



Reducing Disorientation in Teleportation: Improving Navigation in Virtual Reality



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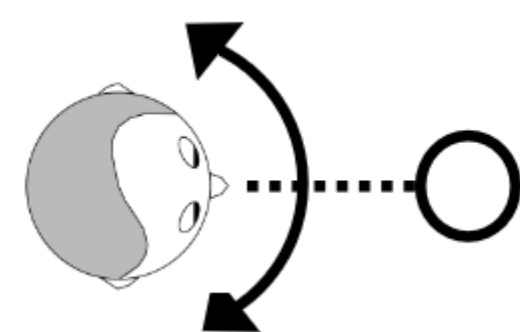
Overview

Teleporting is a common method of locomoting in virtual reality. However, spatial cognitive costs (e.g., disorientation) have been associated with the removal of self-motion cues during teleportation.¹ To mitigate these costs, observing an avatar could help users anticipate future orientations since the presence of another person in a scene can cause spontaneous perspective-taking.²

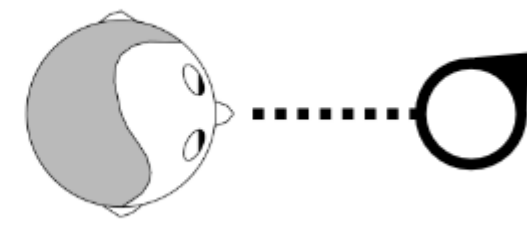
The current study evaluated whether the presence of an avatar would mitigate the spatial cognitive costs of two methods of teleporting, partially concordant and discordant teleporting.

Partially Concordant teleporting: Physically rotate the body, but teleport to translate

Discordant teleporting: Teleport to rotate and translate



Partially Concordant



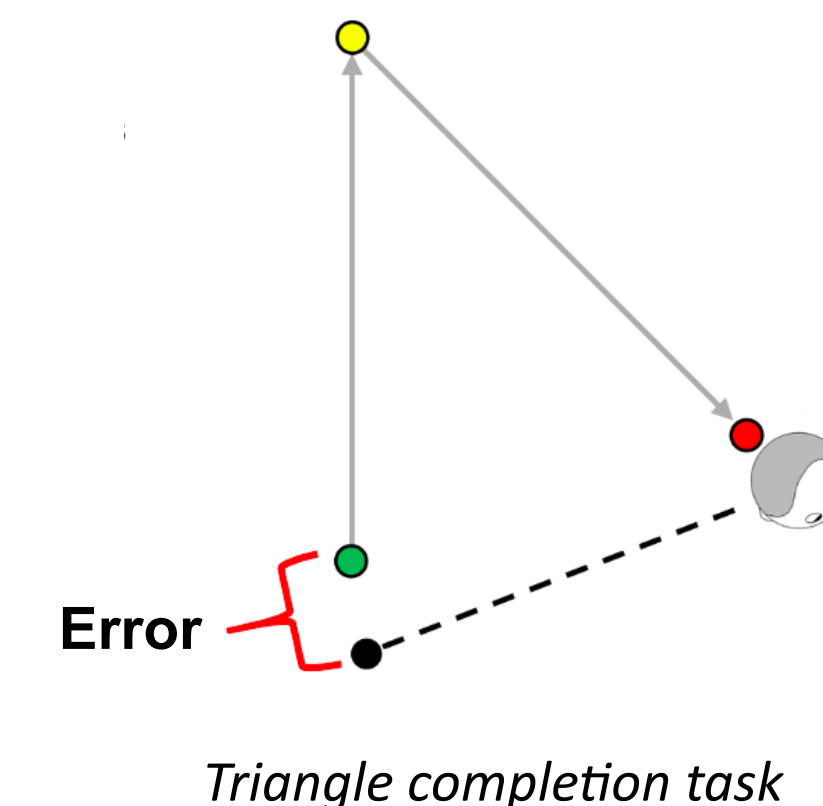
Discordant

Predictions

- The implementation of an avatar will help a user's perspective-taking ability resulting in a reduced sense of disorientation.
- The Partially Concordant method of teleportation will result in lessened sense of disorientation over a Discordant method of locomotion.

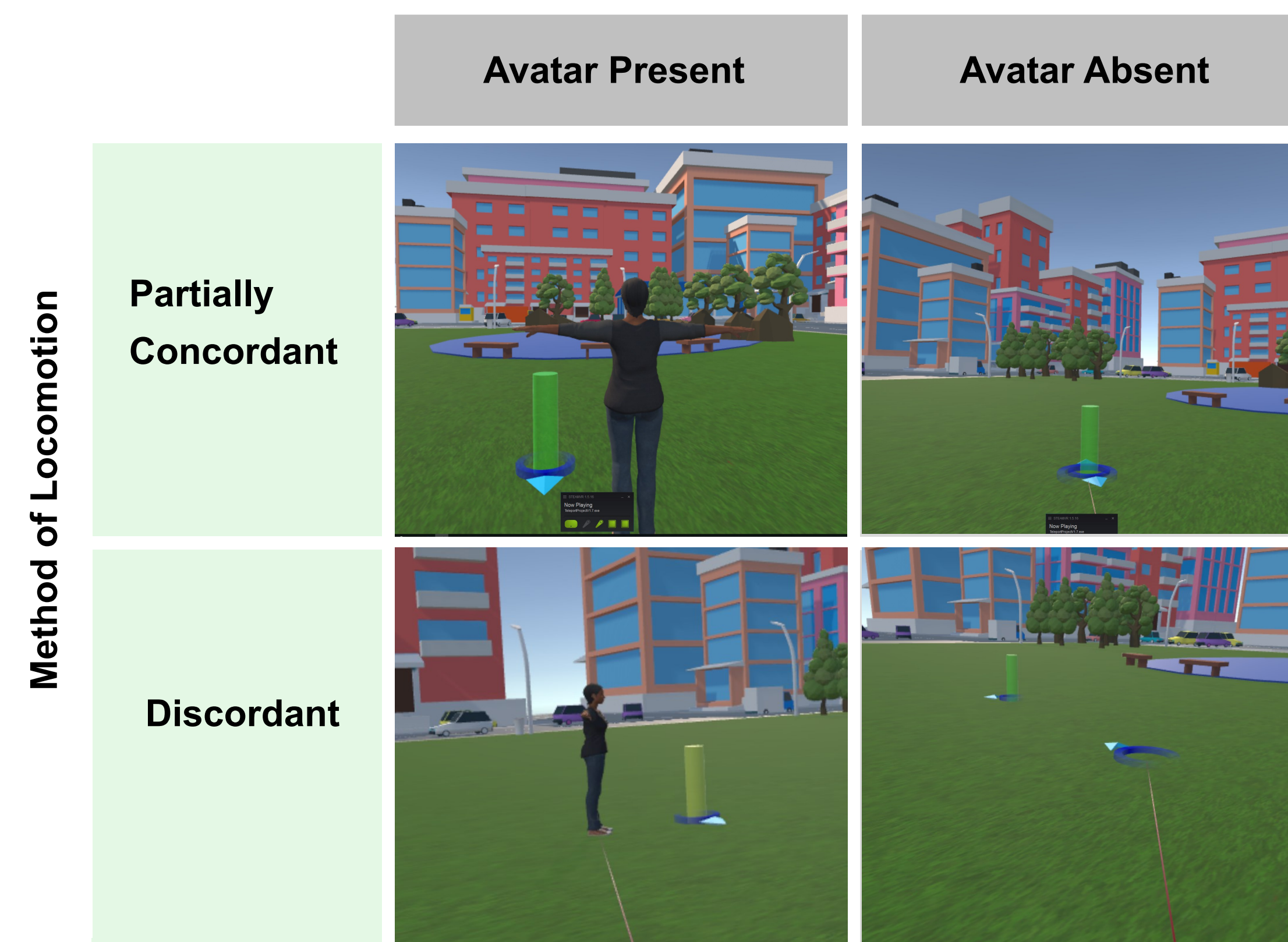
Methods

- 10 participants (5 women)
- Participants completed a **triangle completion task** (teleport to two vertices of a triangle and then point back to their original location)



Triangle completion task

Interfaces



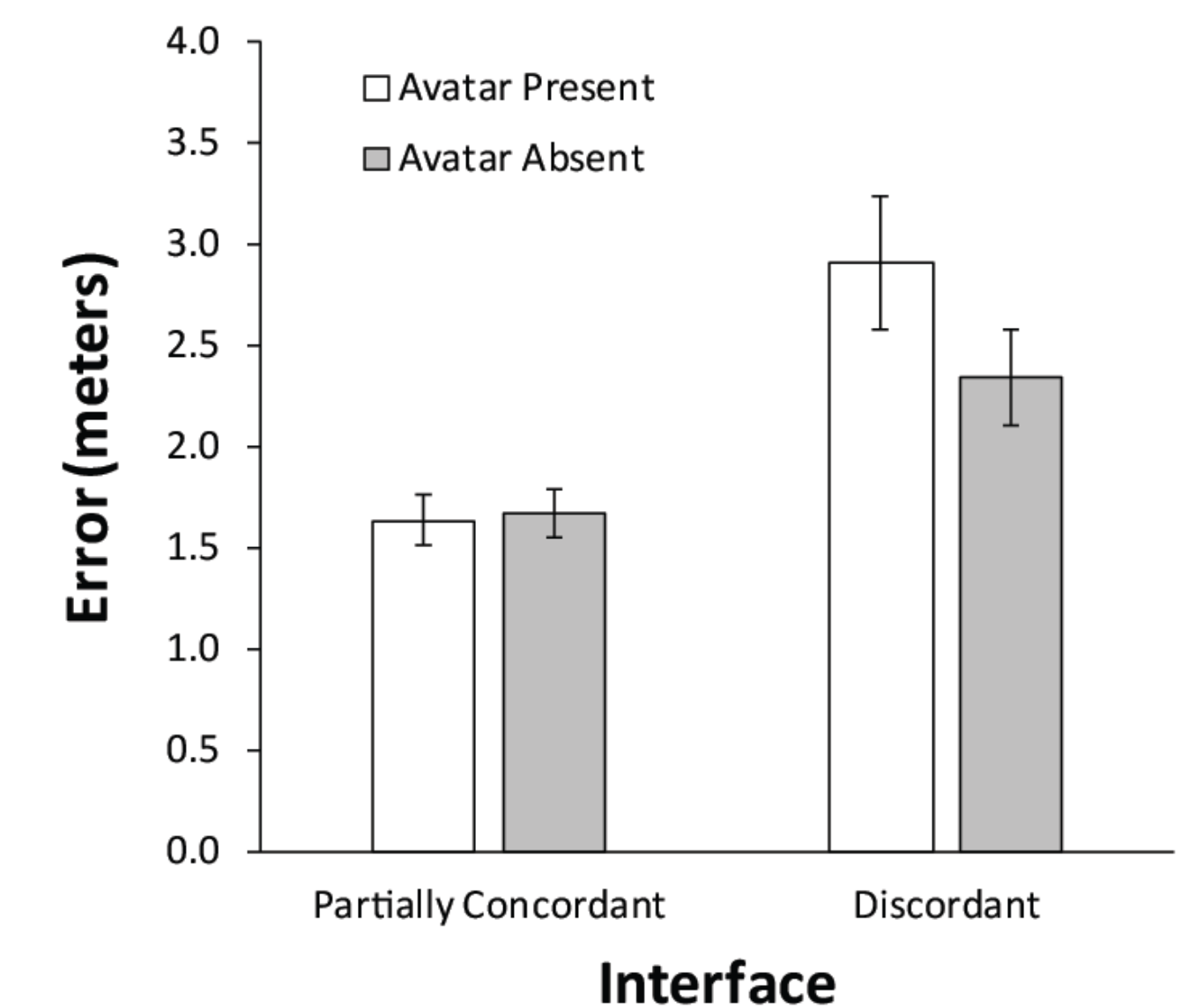
Future Work

- In future work, participants could use a custom avatar, or participants could be given avatar options of varying genders and attributes.
- The VE could also include objects in closer proximity to the participant/avatar as a navigational tool.

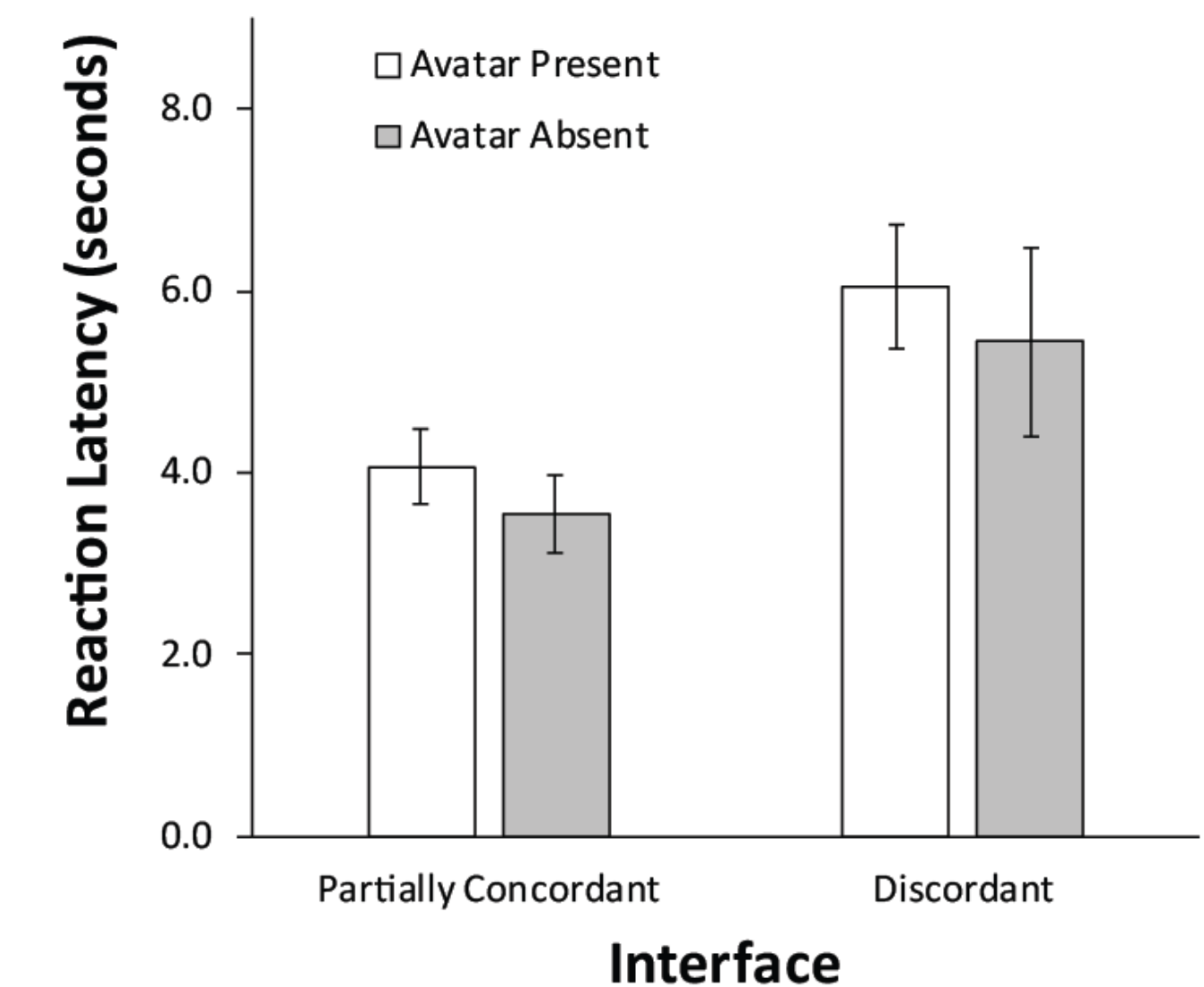
Results

- There was a significant difference of absolute error between partially concordant and discordant interfaces, but not between avatar, no avatar interfaces.
- The presence of an avatar resulted in more absolute error with the discordant interface.
- The discordant tasks could have been improved by limiting direction manipulation in the responses.

Error Magnitude



Response Time



References

- 1) Cherep, L. A., Lim, A. F., Kelly, J. W., Acharya, D., Velasco, A., Bustamante, E., Ostrander, A., & Gilbert, S. B. (under review). Spatial cognitive implications of teleporting through virtual environments.
- 2) Tversky, B., & Hard, B. (2009). Embodied and disembodied cognition: Spatial perspective-taking. *Cognition*, 110, 124-129.



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