



Reducing Disorientation in Teleportation: Improving Navigation in Virtual Reality



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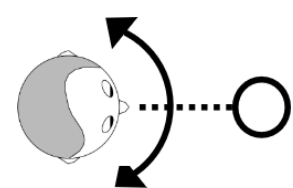
Overview

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 teleportation¹. 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.

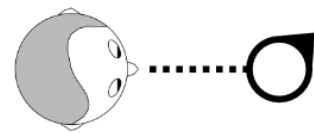
The current study evaluated whether the presence of an avatar would mitigate the spatial cognitive costs of two methods of teleporting: partially concordant and discordant teleporting.

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

Discordant teleporting: Teleport to rotate and translate



Partially Concordant teleporting



Discordant teleporting

Predictions

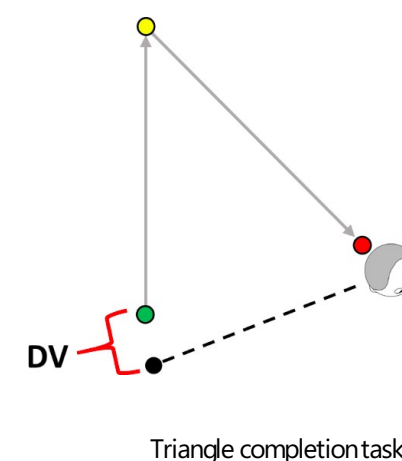
- The implementation of an avatar will help a user's perspective-taking ability resulting in a reduced sense of disorientation.

- The Partially Concordant method of teleportation will result in a lessened sense of disorientation over a Discordant method of locomotion.

Methods

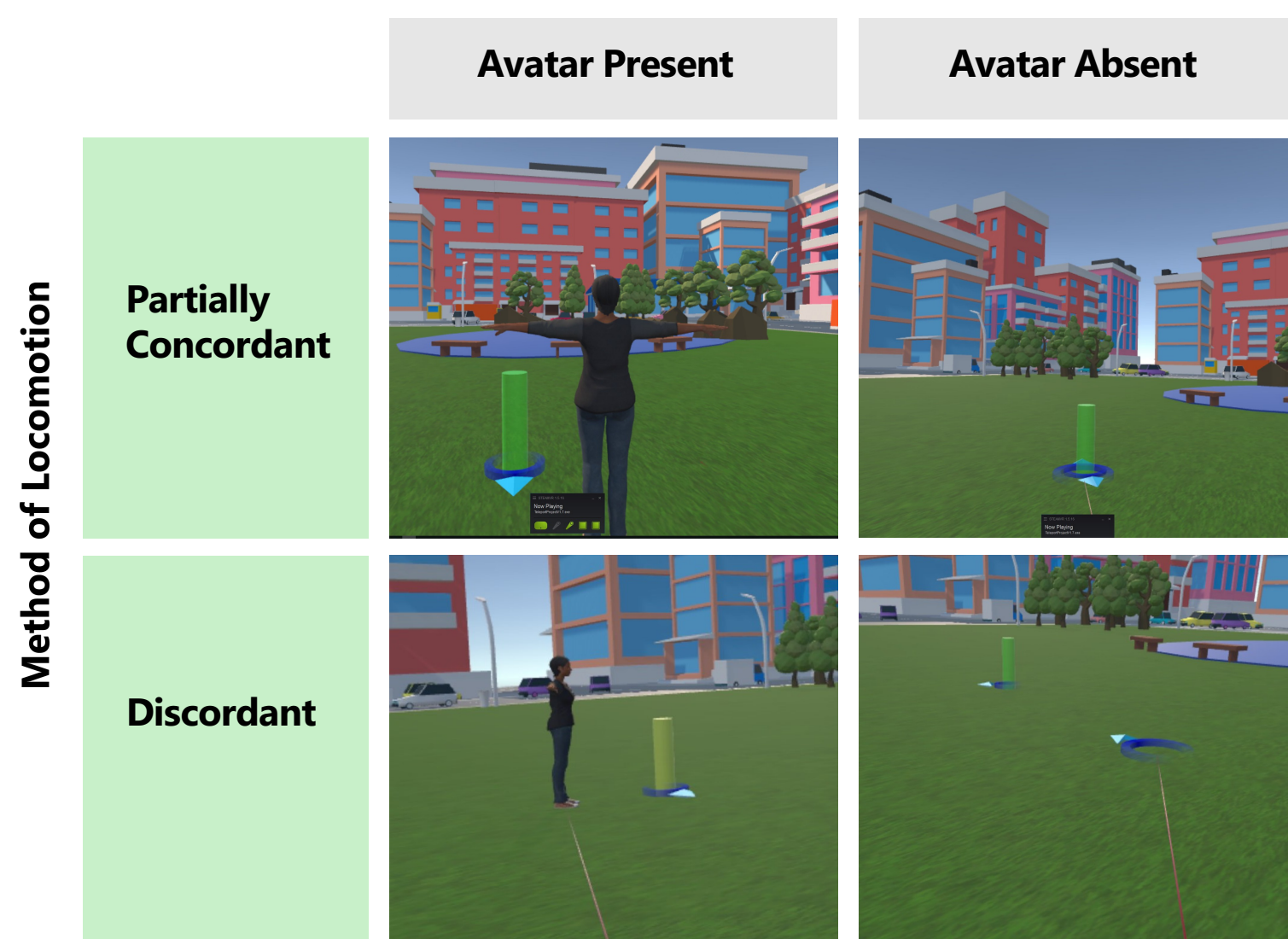
- 10 participants (5 women)
- Participants completed a triangle completion task:

Teleport to two vertices of a triangle and then point back to their original location



Triangle completion task

Interfaces



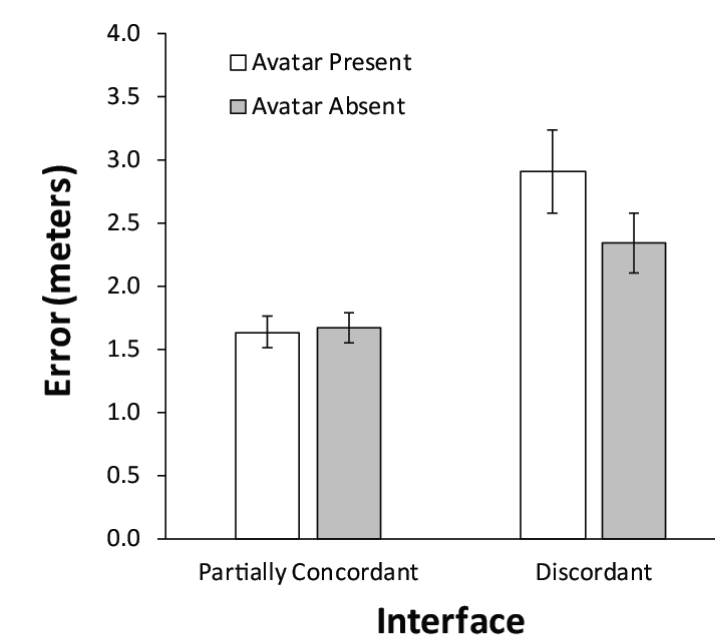
Results

- There is a significant difference of absolute error between partially concordant and discordant interfaces, but not between avatar, no avatar, interfaces.

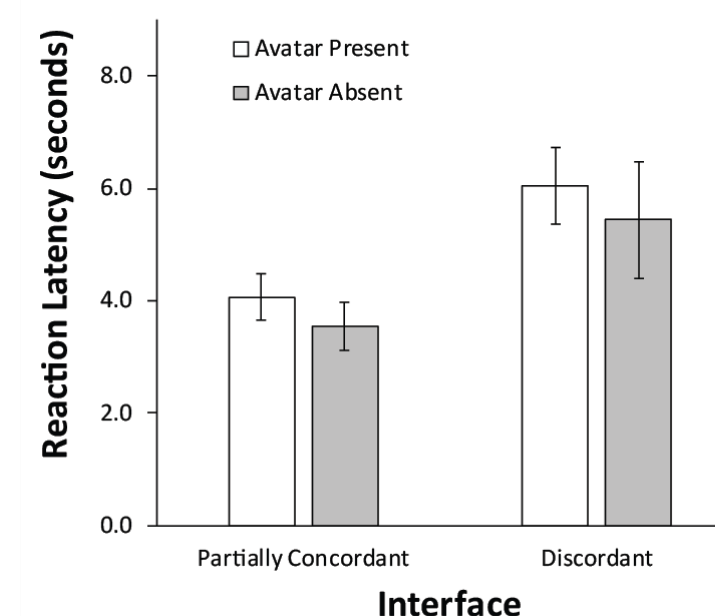
- The presence of an avatar resulted in more absolute error with the discordant interface.

- The discordant tasks could have been improved by limiting direction manipulation in the responses.

Error Magnitude



Response Time



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.

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 applications 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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