Enhancing Meditation Through Virtual Reality: The Effect of VR on Mindfulness and Well-Being.

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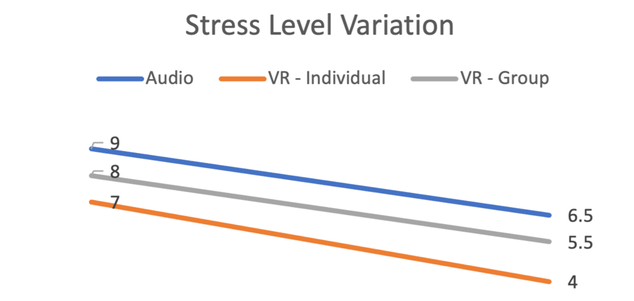
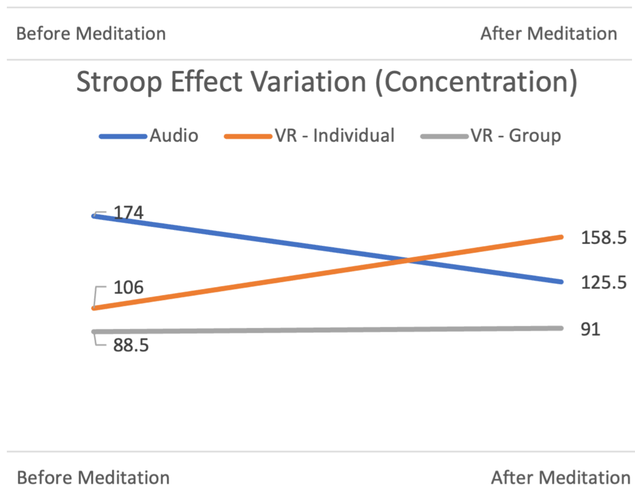
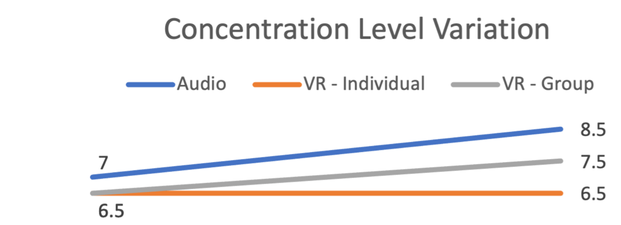
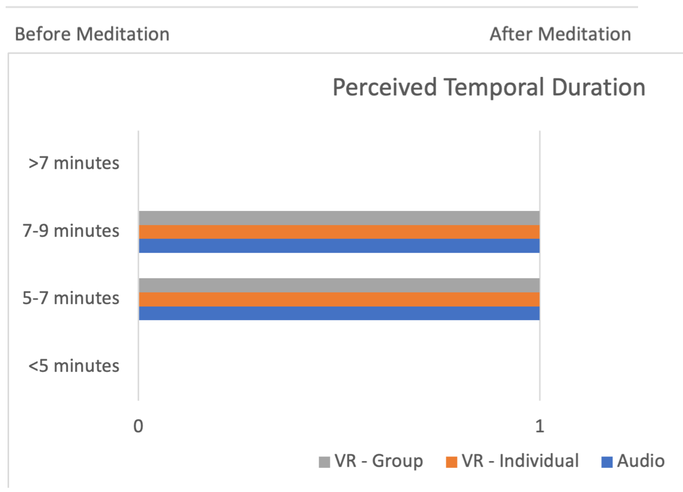
Introduction

In the evolving nexus of ancient traditions and technological progress, the fusion of millennia-old meditation practices with Virtual Reality (VR) unfolds a captivating frontier for well-being. Our research, following a preliminary research on this topic [1], aims at comparing it to traditional audio practices in the dimensions of concentration, temporal perception, and stress reduction. Our research also explores group dynamics in VR meditation effect.







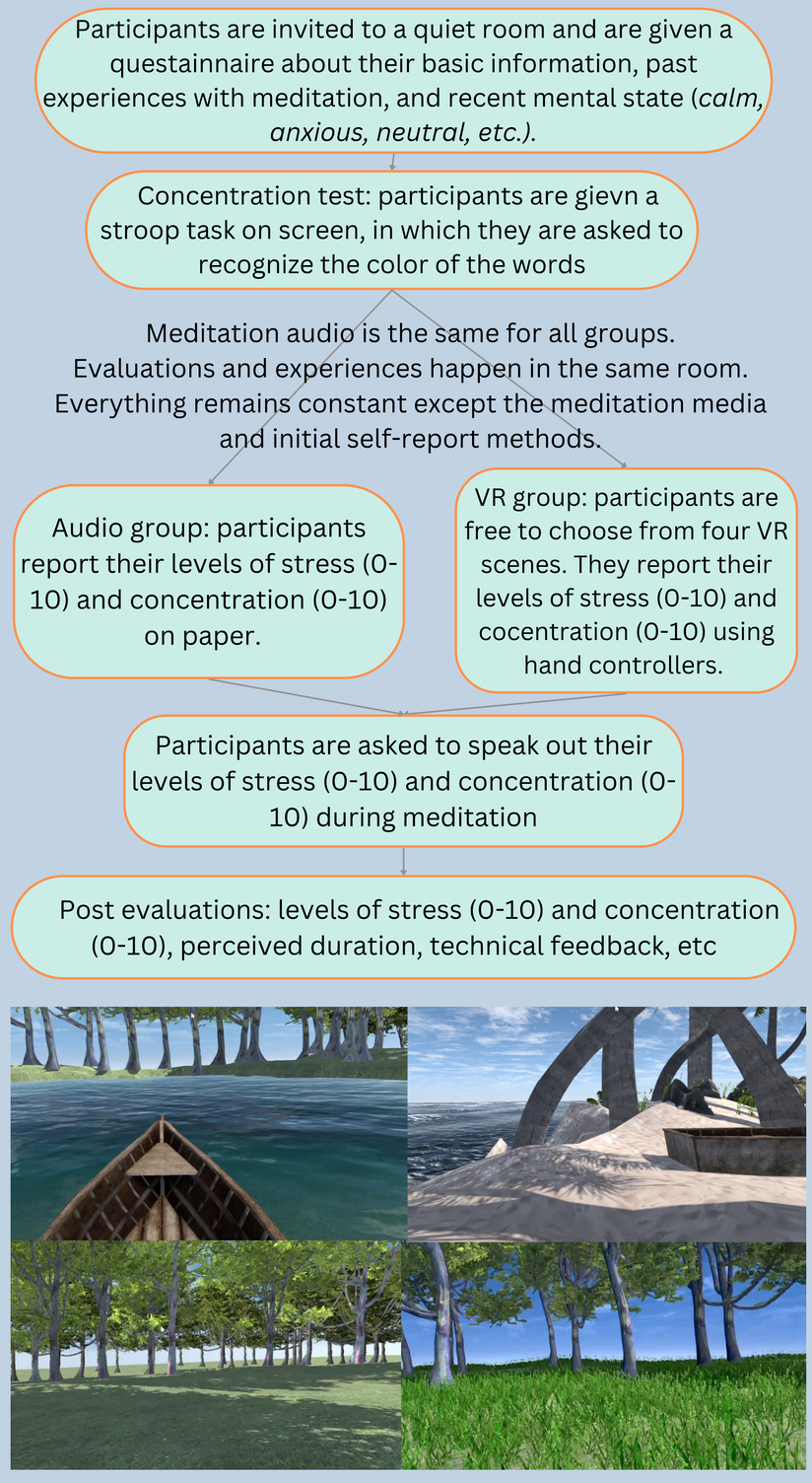


Research Questions

- Does guided meditation in a virtual reality environment lead to a significantly different level of **perceived concentration** compared to traditional audio-guided meditation?
- Are there substantial differences in the perception of **temporal duration** between participants who meditate in VR and those who meditate with only audio guidance?
- To what extent does VR-enhanced meditation reduce **stress** compared to traditional meditation practices?
- Does the **co-presence of other characters** in the VR scene effect the effectiveness of VR meditation?

Methodology

- Six college student participants.
- Meditation materials: license-free online audios (7.5 minutes) [2] and tests & four VR scenes created with Unity.
- Basic information sheet, Stroop task [3], self-evaluation forms, feedback forms



Results

- **Stress Reduction**

Participants **adapted well to the VR environment**, with no increase in anxiety during meditation. In both the Audio and VR groups, 50% showed a decrease in stress levels (e.g., Audio: 8 to 3, VR-Individual: 7 to 1), indicating similar efficacy in anxiety reduction. Likewise, 50% in both VR individual (e.g., 7 to 1) and group settings (e.g., 8 to 3) reported stress reduction, suggesting **comparable effectiveness in these VR meditation formats.**

- **Perceived Concentration**

Participants across all groups experienced varying concentration levels, with the Audio group showing a notable increase in concentration (e.g., Stroop Effect 174ms to 125.5ms), as opposed to less distinct changes in the VR groups. This suggests **a potential advantage of audio meditation in enhancing concentration**.

- **Temporal Duration**

Participants' estimates of meditation duration and immersion levels were consistent across all groups. Both Audio and VR meditations (Audio: 1* “7-9 mins” + 1* “5-7 mins” & average immersive perception “8.5”; VR: 2* “7-9 mins” + 2* “5-7 mins” & average immersive perception “8”) led to similar perceptions of time. **No significant differences in creating immersive environments** among different groups were found.

- **Co-presence of other characters**

In both the VR individual and VR group settings, 50% of participants reported decreased stress levels, indicating that the co-presence of others **does not lead to a significantly different effect** in reducing participant stress. Similarly, both individual and group meditations in a VR setting **do not show a significant difference** in terms of perceived concentration and temporal durations. **No relation between meditation outcome and co-presence in VR was found.**

References

[1] Sin, Nancy L., and Sonja Lyubomirsky. “Enhancing Well-Being and Alleviating Depressive Symptoms with Positive Psychology Interventions: A Practice-Friendly Meta-Analysis.” Journal of Clinical Psychology, vol. 65, no. 5, 2009, pp. 467–487, doi:10.1002/jclp.20593.

[2] “7 Minute Meditation to Reduce Stress and Anxiety.” YouTube, National Center on Health, Physical Activity and Disability, 10 Oct. 2022, youtu.be/QQ0b8XAOZlE?si=dmIWV7jqRHvv9q3P.

[3] Scarpina, F., & Tagini, S. (2017). The Stroop color and word test. Frontiers in Psychology, 8. https://doi.org/10.3389/fpsyg.2017.00557

Discussion

This study on VR meditation was constrained by **the number of participants** and **the implementation of the VR experience.** Additionally, the **duration of the meditation sessions** may have impacted the results. For some participants, particularly in the VR environment, the length of meditation might have been too long, potentially affecting their concentration and stress levels. Therefore, future research should consider a larger sample size, improved VR designs, varied meditation durations consulted with professional therapists or psychological experts, and more comprehensive data collection and analysis.

Several potential applications can be discerned from the research questions, offering insightful directions for future exploration:
1. **Personalized Meditation Experiences** with Customized Environments, Sounds, and Visual Elements;
2. **Alternative Tool to Traditional Meditation Methods** for Individuals Uninterested in Conventional Practices or Attracted to Emerging VR Technologies;
3. **Research Tool** Enabling Researchers to Precisely Control and Alter Meditation Environments.