Virtuoso in VR: Can Virtual Reality Reduce Performance Anxiety?

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Introduction

Previous research shows a trend of positive or neutral impacts of virtual reality (VR) for reducing certain forms of anxiety. For example, as measured by self-report and heart rate, Harris, Kemmerling, and North (2002) found that public speaking anxiety was reduced for university students following a VR-based exposure treatment. Virtual reality therapy and virtual reality cognitive behavioural therapy (VRCBT) have shown to be equally effective as traditional cognitive behavioural treatment for social phobia and public speaking anxiety respectively (Klinger et al., 2005; Wallach, Safir, and Bar-Zvi, 2009). We predicted that practice under VR may reduce performance anxiety for people across a wide range of fields.

Methods

A total of nine participants were recruited (Figure 1). Each participant gave two short performances (~5-10 minutes) one week apart in a VR setting similar to what they might experience in their field. Before and after delivering their performance, participants rated their Subjective Units of Distress (SUDS). Participants also completed three questionnaires following each of their sessions (Figure 2).

Figure 1. Participants

| Discipline	n	VR Environment	Task
Music	1	Theatre	Saxophone Piece
Drama	2	Theatre	Monologue
Voice	2	Theatre	Solo Piece
Communication Sciences and Disorders (CSD) Students	2	Classroom	Scientific Presentation
Adults who Stutter (AWS)	2	Classroom or Meeting Room	Speech

Figure 2. Questionnaires Completed by Participants

| Name	Description	Score Range	Score Interpretation
Subjective Units of Distress Scale (SUDS)	Self-assessment of current anxiousness	0-10	0 = No anxiety 10 = Most anxious
Public Speaking Anxiety Scale (PSAS)	Subjective rating of feelings surrounding public speaking	1-5	1= Strongly disagree 5 = Strongly agree
Presence Questionnaire	Participant's perception of VR realness	0-7	0 = Not at all realistic 7 = Completely realistic
Kenney Music Performance Anxiety Inventory	Subjective rating of feelings before or during a performance	0-6	0 = Strongly disagree 6 = Strongly agree

Results

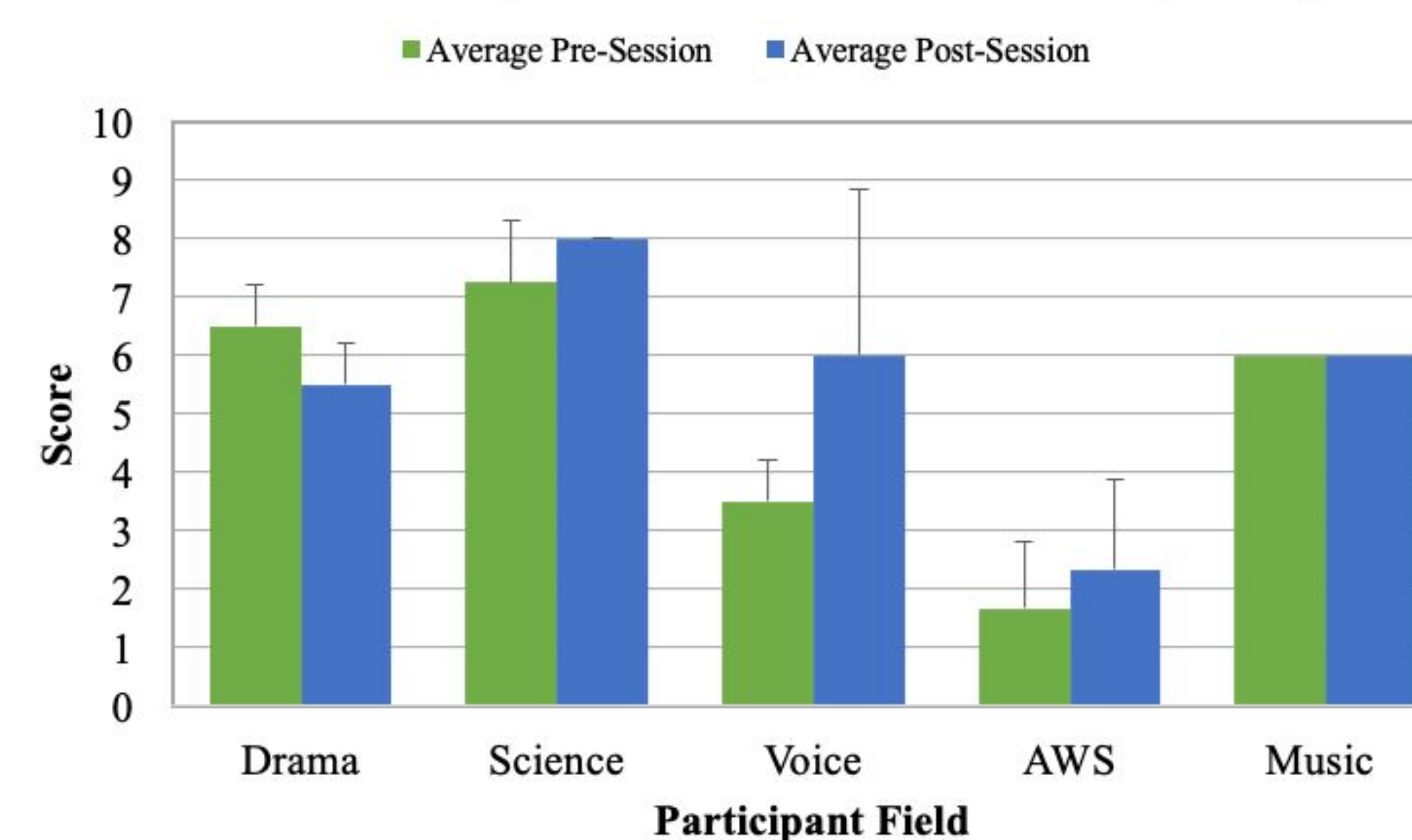Kenney Music Performance Anxiety Inventory
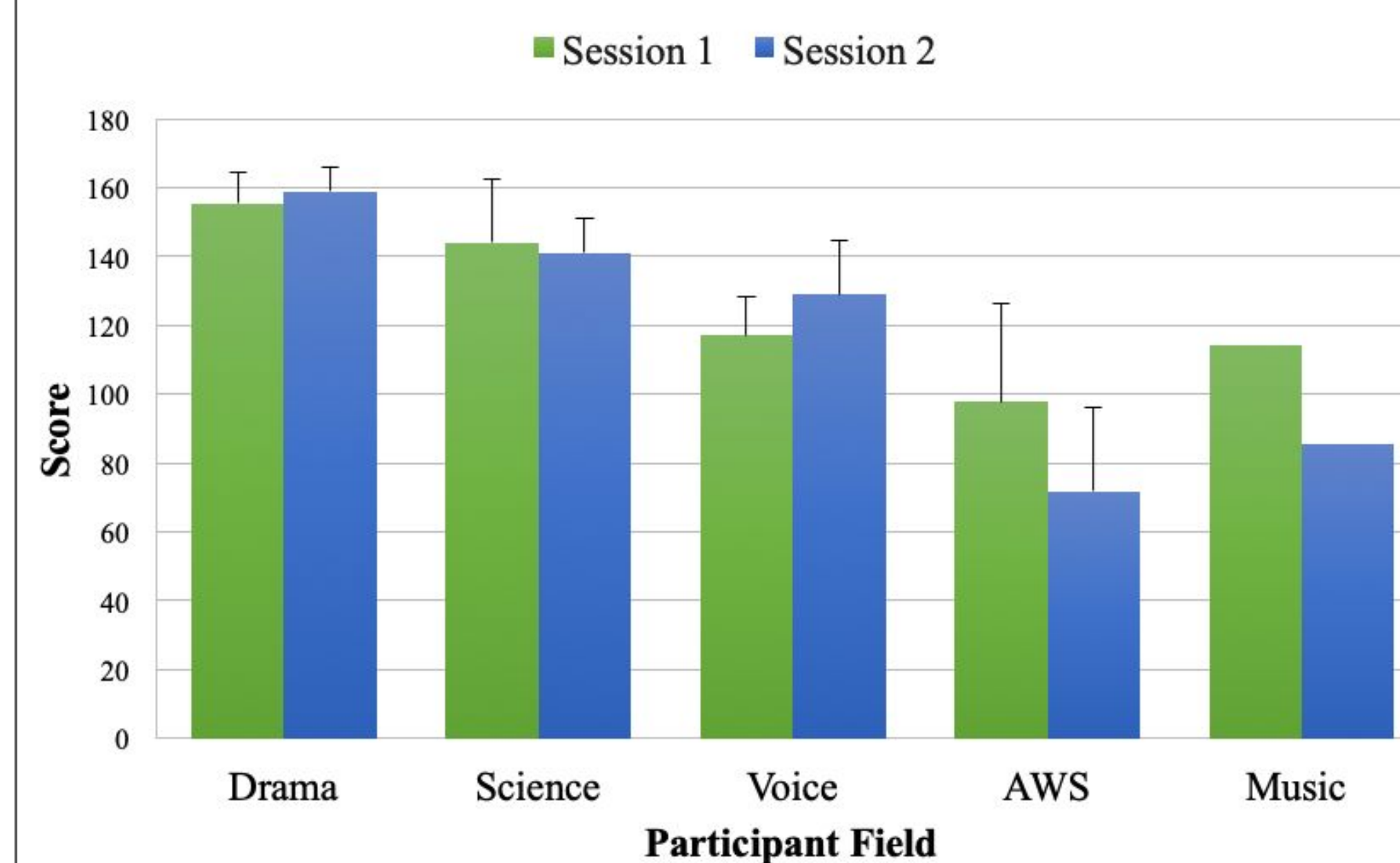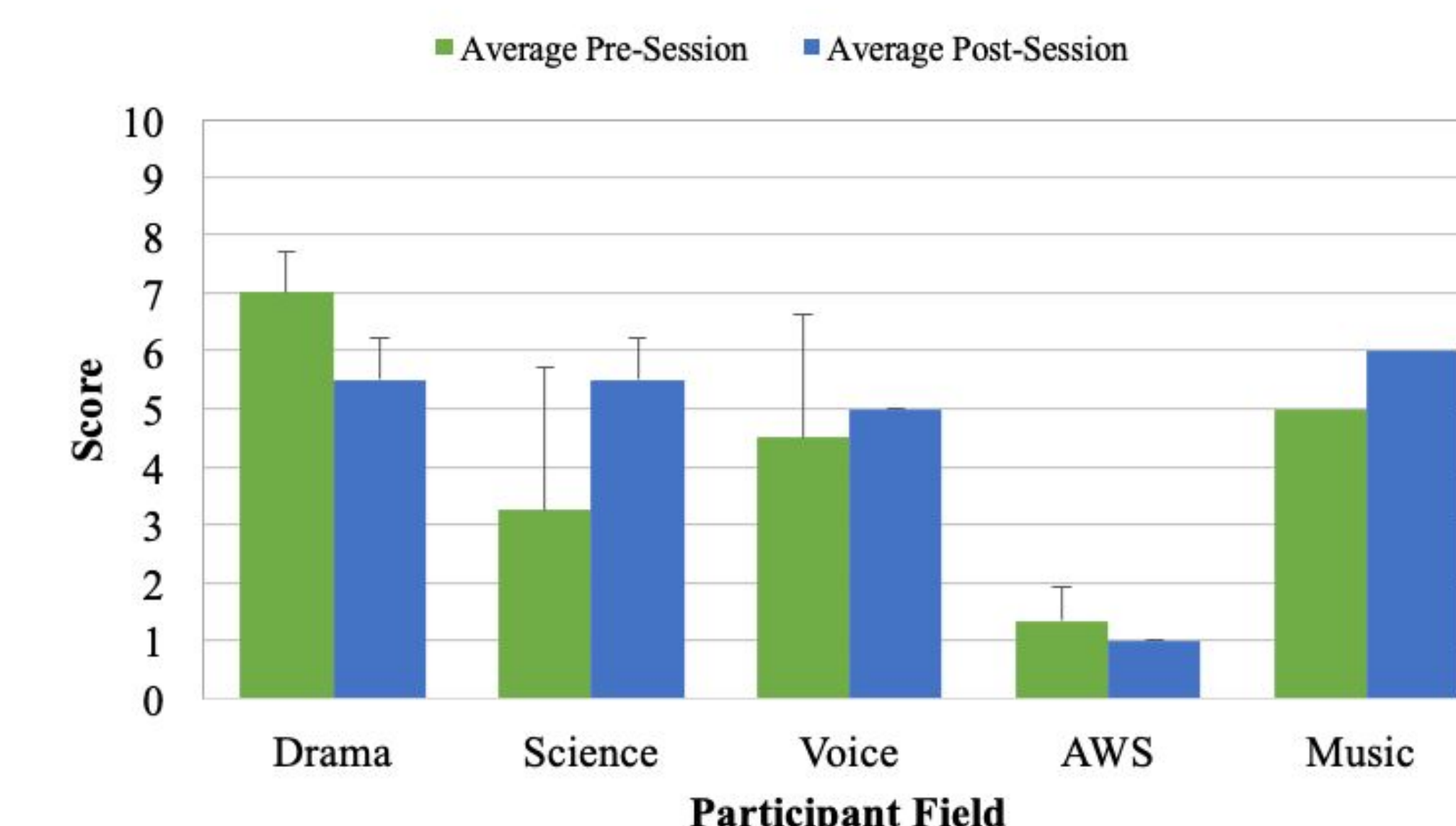
Public Speaking Anxiety Scale (PSAS)
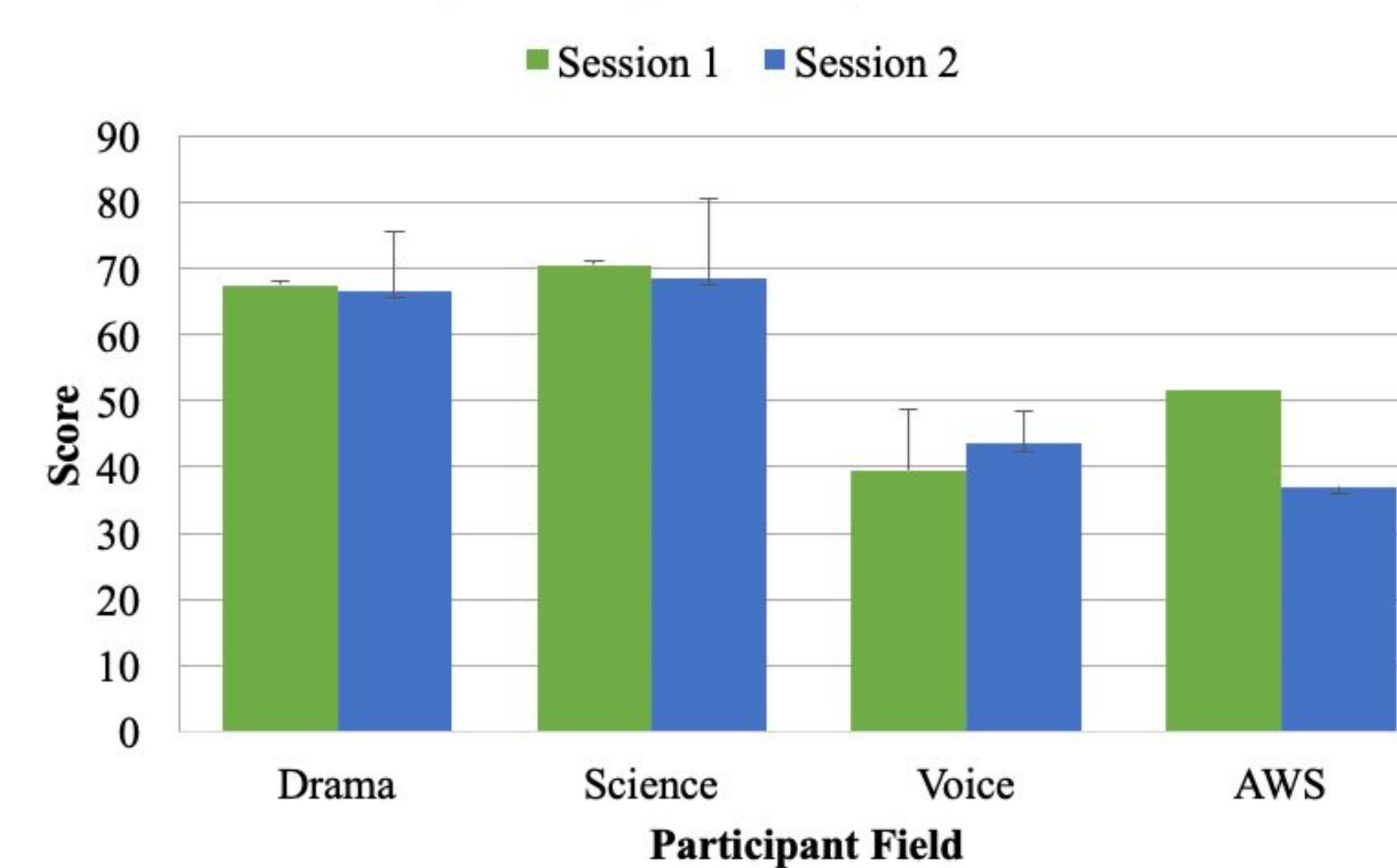
Presence Questionnaire
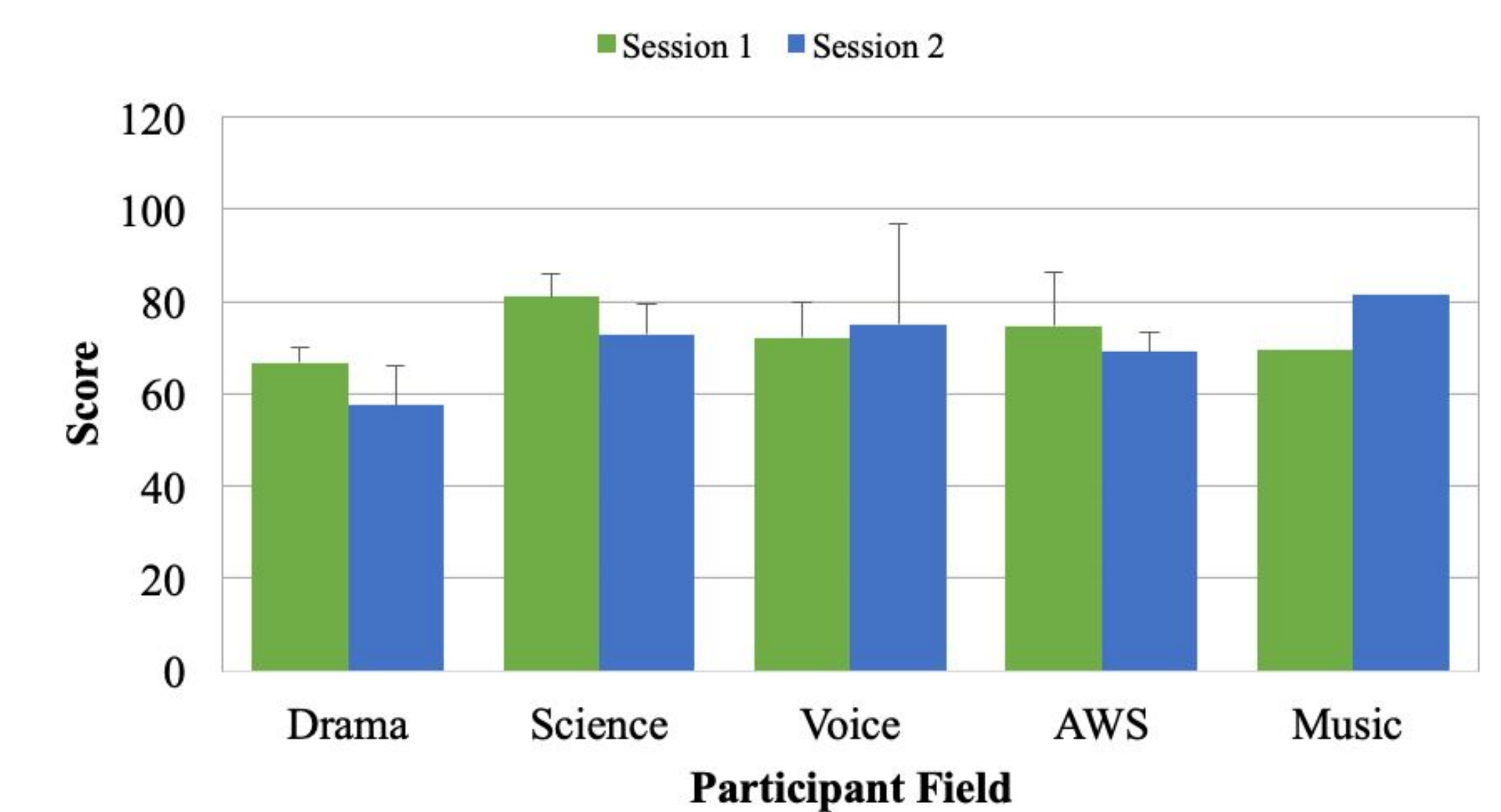
Session 1 - Subject Units of Distress Scale (SUDS)

Session 2 - Subject Units of Distress Scale (SUDS)

Discussion

- VR did not change most measures of performance anxiety between sessions in this varied group of participants
- VR effectively elicited performance anxiety within sessions among participants (excluding AWS)
  - AWS were not selected based on levels of performance anxiety, whereas all other participants self-reported a high level of performance anxiety. Therefore, there was a smaller likelihood of performance anxiety in AWS. AWS were participating in ongoing therapy and were receiving in-depth guidance on social communication.
- The effectiveness of VR environments in eliciting performance anxiety opens up opportunities to reduce that anxiety through repeated exposure and practice under VR
- Participants reported similar perceptions of how realistic the VR environment and experience felt to them

Limitations

There were a limited number of sessions per participant and few participants from each discipline. Additionally, some participants did not complete portions of the data collection as they did not feel it was relevant to their experiences (e.g. PSAS for musicians with performance anxiety). Participant environmental factors were not controlled for (i.e. AWS in intensive program), and there were some inconsistent procedures between participants (e.g. a student's professor being present at a session, timing of questionnaires).

Future Directions

- More sessions with a larger sample size per discipline are needed
- Students in a single class will practice class presentations under VR (i.e. a single discipline with a larger sample size and more sessions) culminating in a presentation in a real, relevant setting
- Future iterations of this research will involve haptic measures (e.g. galvanic skin response)
- Opportunities for Speech-Language Pathology:
  - Low-stakes practice environment for clients with communication difficulties
  - Practice in a realistic setting may promote generalization of skills to real conversation partners
  - Aligns with the Institute for Stuttering Treatment and Research (ISTAR) approach to transfer and maintenance
  - Potential for self-led home practice and/or telerehabilitation as VR technology becomes more accessible

References

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Wallach, H. S., Safir, M. P., & Bar-Zvi, M. (2009). Virtual Reality Cognitive Behavior Therapy for Public Speaking Anxiety: A Randomized Clinical Trial. *Behavior Modification, 33*(3), 314–338. doi: 10.1177/0145445509331926