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Tracking Flanker Task Dynamics: Evidence for Continuous Attentional Selectivity

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Tracking Flanker Task Dynamics: Evidence for Continuous Attentional Selectivity

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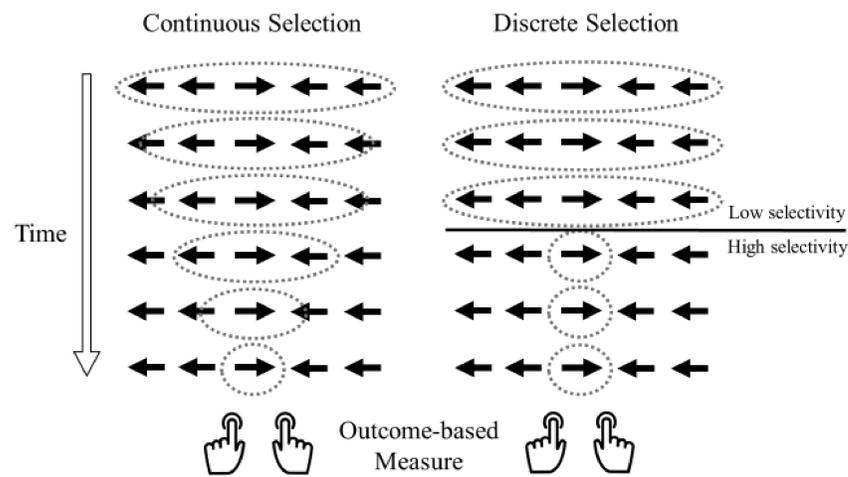


Introduction

Selective attention involves focusing in on goal-relevant information and ignoring goal-irrelevant information.

Two main hypotheses have been proposed to explain how selective attention is implemented:

1. Selective attention increases **continuously** over time (Heitz & Engle, 2007)
2. Selective attention shifts from a low- to a high-state of selectivity at a **discrete** point in time (Hübner, Steinhauser, & Lehle, 2010)



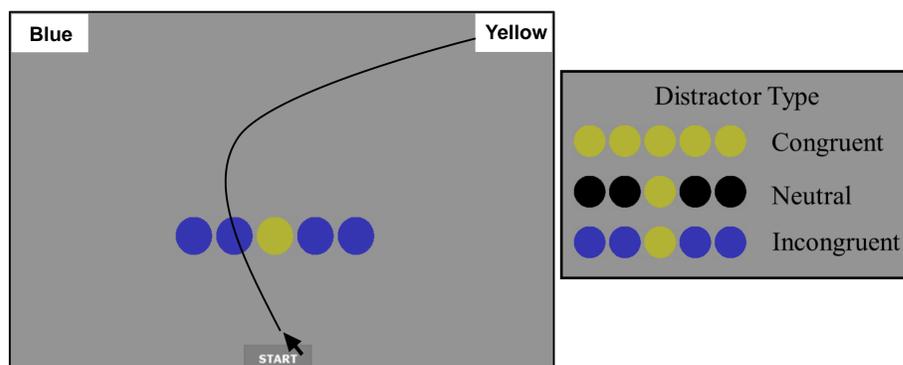
Research Question:

Does selective attention improve continuously or discretely over time?

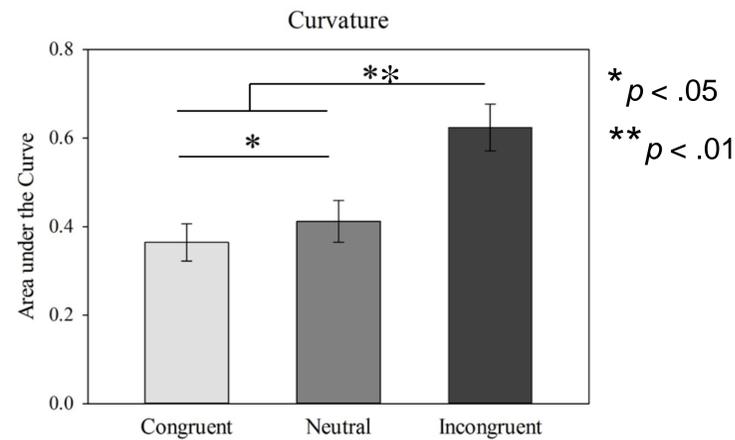
Methods

Flanker task: Participants were instructed to attend only to the central object and ignore the “flanking” distractors.

Movement tracking: We recorded real-time movement trajectories as participants moved from the start location to one of the two response locations.



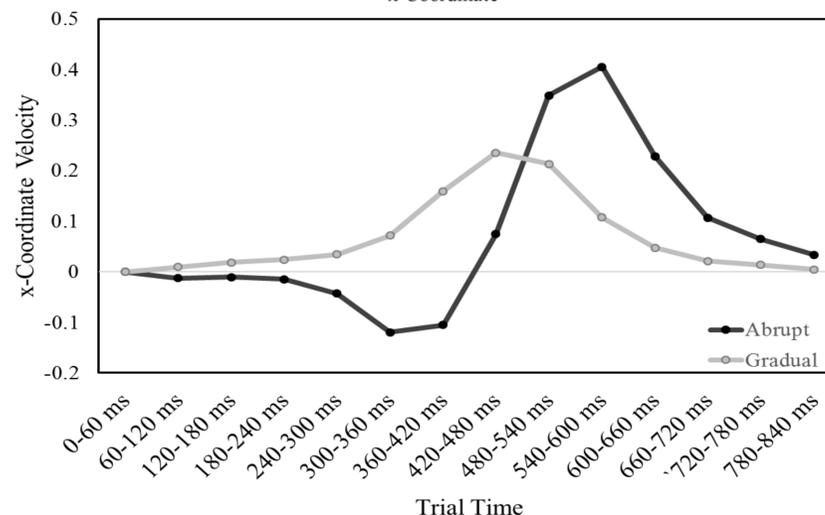
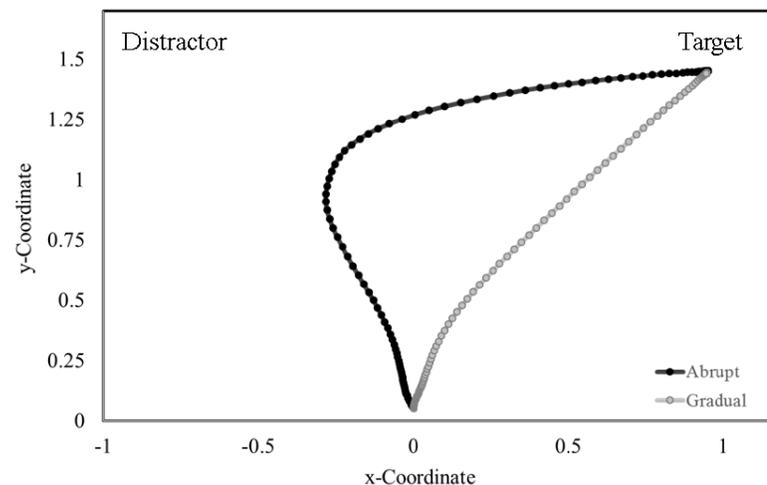
Results- Movement Curvature



Results- Continuous vs Discrete

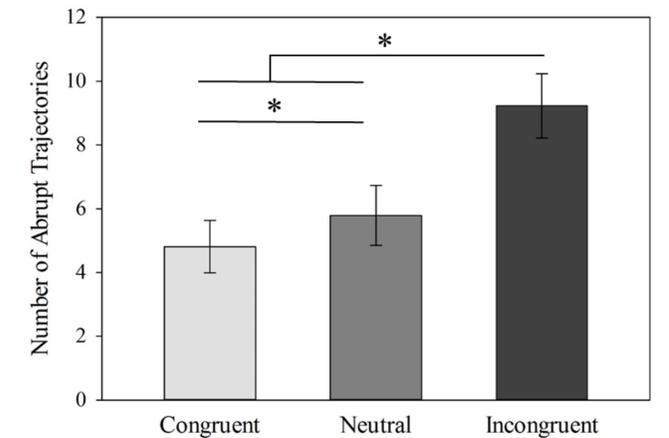
We coded movements that reflected either abrupt or gradual trajectory shifts toward the correct response location

- 84.4% of movements were characteristic of gradual shifts:

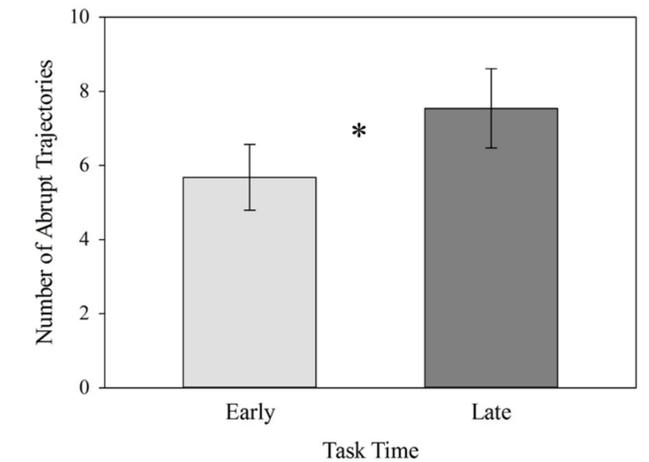


Abrupt trajectories moved faster toward the distractor response location at earlier time points compared to gradual trajectories.

While most movements in the flanker task were characteristic of gradual shifts, we explored what factors were associated with discrete-like, or abrupt trajectories.



Abrupt trajectories were more likely to occur in the incongruent condition, when there was strong distractor interference.



There were significantly more abrupt trajectories in the first half of the flanker task compared to the last half, suggesting that discrete movements are associated with fatigue.

Discussion

Our results suggest that selective attention improves continuously over time, as opposed to discretely over time.

- Movement tracking data revealed that trajectories were strongly representative of continuous selective attention, indicated by a gradual path toward the target response location.

References

Heitz, R. P., & Engle, R. W. (2007). Focusing the spotlight: Individual differences in visual attention control. *Journal of Experimental Psychology: General*, 136(2), 217.

Hübner, R., Steinhauser, M., & Lehle, C. (2010). A dual-stage two-phase model of selective attention. *Psychological review*, 117(3), 759.