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Temporal normalization during valuation creates preference reversals

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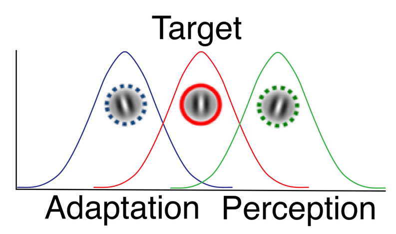
Introduction

Preference reversals (PR) are systematic disparities between expressed preferences (estimated values) and observed choices. Studied for more than four decades, Neuroeconomics[1,2] conceives and explains biases such as PR on the basis of the low-level properties characteristic of perceptual biases. One of such, temporal normalization bias ***(TN)*** (= range adaptation, = between-choice contextual effect), describes the process in which a system (user) changes its operating properties/sensitivity to recent history in response to changes in environmental statistics.



Aim: Investigate the poorly described behavioral properties of Temporal Normalization in economic contexts.

Does Temporal Normalization influence Preference Reversals?
Is TN a domain specific or generic bias?

Methods

Participants:
Students sample (n=41)
20 females, 21 males ; 19-25 years old

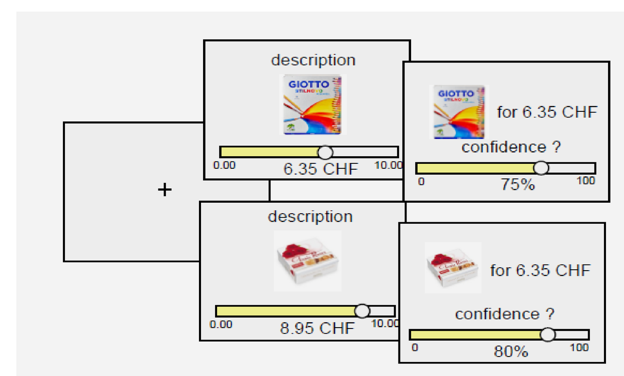
Stimuli:
288 items (major Swiss supermarket) highly or lowly valued

Model:
Generalized Linear Mixed Effects Model

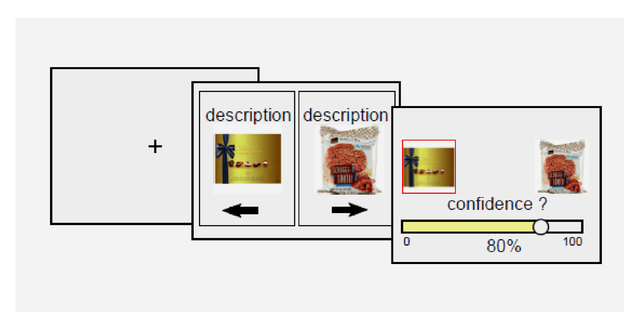
PR = 1 + Absolute Value Difference * Manipulation * Block +
(1 + Absolute Value Difference * Manipulation * Block / Subject)

Behavioral Task

Valuation Task
2 categories (trinkets & food)

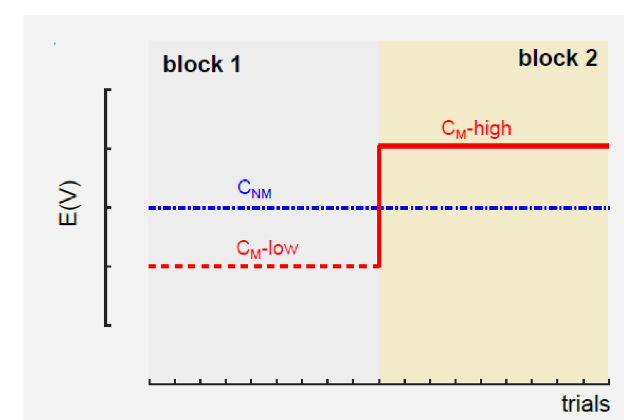


Binary Choice Task

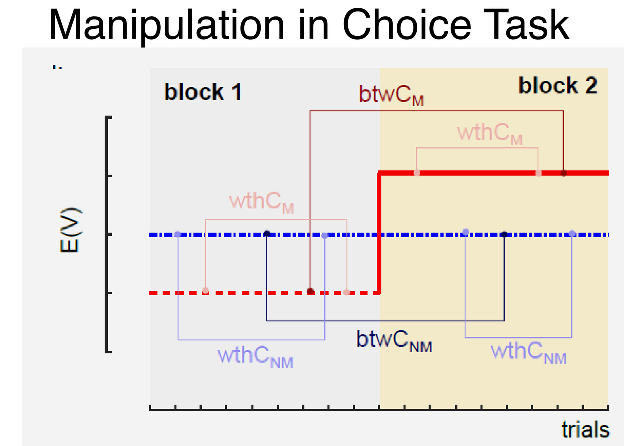


Manipulation

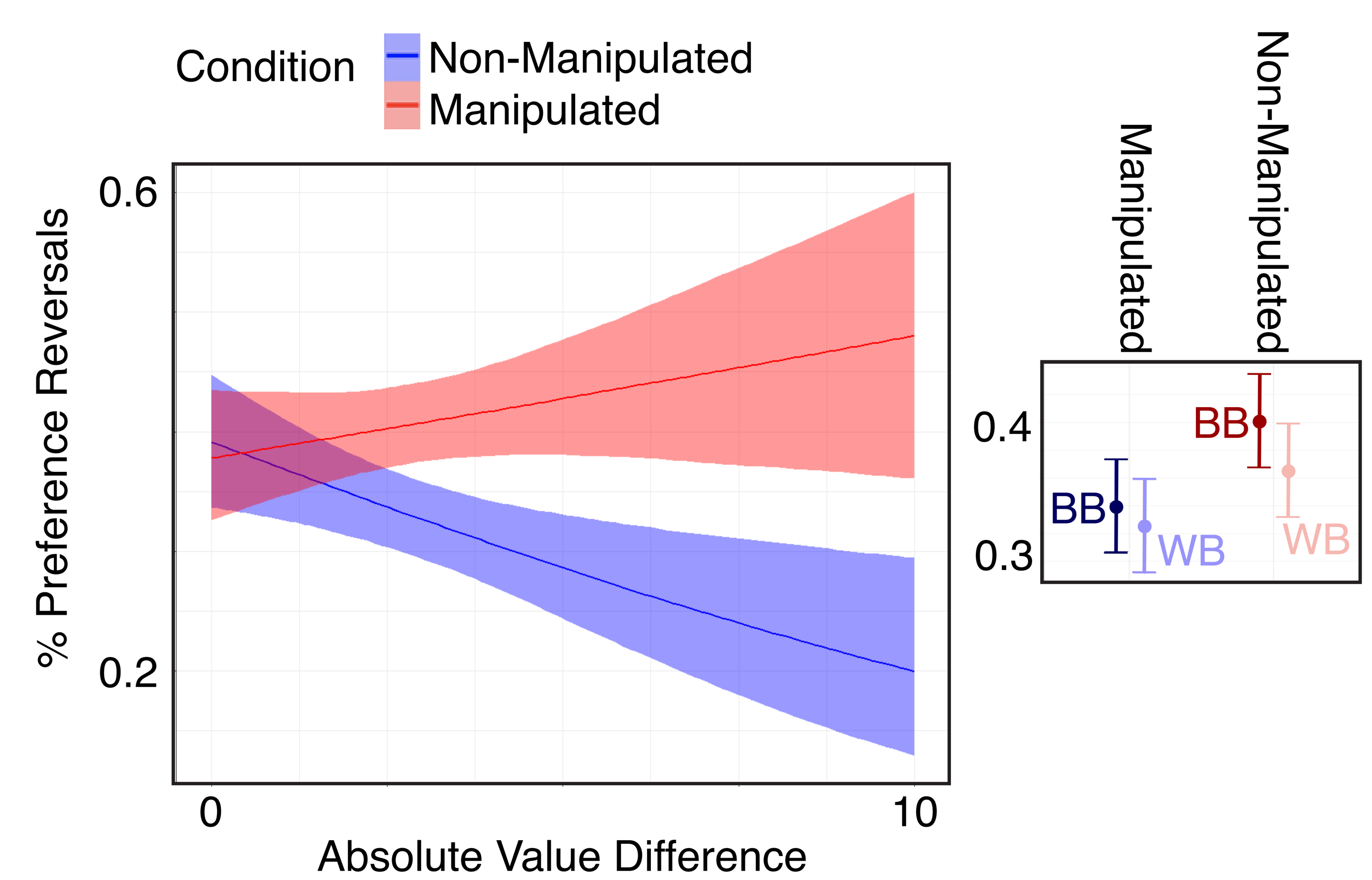
Manipulation in Valuation Task



Manipulation in Choice Task



Results



Conclusions

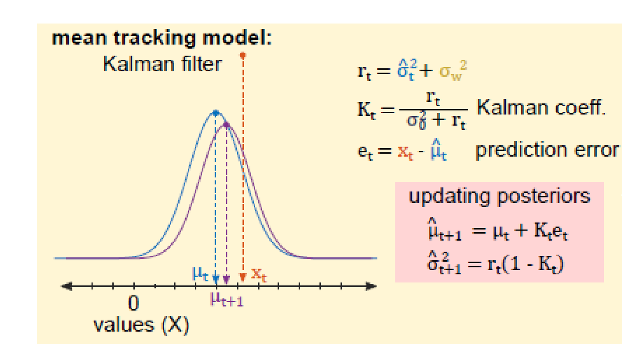
- Here presented developed behavioral experiment allows to accurately predict observed behaviors during economic decisions in the presence and absence of TN.
- TN during valuation impacts PRs (BF=15).
- TN appears domain specific (work in progress).

Possible Implications

- Understanding whether / how TN impacts valuation and consequently affects choice stability is important for:
  - Neuroeconomics
  - Psychology
  - Marketing

Future Research

- Implementation of Kalman Filter for mean tracking model.



- Implement machine learning for describing the temporal dynamics underlying the acquisition of observed biases in decision making.

References

1. Rangel, A & Clithero, J.A. Value normalization in decision making: theory and evidence. *Curr. Opin. Neurobiol.* **22**, 970-981 (2012)
2. Khaw, M.W., Glimpcher, P.W. & Louie, K. Normalized value coding explains dynamic adaptation in the human valuation process. *Proc. Natl. Acad. Sci.* **144**, 12696 - 12701 (2017)

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