Can Interactive Virtual Reality Elicit Awe for Improved Well-Being?

**Research Questions**
*Can interactive virtual reality elicit awe for improved well-being?*

*And, what are the design considerations for successful awe-inspiring VR systems?*

**Motivation**
*Awe has wellness and educational benefits*

Characteristics include feelings of social interconnectivity [1], shifts in perspective [2], and increased life satisfaction [3]

• Awe is a rare experience in our busy everyday lives, and rarer in a lab setting [4]

• Awe experiences have specific markers, such as physiologic goose bumps (quantitative) [5,6] and themes of awe descriptions (qualitative) [7]

• Interactive Virtual Reality (VR) could help make immersive, awe-inspiring experiences accessible to people [8].

**Methods and Materials**
16 participants spent 20 minutes interacting with VR to travel, visit natural wonders, and orbit Earth through Google Earth VR using a HTC Vive headset and hand controller interactive interface.

Three datasets collected: Physiological goose bumps, introspective survey ratings, and interviews.

• Goose bumps were recorded on the skin with a video camera

• Surveys included ratings on the reported level of awe

• Semi-structured, open ended interviews provided further insight into the phenomenon

Phase 1: instructed participants to travel to the experimenter-selected locations (a city and a natural wonder); Phase 2: personalization that allowed participants to travel to any place of their choosing.

**Quantitative Results**
*Participants rated awe 79.7 (out of 100); 43.8% of participants experienced goose bumps*

• Most goose bumps were seen in Phase 2, personalization phase (60% of goose bump occurrences)

• Participants who had goose bumps showed significantly higher ratings of awe than those who did not: t(14) = 2.82, p = .014, r = .36

**Qualitative Results**
*Verbal indications of awe were made by all participants*

• Those who experienced awe revealed feeling calmed by the experience (N=7), and increased curiosity (N=9)

• Profound social connection with their home, friends, and families (N=11), mainly during the personalization phase

• 10 of 16 struggled with the controllers (interaction interface); despite a 360 degree environment, looking around was not intuitive and many relied on controllers to manipulate the environment (a possible artefact of face-forward, seated gaming expertise)

• Participants who struggled with the interaction interface reported distraction from the virtual environment, which could impede awe

**Conclusion and Next Steps**
*Interactive VR has a powerful capacity to elicit awe, especially within personalized environments. Physiological goose bumps provide reliable, non-intrusive indications of awe, and introspective data can provide valuable insights into the VR system qualities and the experience of awe so we can design effective awe-inspiring experiences. Care must be taken to design interaction interfaces that do not impede awe.**

**Future work** involves testing the effectiveness of our new, custom VR system designed to elicit awe. We aim to use additional physiological sensors to complement goose bumps and introspective data collection.

**REFERENCES**


