

Older adults prefer virtual reality when playing a fruit reaching game

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Background

Exergaming, physically active gaming, is widely used for training and rehabilitation purposes¹. Its popularity as a training tool in older adults has seen a considerable upsurge². Apart from the physical effect of exergaming, positive effects on cognition and balance have been reported as well². Targeted balance training can reduce the risk of falling which positively influences the ability of independent living in older adults³. Extended technologies such as virtual reality (VR), augmented reality (AR), or a combination thereof, passthrough (PT), have great potential to increase physical activity in older adults which leads to increased health.

Objectives

- Find out if VR, AR, or PT is subjectively preferred by older adults while playing a reaching game.
- Objectively measure the movement of the trunk and hip, and center of pressure in VR, AR, and PT.

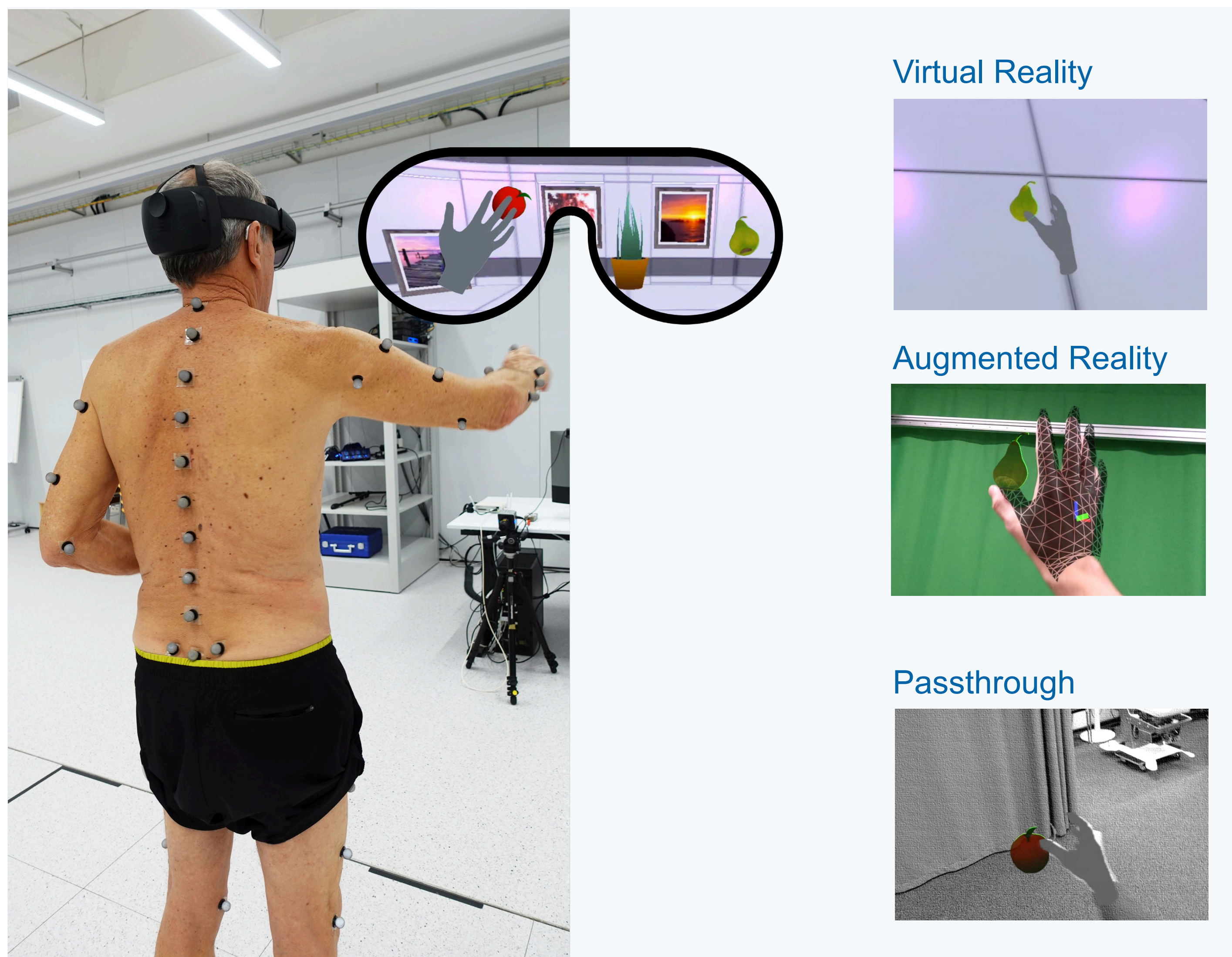


Figure 1: Reaching game with three modes of play.

Materials and Methods

- 7 participants (4 males, 3 females)
- > 65 years of age (mean 71.43 ± 4.16)
- No musculoskeletal or neurological diseases
- 3 minutes of playing the fruit reaching game in VR, PT (both Oculus Quest 2), or AR (HoloLens 2) in a randomized order
- Recording kinematics of the hip, trunk, and shoulder
- Subjective rating of the experience after each mode

Contact

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Results

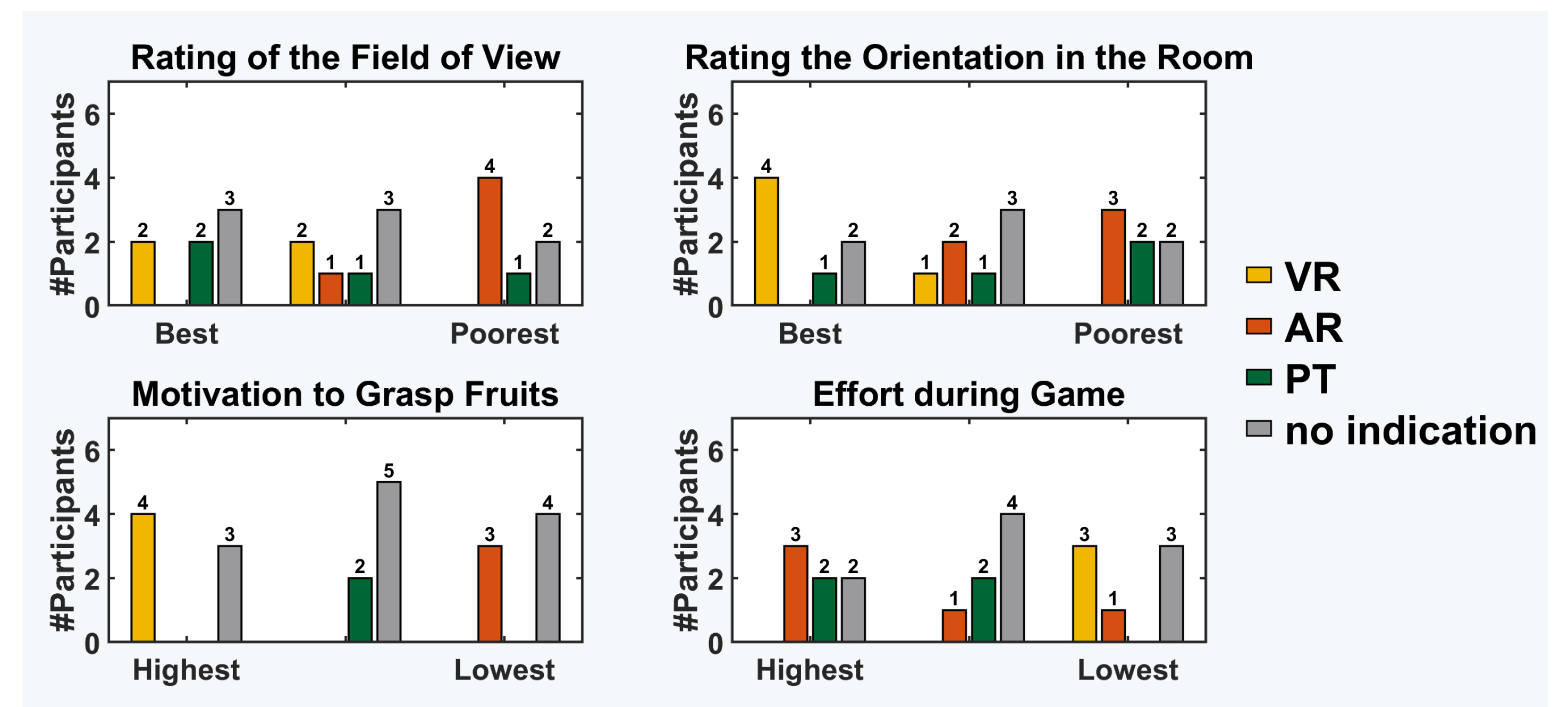


Figure 2: Results of subjective rating.

- No ($n = 0$) dizziness or nausea during the reaching game
- User-friendliness of the headsets was rated as simple
- No one had an uneasy feeling although the real environment was not visible while using the VR headset
- The trunk flexion-extension angle indicates that patients control the reaching movement either from the trunk or from the hips

Conclusion

- The VR headset was favored by most of the participants
- For future projects different games with adaptive difficulty levels should be tested
- Creating a game with specific exercises or movement sequences could lead to increased balance control and thus reduce the risk of falling

References

1. Gao, Z., Lee, J. E., Pope, Z., & Zhang, D. (2016). Effect of Active Videogames on Underserved Children's Classroom Behaviors, Effort, and Fitness. *Games for Health Journal*, 5(5), 318–324.
2. Ismail, N. A., Hashim, H. A., & Ahmad Yusof, H. (2022). Physical Activity and Exergames Among Older Adults: A Scoping Review. *Games for Health Journal*, 11(1), 1–17.
3. Delgado, F., & Der Ananian, C. (2021). The Use of Virtual Reality Through Head-Mounted Display on Balance and Gait in Older Adults: A Scoping Review. *Games for Health Journal*, 10(1), 2–12.