Numerical & Mathematical Cognition III #99

Does body posture modulate the SNARC effect? Embodied and situated constraints of numerical cognition

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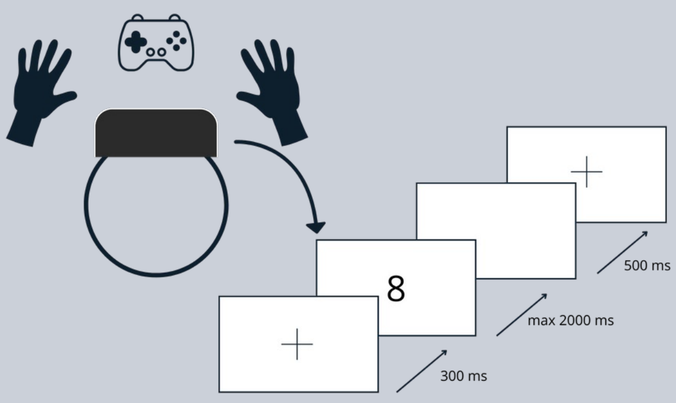
INTRODUCTION

- SNARC effect: Faster left-/right sided responses to small / large magnitude numbers respectively [1]. It is a highly replicable effect in mathematical cognition.
- SNARC effect has been considered in the context of embodied and situated cognition. To list few known modulators: finger-counting habits [2][3] or peripersonal arrangement in space [4].
- Research gap: Whole-body posture has not been systematically studied. In fMRI studies - where participants lie flat - behavioral evidence for the SNARC effect is limited. One possible explanation is that posture suppresses or alters spatial-numerical associations.
- Hypothesis:
  - Body posture determines occurrence of SNARC.
  - Effect expected to be weaker or absent in lying/leaning positions - evidence for embodied constraints on numerical cognition.

Study's OSF preregistration

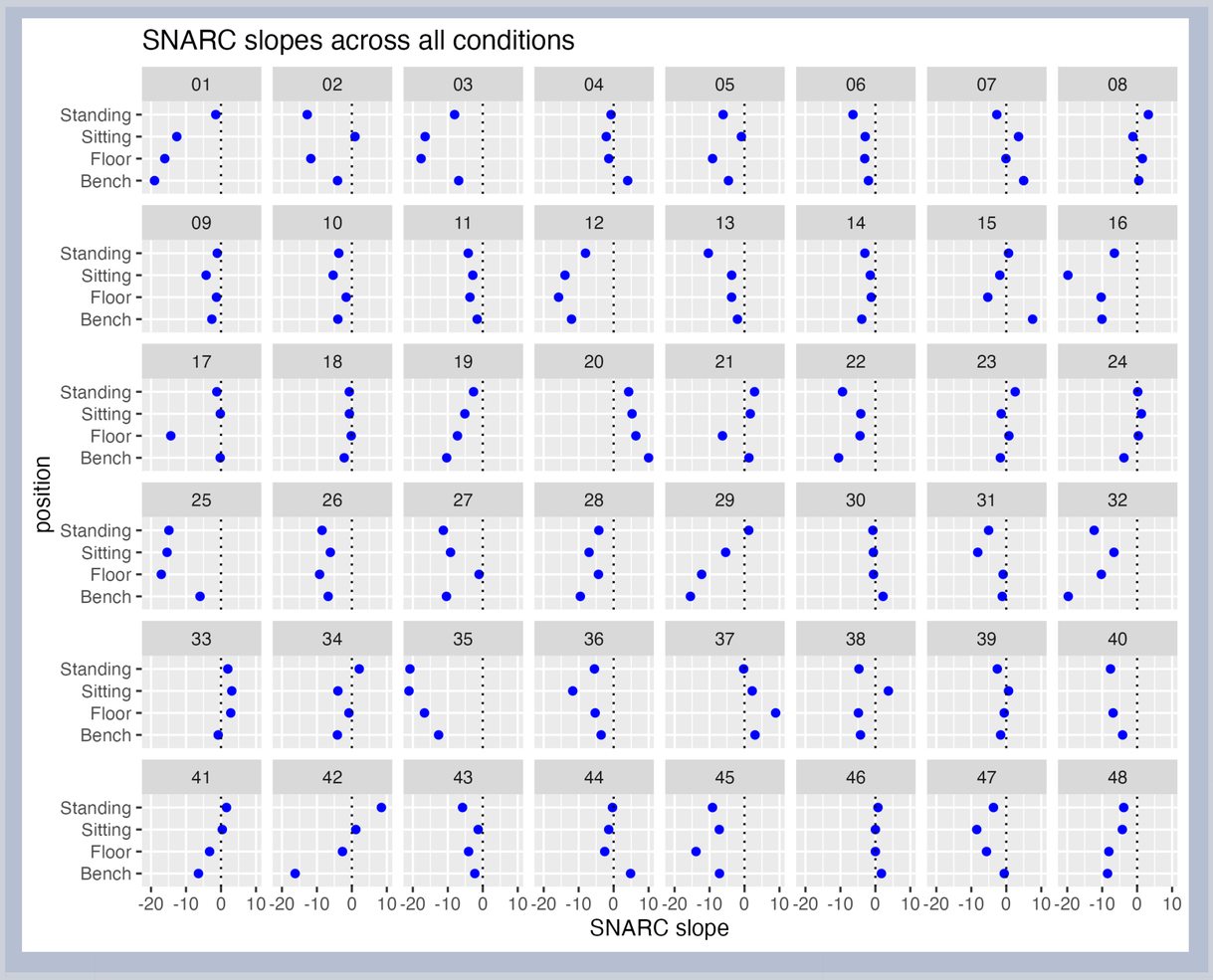
METHODOLOGY

- Task: Parity judgment task (even vs. odd judgment).
- Design: Within-subjects - each participant completed the task in four postures conditons
- Sample size: Currently, N = 48 (32 F, M= 23.6); data from posture condition of 1 participant excluded due to low accuracy. Target N = 80 (based on power analysis).

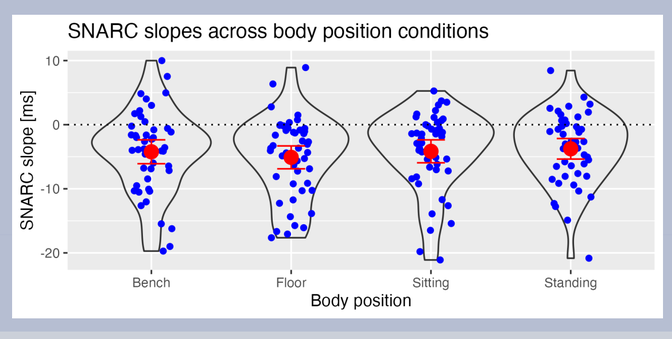


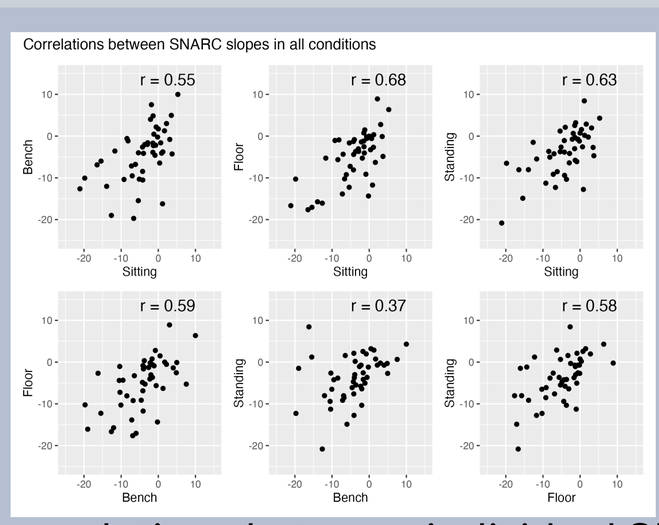
RESULTS

Accuracy varied significantly across body positions (highest in lying down, lowest on the bench), while reaction times showed did not differ significantly.



Negative slopes were observed in all body positions, confirming a SNARC effect regardless of posture supported by strong Bayesian evidence. ANOVA showed no significant effect of body position on SNARC slopes.





Pairwise correlations between individual SNARC slopes were strong to moderate and positive

CONCLUSIONS

- Although data collection is still in progress, preliminary results show a very similar SNARC effect across all body postures.
- We found significant differences in accuracy, but no differences in reaction times between posture conditions.
- Moderate-to-high correlations between SNARC slopes across conditions (rarely observed in SNARC studies) suggest stable individual differences, which may be explained by the one-hour testing window, the controlled VR environment without distractions, and the high precision of reaction time measurements.

References
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