Do we rely on the outcome of our movements to know how we just moved ?

Angeliki Charalampaki [1,2,3], Elisa Filevich[1,2,3]

Mail to: angelikichar@gmail.com

1 Bernstein Center for Computational Neuroscience (BCCN), Berlin
2 Humboldt-Universität zu Berlin, Faculty of Philosophy, Berlin School of Mind and Brain, Berlin
3 Institute of Psychology, Humboldt Universität zu Berlin, Berlin

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Introduction

Previous studies have shown that we can metacognitively monitor our movements.

Nevertheless, it is unclear what type of information we use to do so. In this study we tested whether the metacognitive representations of the movement or the outcome are more important for this assessment.

Methods

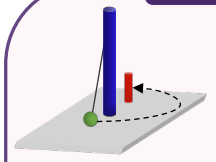
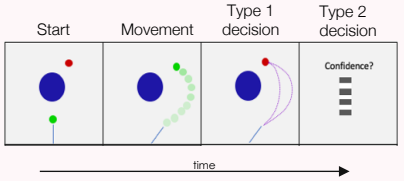


Figure 1. Participants (n=28) played a virtual version of a ball-throwing game (left), with the goal of hitting the target (red ball).



After each ball throw, they selected the trajectory better representing their ball throw and rated their confidence over their selection.

Results

A. Outcome information

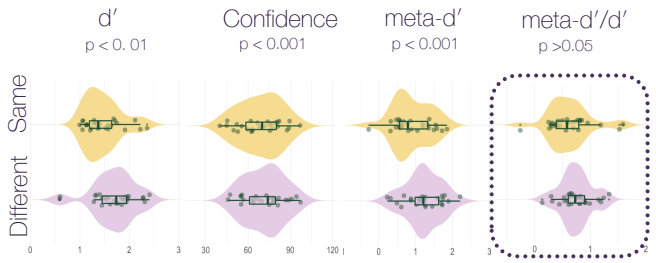


Figure 3. d′, mean confidence, and metacognitive sensitivity (meta-d′) was higher for the Different-outcome condition. No difference in the metacognitive efficiency (meta-d′/d′) when participants' performance is taken into consideration.

B. Hitting or Missing the target

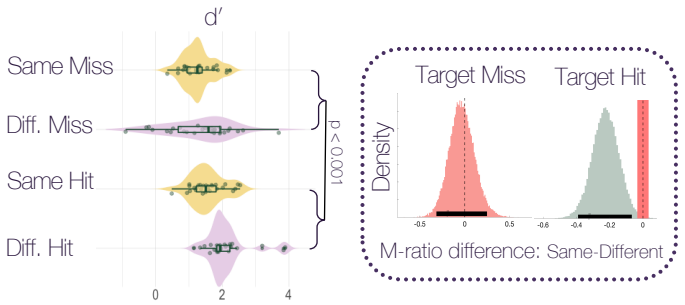


Figure 4. First order performance is higher when participants hit the target (left). Metacognitive efficiency is higher in the Different-outcome condition (Diff.) only when hitting the target (right).

Conditions

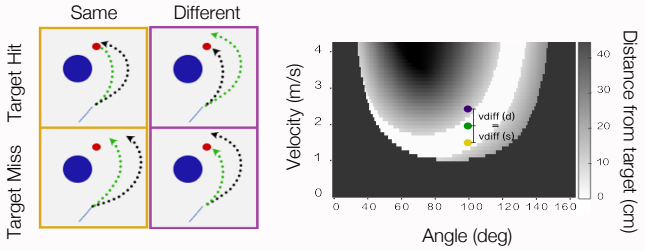


Figure 2. The two conditions differed on whether the two trajectories shown matched (Same-yellow) or differed (Different-purple) in terms of hitting the target or not (left). Alternative trajectories (green) were drawn by using a higher/lower velocity at time of ball release (right).

Discussion

Information of the outcome improves participant's performance. This information is advantageous at the metacognitive level, only when participants hit the target.

We argue that these findings underline the separation between the different levels of information that may contribute to body monitoring, which are often treated indiscriminately in the literature.

References

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