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Review of the corrected doctoral thesis

"Magnitude and Context Effects in Preference Reversals"

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Synopsis

Preference reversals in judgment and decision making are a puzzling phenomenon and thus an interesting research topic, which has been extensively studied. The impact of external factors on this phenomenon, e.g. the impact of response context and memory processes have also been widely studied. Moreover, the research on the use of different decision rules as well as research on memory – the processes that might shape preference reversals – have very rich history and background, in the psychology of judgment and decision making and in cognitive psychology. The PhD thesis under review is an attempt to study these processes in order to provide the evidence for the impact of task context and memory processes on preference reversals. To study this, the PhD candidate used the popular behavioural approach of simple lotteries with varying outcomes (gains vs. losses) and varying probabilities of these outcomes. In four empirical studies with rather large (albeit sometimes heterogenous) samples and using this behavioural method, sometimes with modifications, the candidate attempted to present the evidence for task context and memory effects. In this corrected version of the thesis, the candidate also added an important meta-analytic study of the effects of payoff magnitude on preference reversals. While the former version of the thesis had many weaknesses, particularly in presentation of the results, this version is much improved and satisfies the requirements of a defendable PhD thesis. The PhD candidate put a lot of good theoretical, analytical and editorial work to improve his thesis, with a positive effect which I appreciate. There are, of course, some issues to discuss – I outline them below.

Formal characteristics of the thesis

The reviewed corrected thesis is written in English on 252 pages, including the title page and all the Appendices) with Abstracts in English and Polish, Lists of Tables, Figures and Abbreviations, Declarations, Acknowledgments, 12 main Chapters, Bibliography, and Appendices.

The theoretical part of the thesis is constituted by Chapters 1-2: 1. Introduction (24 pages of text) and 2. Hypotheses (a little over 19 pages of text, tables and figures). These chapters contain sections on particular topics relevant to the empirical studies: 1.1 Approaches to decision-making heuristics, 1.2 Episodic memory, 1.3 Preference reversal, 1.4 Theoretical perspectives on PR, 1.5 Outline of substantive sections and 2.1 Risk preferences and magnitude effects , 2.2 Heuristic-based binary choice, 2.3 EVDs in classic PR, 2.4 EVDs in attraction effect PR, 2.5 Episodic memory in PR.

The empirical part starts with Chapter 3. Overview of the experiments and continues with Chapter 4. Statistical methods and Chapters 5-9: 5. Experiment 1: Magnitude effects in PR, 6. Experiment 2: Binary choices in PR, 7. Experiment 3: Episodic memory in PR, 8. Experiment 4: Episodic memory in attraction effect PR and Chapter 9. Binary choice and PR:

three meta-analyses. It concludes with Chapter 10. General discussion and Chapter 11. Summary, limitations and future directions and Chapter 12. Conclusions.

The thesis is written in satisfactory English, yet with some stylistic language errors scattered throughout the text. The thesis is well edited and contains very few editing errors. The thesis fulfils the formal requirements of a doctoral thesis.

Evaluation of the content of the thesis

Theoretical part

The theoretical part consists of Chapters 1-3: 1. Introduction and 2. Hypotheses. These chapters contain important sections on particular topics relevant to the empirical studies: 1.1 Approaches to decision-making heuristics, 1.2 Episodic memory, 1.3 Preference reversal, 1.4 Theoretical perspectives on PR, 1.5 Outline of substantive sections and 2.1 Risk preferences and magnitude effects , 2.2 Heuristic-based binary choice, 2.3 EVDs in classic PR, 2.4 EVDs in attraction effect PR, 2.5 Episodic memory in PR.

In comparison to the previous version, this theoretical part is much improved, thanks to the inclusion of the important sections on heuristics and episodic memory, which I suggested in the former review. Overall, these two new sections, albeit a little short (slightly over 5 pages together) introduce the topics of heuristics and episodic memory in a satisfactory manner. Another noticeable change is moving the parts on preference reversals from Chapter 2. in the previous version to sections of Chapter 1. in the current version. This change did not do much in terms of content – these parts were already well written in the previous version and they remain good in this version. However, these changes helped to remove some inconsistencies that I mentioned in the previous review – for example, unnecessary mixing of theoretical introduction with a discussion (which belongs in a discussion section).

The chapter on hypotheses (Chapter 2. in the current version) has also been improved, it is now much clearer and readable and sensibly introduces the hypotheses. As in Chapter 1., the Author reviewed substantial amounts of classic and recent literature to support his hypotheses. This chapter now introduces only 9 hypotheses instead of 15, which is an improvement.

In both Chapter 1 and 2, I particularly appreciate the theoretical sophistication with which the Author approaches the topic of preference reversals, introducing the recent relevant literature on this topic. It is obvious from reading these parts that the Author is becoming an expert on this topic. Overall, the theoretical part is now much more complete and forms a solid theoretical foundation for the empirical studies.

The empirical part

As already mentioned, the empirical part of the thesis spans Chapters 3-12, where the Chapters 3 and 4 introduce the empirical studies, Chapters 5-8 describe the empirical studies and Chapter 9 describes a new metanalytic study and Chapters 10-12 summarize and discuss this research.

Chapter 3. Overview of the experiments is a one-page overview of the four experimental studies, improved in comparison to the previous version, because it does not contain any unnecessary and premature summary of the results (as was the case previously).

Chapter 4. Statistical methods is a short (2 pages) new chapter, in comparison to the previous version, which explicitly introduces the statistical methods with which the data from the empirical studies were analysed. It is a sensible and much needed chapter, because it helps the reader to follow the later results sections of each empirical study.

Chapter 5. Experiment 1: Magnitude effects in PR

In the current version, this chapter actually describes two empirical studies: a pilot study, and the main study that was already described in the previous version of the thesis, which aimed to test the effects of magnitude of loss ratio on preference reversals.

The pilot study involved 48 participants and a small number (3) of lotteries as the choice tasks, whereas the main experiment involved 137 participants and a larger number (27) of lotteries with varying loss ratios, grouped into low, middle and high loss ratios. The main study employed a between-subjects design, with separate groups of participants performing the lotteries with varying degrees of loss ratio. The analyses mainly involve the comparison of the low vs. high loss ratio groups, with additional analyses involving loss/gain ratios as a continuous predictor in nonlinear regression.

The presentation of results is now much clearer. First of all, the Author renamed the lotteries in the figures as low, middle and high ratio lotteries – which greatly improved the readability of the figures by reducing unnecessary noise. In general, the plots and tables are readable and make sense now. The results are also described better, with summarizing sentences clearly pointing out what the main results are, so it is easy to get a picture of the whole study. Therefore, now it is possible to appreciate the discussion of the results as well. In fact, I particularly like the discussion section of this study, the sophistication with which the author refers his findings to the available literature is a real strength of this thesis.

There is one thing that puzzled me about the discussion section of Experiment 1 - I do not understand why the author spoils this good discussion with the last sentence on the "A/A genotype" which is completely unnecessary there and uses the phrase 'A/A genotype' in a wrong way. What the Author means is an A/A allele of a particular gene (*rs806379*), as the authors of the cited study (Zeng et al., 2021) explain. So, the 'A/A genotype' used in this

particular context makes perfect sense, but using the phrase 'A/A genotype' out of that context is misleading. If the Author wants to use arguments based on genetic studies, it is worth to introduce this within some context. Otherwise, it is an unnecessary distraction that does not help in the discussion. This is a minor issue, but since it is at the very end of the discussion, it stands out and begs for a comment.

Chapter 6. Experiment 2: Binary choices in PR describes an experiment aimed at testing whether choice preferences are predicted by different decision heuristics and by prospect theory.

In comparison to the previous version, here, the improvement is also visible, because the research topic of this experiment has been properly introduced in the theoretical part of the thesis, as suggested. The experiment is also described better, with explicit explanations in the main text and much reduced references to the Appendices. Also, references to COVID-19 pandemic help to understand the inconsistencies of the experimental procedure and the sample.

The presentation of results is also much improved – particularly, the text is shortened and more explicit, with fewer referenced to the Appendices. However, there are still some issues here. The Author used one large figure (Figure 9) and one large table (Table 8) to summarize the results, and here the weaknesses of the previous version still partly persist. Figure 9 refers to Conjectures and Propositions described somewhere else. This should not be the case, because figures must be self-explanatory – the reader should easily grasp what the figure shows without looking anywhere else. This is the reason why figures are used, in general. I would like to see this figure remade in the presentation at the defence and I would like the Author to concisely explain this figure during the presentation.

There is also the case of Table 8. This table spans four pages, three of which are in Chapter 6, with one page in Chapter 7. Is this really necessary? What is the purpose of continuing a table into the next chapter, and thus separating parts of the table with several pages of text? Tables are usually more detailed than figures, they do not need to be so self-explanatory, but they also have a purpose of helping the reader grasp the main message. Table 8, apart from being too long, refers to the Conjectures and Propositions, and thus it does not serve this purpose well.

The discussion of Experiment 2 is also improved, because the discussion section for this experiment appears for the first time (it was not present in the previous version). However, it is still quite difficult to understand what the main result of the study is, because the Author does not summarize the results in the discussion section, he heads right away to discussing issues related to the methodology of the study. It is really important in science to properly communicate one's findings, therefore such interim summaries are necessary, because they help both the reader and the author to understand what the results are.

Chapter 7. Experiment 3: Episodic memory in PR describes the experiment aimed at testing 1) the impact of differences in bets' Expected Values and 2) the impact of memory processes on preference reversals.

This experiment was well described already in the previous version of the thesis, with the exception that it referred to concepts not introduced in the theoretical part. Now, this issue has been addressed by the inclusion of the sections on episodic memory in Chapter 1.

The presentation of results has also improved, particularly because the Author used corrected figures in the new version – they are in color now, with improved labels on the X axes.

The discussion section for this Experiment is quite good, much better than for the Experiment 2 – the Author summarizes the results first, and only then he discusses them referring to the literature – this is done in quite a sophisticated manner. I like this contribution to decision psychology, its strength lies in linking decision psychology with cognitive psychology, and the Author does a good job of here.

Chapter 8. Experiment 4: Episodic memory in attraction effect PR describes an experiment investigating the impact of EV and memory processes on preference reversals.

This experiment was described well already in the previous version of the thesis, with the exception that it referred to a figure in the Appendix. This issue has been addressed as suggested, so now it is event easier to follow the logic and the procedural details of the experiment. In this version, the results are presented well, too, with intelligible figures and tables. As for interpreting the results, I really like the discussion section of this experiment, how the Author thoughtfully refers to the current theories introduced in the theoretical part, particularly to the fuzzy-trace theory.

Chapter 9. three meta-analyses describes a meta-analytic study on the impact of payoff magnitude on preference reversals. It is a new chapter, not present in the previous version, thus it is one of the important improvements of the thesis. It is an interesting addition that brings new evidence on the PR phenomenon, and it also raises a puzzling question, in the context of the whole thesis.

The meta-analysis is very detailed, with properly used statistical methods. It is properly described, with references to the methodological works detailing how meta-analyses should be conducted – so, it is easy to understand the rationale and particular methodological choices made by the Author when conducting this analysis. As such, it is really a very good addition to the thesis and a valuable contribution to the psychology of decision-making.

And here comes the puzzling question. The conclusion of this meta-analysis, which the Author explicitly acknowledges in the discussion section of this study, is that there is no effect of low vs. high loss/gain ration on preference reversals, and this is in contrast to the results

of the empirical studies reported earlier in the thesis. The Author discusses this issue in further paragraphs of the discussion section, providing three possible reasons for this discrepancy – and this is a good, sophisticated discussion.
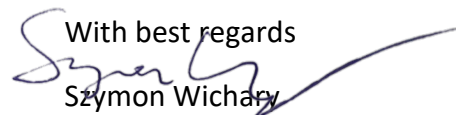
Chapters 10. General discussion, 11. Summary, limitations and future directions and 12. Conclusions form the discussion part for the whole thesis. They are generally greatly improved in comparison to the previous version, because the Author explicitly summarizes the results before referring them to the literature, and generally stays focused on the subject. So, they are generally quite good, with one exception – the omission of this puzzling question that I mentioned above – the discrepancy between the results of the meta-analysis and the empirical studies.

Hence my questions to the Author: How do you interpret the discrepancy between the results of the empirical studies and the meta-analysis? This issue is not properly discussed in the General discussion, and it is a major issue to discuss – please refer to it during the defence and discuss it thoroughly.

Conclusion

Given the above comments, and the improvements that the Author has made from the previous version of the thesis, my conclusion is positive. This thesis is now a good doctoral thesis, reporting interesting and important contributions to psychology, and is ready to be defended. The Author has addressed the issues and made considerable additional effort to improve the thesis, and showed sophistication in data analysis and interpretation of his results. (Legal text in Polish follows):

Stwierdzam zatem, że przedstawiona mi do oceny rozprawa doktorska spełnia warunki określone w art. 13 ustawy z dnia 14 marca 2003 roku o tytule naukowym i stopniach naukowych. Dlatego też wnioskuję o dopuszczenie pana mgra Yong Lu do dalszych etapów przewodu doktorskiego.

With best regards
Szymon Wichary