Does Height Really Matter: Perception in Virtual Reality

Snyder, C. A., Owen, B. O., & Morris, D.M., Ph.D.

Introduction

- Embodied perception theory suggests that our perception of our own physical ability is relative to our state. [1]
- One factor that may impact our sense of strength is our relative height/size in an environment. [2]
- Virtual environments allow for users to change the height/size of their own in-game character (avatar), allowing for a shift in embodiment.
- The purpose of this study if to see if manipulating a user's perceived height in a virtual environment will also change their perceived strength out of the game environment.

Methods

- 16 Participants (7M, 9F; 19.56±1.17 yrs)
- Materials: Simulator Sickness questionnaire, Motion Sickness Susceptibility Questionnaire, PlayStation 4 VR, 10 weighted bottles
- Procedure: Participants completed a standard demographics questionnaire
- Completed a 5 minute acclimation simulation followed by a 10 minute testing simulation
- Participants manipulated an in-game bottle with a controller in their dominant hand, then determined the real world weight equivalent using by comparing it to real world bottles in their non-dominant hand. (Figure 1)

Figure 1: The *Job Simulator* Virtual Environment. Bottle on right used as a weighted item out of game.

Figure 2: Successful manipulation of height in game.

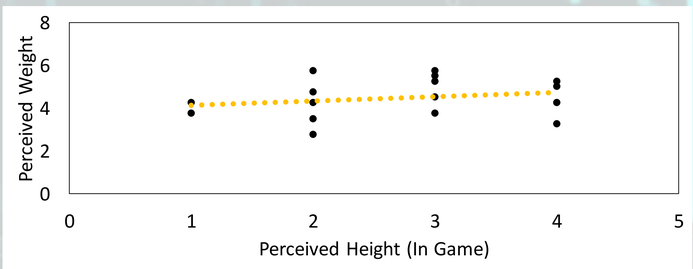

Figure 3: Relationship between height and weight in game.

Results

- The average perceived weight of the in-game bottle was 17.42oz ± 3.55oz (Figure 1).
- Those in the tall condition felt significantly taller in game than those in the short condition, $t(14)=3.66, p=.003$; $t(14)=2.96, p=.010$ (Figure 2).
- There was no relationship between perceived height in game, and perceived weight of the in game bottle $r(16)=.223, p=.407$ (Figure 3).
- No cases of simulator sickness occurred during data collection.

Discussion

- We were able to successfully manipulate height in the game. Users felt tall in their in-game environment, and taller than their normal self.
- In-game height did not impact relative strength, as measured by perceived weight of the bottles.
- Although no change has been shown, the study suffers from an exceptionally low *N* as a result of COVID restrictions.

References

1. Proffitt, D. R. (2006). Embodied perception and the economy of action. *Perspectives on psychological science*, *1*(2), 110-122.
2. Van Quaquebeke, N., & Giessner, S. R. (2010). How embodied cognitions affect judgments: Height-related attribution bias in football foul calls. *Journal of Sport and Exercise Psychology*, *32*(1), 3-22.