The role of tactile information on metacognitive representations of agency

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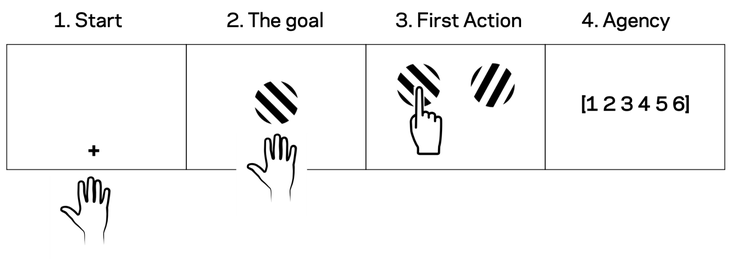
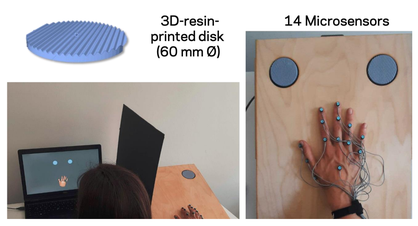
Introduction

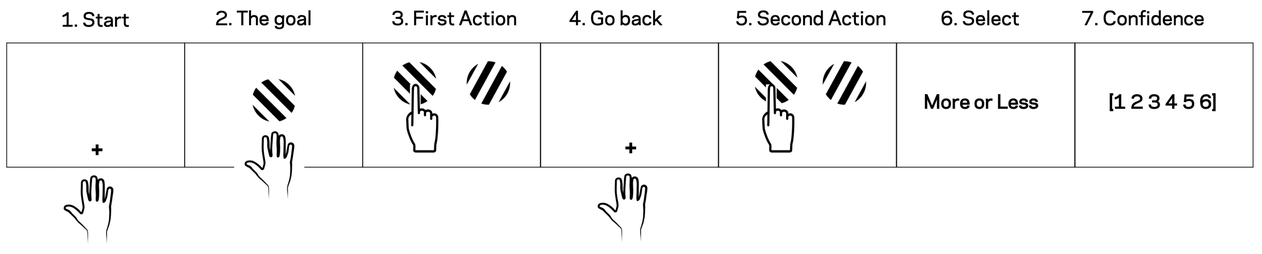
Empirical studies often investigate the sense of agency by manipulating primarily visual representations of an action. While most experimental manipulations focus on the visual components of the action, tactile information can, and does, also guide our actions by encoding properties of the external world. To investigate the contributions of tactile information to representations of our own actions, we compared the contributions of visuo-tactile and visuo-proprioceptive information.

Methods





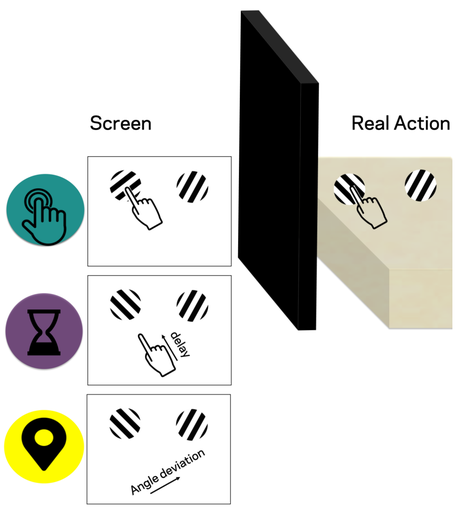
Agency task: Participants (40) moved their right hand towards one of two targets (circular 3D-resin-printed ridged plates; right) and then rated how much agency they felt they had. With fourteen high-precision sensors, participants could control online the virtual hand seen on the screen.

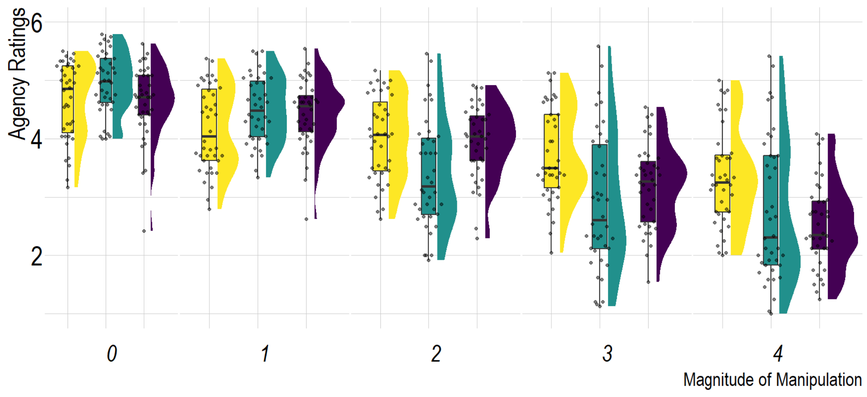


Meta-Agency Task Participants (40) moved their right hand towards the target two consecutive times. They first discriminated in which of the two intervals they felt more control over and then rated their confidence in their own decision.

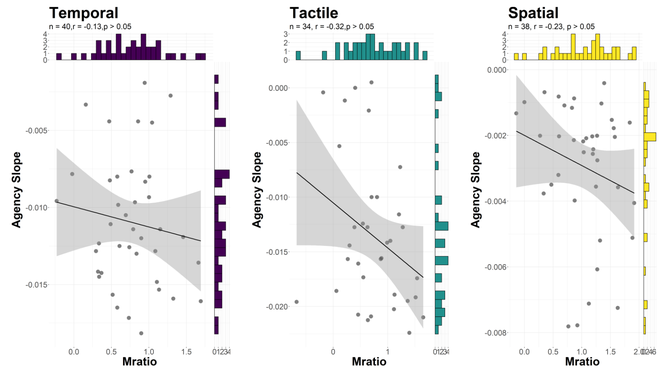
Results

Conditions

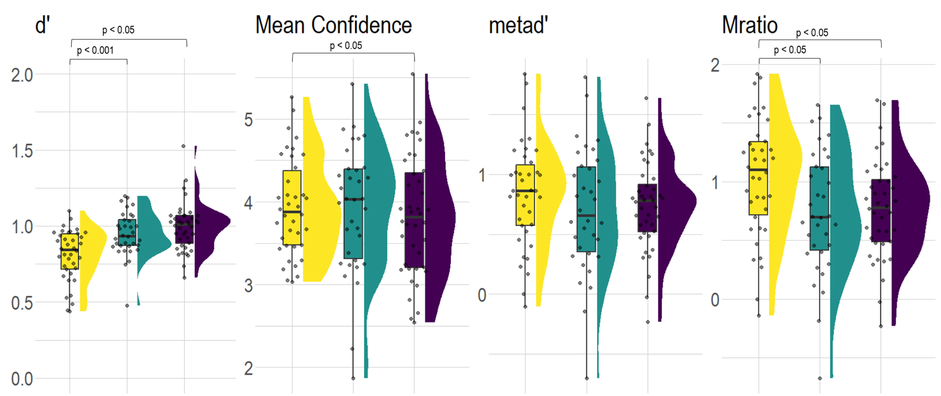




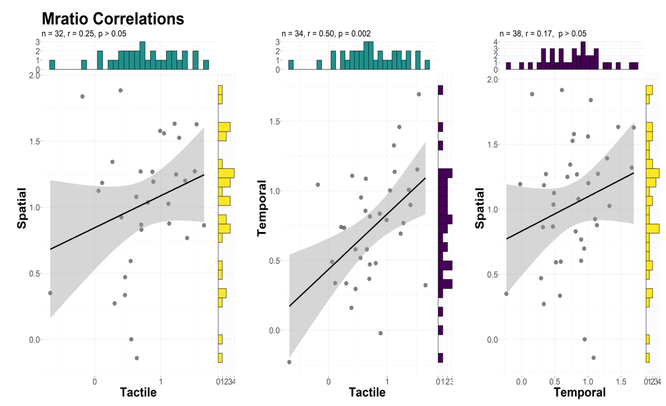
Agency Task Behavioral results: The agency ratings decreased as the level of magnitude of manipulation increased in all conditions



Agency Slopes vs. Mratio: No significant correlations, but a negative trend.



Meta-Agency Task Behavioral results: Significant differences were found on d' and M-Ratio only between the spatial and tactile, spatial and temporal conditions.



M-Ratio correlations: Significant positive correlation between tactile and temporal conditions.

Discussion

- The magnitude of the tactile discrepancy was inversely related to the agency ratings.
- Participants' metacognitive accuracy of their agency judgment was above chance on all three conditions.
- Tactile information did not result in more precise representations compared to the temporal information, but resulted in less precise representations compared to the spatial information.
- There is a negative, but not significant, trend between the metacognitive and subjective measures of agency.
- This result emphasizes the distinctiveness of these measures and their complimentary role in understanding sense of agency.

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