.
5. On page 21 it is said “actively guessing a number is a strategy that weakly dominates randomization”. Is this generally true? Isn’t it true only when confronting an animate being who is expected to be biased?
6. Still on page 21, the authors wonder why participants were not overpaying compared to findings in other situations. One ought to wonder that participants were at all sensitive to the the manipulation given that the task was only make-belief.
7. There is a typo in the section Cultural differences… it says “t\_r (only the guesser thinks)” but should be r\_t.
8. The two references to Hofstede should be 1984 not 1884.
9. The finding that the t\_r condition is considered worse than r\_r is very interesting given that they do not differ in the winning chances of the guesser. It may be worth elaborating on the possible reason, which could be frustration accompanying the former.
10. On page 22 “The guessing game in the present experiments is a sequential battle of wits”. I would say ‘mimics’ a sequential battle. After all, there is nothing truly sequential in the experience of the participants.

One issue that I would like to mention is the disappointment I had when getting to the end of the paper. I did expect to see experiments with true interaction following the “imagine” ones. This is not to say that the paper cannot be published without them but I hope to see such studies in the future.

The reference to the paper I referred to: Rubinstein, A., Tversky, A., & Heller, D. (1997). Naive strategies in competitive games. In Understanding strategic interaction (pp. 394-402). Springer, Berlin, Heidelberg.

##### Rating scale questions

|  | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| --- | --- | --- | --- | --- | --- |
| The study/studies in this manuscript have strong construct validity (good measures and/or manipulations of the constructs the authors wish to study). (Choose “Neutral” if this is not an empirical manuscript) |  |  |  | ✔ |  |
| The study/studies in this manuscript have strong statistical validity (appropriate statistical tests, assumptions are clear and reasonable, no statistical errors, appropriate statistical inferences, etc.). (Choose “Neutral” if this is not an empirical manuscript) |  |  |  |  | ✔ |
| The study/studies in this manuscript have strong internal validity (any causal claims or implications are well-justified, alternative explanations are thoroughly considered, etc.). (Choose “Neutral” if this is not an empirical manuscript, or no causal claims are made or even vaguely implied.) |  |  |  |  | ✔ |
| The study/studies in this manuscript have strong external validity (authors appropriately constrain their conclusions based on the limits of the generalizability of their findings to other contexts (including from lab to real world), other populations, other stimuli or measures, etc.) |  |  |  | ✔ |  |

# Reviewer 2

##### Open response questions

### **Please write your review here. The author(s) will see this review. Your identity will not be revealed to the authors unless you also include your name (i.e., sign your review) in this box. It is up to you whether to reveal your identity or not, either is fine.**

I find the paper overall well written, and the experiments elegant and adequately described and analyzed. Although the manuscript is by no means long, I still feel that certain parts—mostly the introduction, but also the general discussion and conclusion—can be shortened. This is most obvious with respect to the lengthy description and quote from the Princess Bride in the introduction (448 words), which refer to a point that has already been addressed with respect to warfare and penalty shootouts in football. Maybe place this text in the appendix for the interested reader. What’s missing, in my opinion, are references to similar experiments that have been conducted in the past. I’m able to recall this manuscript – <https://kops.uni-konstanz.de/bitstream/handle/123456789/18877/TWI-RPS-074-Heinrich-Wolff-2012-03.pdf?sequence=1&isAllowed=y> – which, if I’m not mistaken, addresses a very point, or at least included a very similar experiment. The current manuscript should include a review of similar experiments, and attempt to integrate their results, to better explain what the new data adds to the current knowledge. In the conclusion, I did not understand the sentence “The player who is the first to redefine the game can take the advantage”. If it is possible to “redefine” the game, than the original game was not correctly construed/understood in the first place. Figure 1: shouldn’t there be another “I think? in the beginning (part of the k=2 level)? Figures in general: I would place similar figures alongside each other as separate panels in the same figure. If would be easier to appreciate the differences and similarities between the results presented in Figures 3, 4, 7, and 8, if they were displayed together (same goes for Figures 2 and 6, and for Figures 5 and 9). This seems relevant: Bar-Eli, M. and Azar, O.H. 2009. Penalty-kicks in soccer: An empirical analysis of shooting strategies and goalkeepers’ preferences. Soccer and Society, 10: 183–191.

##### Rating scale questions

|  | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| --- | --- | --- | --- | --- | --- |
| The study/studies in this manuscript have strong construct validity (good measures and/or manipulations of the constructs the authors wish to study). (Choose “Neutral” if this is not an empirical manuscript) |  |  |  | ✔ |  |
| The study/studies in this manuscript have strong statistical validity (appropriate statistical tests, assumptions are clear and reasonable, no statistical errors, appropriate statistical inferences, etc.). (Choose “Neutral” if this is not an empirical manuscript) |  |  |  | ✔ |  |
| The study/studies in this manuscript have strong internal validity (any causal claims or implications are well-justified, alternative explanations are thoroughly considered, etc.). (Choose “Neutral” if this is not an empirical manuscript, or no causal claims are made or even vaguely implied.) |  |  |  | ✔ |  |
| The study/studies in this manuscript have strong external validity (authors appropriately constrain their conclusions based on the limits of the generalizability of their findings to other contexts (including from lab to real world), other populations, other stimuli or measures, etc.) |  |  | ✔ |  |  |

**Author Response**

May 27, 2021

Dear Dr. Moran,

Thank you for your constructive feedback on our submission and the invitation to prepare a revised manuscript.

In the following, we respond to the comments we received and note where to find the implemented changes in the revised manuscript.

1. *Both reviewers made valid comments about missing refs – see R1’s comment 2, and R2’s comment: “The current manuscript should include a review of similar experiments, and attempt to integrate their results, to better explain what the new data adds to the current knowledge.”*

We thank both reviewers for their thorough and on-point comments on this. We have included a full paragraph right before the subchapter “The present research” (p. 8; beginning with: “To date, there has been little research [...]”) addressing their comments & suggestions. We included both literature pieces and their underlying line of research suggested by both reviewers. We, as requested by reviewer 2, outlined what has already been done and what insights our set of studies adds to this.

We also agree with reviewer 1’s comment that we should encourage future studies on this topic with real, practical, interaction between a chooser and a guesser. We, hence, added a paragraph at the end of “Cultural differences and future research” to address this possibility for future research (p. 22) as follows: “Lastly, we note the need for future research to replicate the present findings in the context of real interaction between a chooser and a guesser playing for money.”).

1. *You might want to consider following R2s helpful advice about what part of the current Introduction can be slightly shortened.*

We found this advice to be very helpful and revised the manuscript accordingly. We shortened the Princess Bride paragraph from 448 words to 133 words; p. 3, beginning with: “A famous scene from *The Princess Bride* [...]”) and followed reviewer 2’s suggestion to move Vizzini’s monologue from *The Princess Bride* to the Appendix (see footnote 2 on p. 3; and Appendix A on p. 31). Additionally, we slightly adapted the whole introduction at several paragraphs to make it a more compact read.

1. *As requested by R1, comment 5, please clarify what precisely you mean when stating that: “actively guessing a number is a strategy that weakly dominates randomization”*

We thank you and reviewer 1 for calling our attention to this statement. We revised the passage (p. 19) and hope that this makes our statement clearer. What we mean to say is that when “in the shoes of the guesser against a human chooser, actively guessing a number is a strategy that weakly dominates randomization. That is, if there is any chance that the chooser thinks of a number, the guesser is better off also thinking, but the guesser cannot be worse off than when randomizing.” We hope that this reformulation resolves the confusion.

1. *As requested by R2, please clarify the argument that: “The player who is the first to redefine the game can take the advantage”.*

We agree with reviewer 2 that *redefining* the game is too strong of an expression for what we want to argue. We reformulated the respective paragraph (p. 24, beginning with: “What then is the hallmark of strategic reasoning? [...]”) and hope that our point is clearer now. We merely want to note that common game theoretical considerations do too little to take into account “higher-order kinds of strategizing such as cunning” or unfair play (p. 24). We find this aspect important to emphasize because “psychological theories have no such constraints” (p. 24). We want to point this out because in reality such loopholes in games are common and, more importantly, commonly used (see examples that we list, like, car dealers, business negotiators, or athletes, also p. 25).

1. *I tend to agree with R1’s suggestion about the numbering of experiments (Comment 1), and with R2s suggestion about changing the way you present the Figures, and commend you to consider following these suggestions.*

We agree with reviewer 1’s suggestion of renumbering, too. Hence, we have done 2 things:

1. Renumbered the experiments 3a & 3b to 3 & 4
2. Explicitly stated that experiments 3 & 4 (German sample) were conducted in one sample (p. 15), as follows: “We sought to replicate the findings of experiments 1 (with experiment 3) and 2 (experiment 4) in one preregistered study within a German sample (aspredicted.org/blind.php?x=hn9gb3).”.

Further, we welcomed reviewer 2’s suggestion to combine connected figures. We combined figures 3 & 4 (p. 14), and figures 7 & 8 (p. 18). Additionally, we improved the distinction between the displayed histograms visually to make it even easier for readers to grasp the

difference between simple vs. meta thinking. Reviewer 2 also suggested combining Figures 2 & 6, and 5 & 9. However, we fear that putting these Figures together might be confusing to the reader. The structure of the paper presents the studies with American participants followed by the German replication. If we now combined Figures 2 & 6, we might run the risk of confusing readers with Figure 6 being presented ahead of its narrative context (= experiment 3), that is, before readers are introduced to a replication of the findings for American participants with German participants. The same argument could be made for combining Figures 5 & 9. We hope you will agree that keeping these figures separate is an acceptable solution for the final manuscript.

1. *Please fix all typo’s – R1 comments 7 & 8, and respond to R2’s comment about a missing “I think” in Figure 1.*

We thank the reviewers for their specific comments on typos and the missing part in Figure 1. We have adapted everything as suggested by both reviewers:

* + R1’s 7. point: Corrected on page 20.
	+ R1’s 8. point: Corrected on page 20 and, now, in alignment with the respective reference (p. 28).
	+ R2’s comment on a missing “I think” in Figure 1: Corrected in Figure 1 on page 4.
1. *I leave it to you to decide whether or not to follow R1’s additional recommendations provided in comments 3, 4, 6, and 10.*

Again, we are very thankful for reviewer 1’s insightful comments.

Corresponding to R1’s 3. point: We reformulated respective passages to exclude the term “homeliness contest” from the manuscript.

Regarding the 4. point: We thought about this suggestion and discussed it several times. We think that, while the interaction effect surely is the main focus in the respective analysis, reporting this effect before the main effects might confuse readers. We, hence, would like to leave the presentation order of results as it is, also to stress the interaction effect’s importance by presenting it at last.

Regarding the 6. point: We found R1’s idea of why participants did not overpay very interesting and, too, discussed this several times. We think that if participants were insensitive to the manipulation in general (to explain underpayment in all conditions) they would also

have been insensitive to the different couplings of chooser and guesser (not paying more for one or the other). As this is not the case, mere insensitivity seems not to be sufficient to explain the underpayment finding. We tried, in the manuscript, to make it very clear that this underpayment finding is still not settled to mark it as an important topic to look into in future research (pages 19-20) as follows: “Note, however, that even in this condition participants were not overpaying relative to the expected value of $10 or €10. In contrast, when gambling (Garrett & Sobel, 2004; Griffiths & Wood, 2001) or buying insurance (Pauly, 1990), people routinely pay in excess of the expected value.”

Regarding the 10. point: We agree with R1 and reformulated this to (p. 21): “Our guessing game stylizes the dynamics of a sequential battle of wits.“ We hope that this solves the correctly addressed problem of the prior formulation.

In response to R1’s 9. point: We found reviewer 1’s interpretation of why there is a difference in WTP between t\_r and r\_r extremely interesting and, therefore, included it in the revised manuscript (pages 20 to 21), beginning with: “As noted by a reviewer, the descriptively lower WTP [...]”).

Additionally, we added R2’s suggested and very fitting reference from Bar-Eli & Azar (2009) to our soccer example of chooser and guesser (see p. 2).

We hope to, with our revision, have addressed all the comments and the suggested minor revisions. Thank you, once again, for helping us to improve this manuscript through your and the reviewers’ thoughtful comments.

Sincerely,

David J. Grüning

**Editor Final Decision**

June 16, 2021

Dear David J. Grüning,

I have now had a chance to read over your manuscript “Strategic Thinking: A Random Walk into the Rabbit Hole”, along with the letter describing the changes you made. Thank you for your responsiveness to the concerns that the reviewers and I raised. I am happy to say that your paper is now officially accepted for publication in Collabra: Psychology. Congratulations on this excellent work, I think it will make an important contribution to the literature and I look forward to seeing it published! I hope your experiences with Collabra: Psychology have been positive and that you will continue to consider it as an outlet for your work.

As there are no further reviewer revisions to make, you do not have to complete any tasks at this point. Our managing editor will contact you in case there are any pre-prodution file related questions. You will have an opportunity to check the page proofs before we publish your article. Thank you again for publishing in Collabra: Psychology.

Sincerely, Simone Moran