



Can a 360° VIRTUAL REALITY NATURE IMMERSION elicit the same PSYCHOLOGICAL AFFECT as the PHYSICAL OUTDOORS?

Aim & Context

Connection to nature has been researched extensively over the last decade, with research showing that **nature influences human well-being by reducing environmental stressors that occur in everyday life** (Silvia et al., 2018).

However, with more individuals living in cities with limited access to safe natural spaces, it's crucial to conduct research looking at alternatives to physical nature (Rigolon et al., 2018). One inexpensive and accessible way to provide this nature experience is through a 360° video in Virtual Reality (VR).

Due to VR being a modern invention, there are limited studies looking at nature experiences using a 360° video in VR (Browning et al., 2020; Calogiuri et al., 2018). Consequently, this study aimed to expand on this research by looking at the **impacts that a 360° virtual reality natural environment has on psychological affect, in this case mood, in comparison to physical nature.**

This URSS project will hopefully provide a basis for the development of a virtual intervention that can be implemented in clinical settings and areas which have limited access to nature.

Want more information about the rationale/references?



The objectives of this study are to investigate:

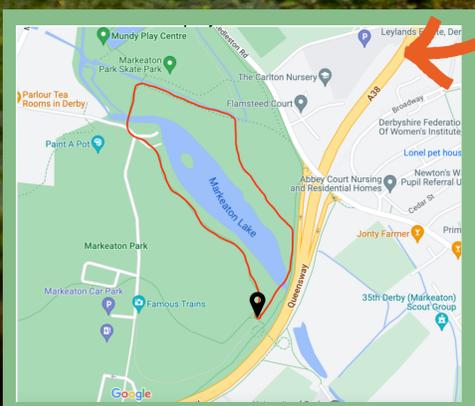
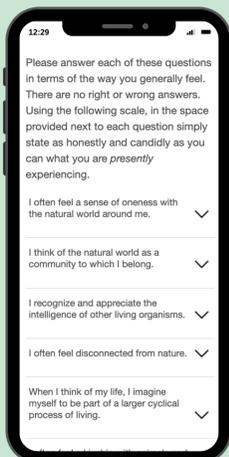
1. The difference between the affect scores following a Virtual Reality 360° 15-minute "walk" versus the scores following an outdoor 15-minute walk.
2. Participants' nature connection versus their mood scores following both conditions.
3. How the experience of nature in Virtual Reality made participants feel in comparison to physical nature.

Methods, Procedure & Analysis

The sample consisted of **10 University of Derby students**, ranging from 18 to 44 years old. The sample varied in ethnic origin with 7 participants identifying as white, 2 as Asian, 1 as mixed ethnicity and 1 preferred not to say. Participants were recruited through an opportunity sample by promoting the study physically at the University of Derby and online through Teams.

The first part of the procedure consisted of the participants filling out a **14-item 5-point Likert Connectedness to Nature Scale** (Mayer & Frants, 2004) that was distributed through Qualtrics. Following this a date and time to do both conditions were agreed on (VR Nature condition and Physical Nature condition).

The participants were required to fill out a **20-item 5-point Likert Positive and Negative Affect Schedule (PANAS)** scale prior to and post each condition (Watson, Clark & Tellegen, 1988). The participants were required to walk for 15min (whilst standing still) in the VR condition, then walk the same 15min route in Markeaton Park, with a 30min break in-between.



Agata Napiorkowska

Supervisors: Dr Carol Stalker & Dr Chris Windmill

Results & Discussion

Negative affect – Reduced in both VR and Nature walk conditions

A significant difference between negative affect scores of participants pre-VR and post-VR immersion (Wilcoxon's T (N = 10) = 11.5, z = -1.638, p = .05, d = 0.6, one-tailed) with moderate effect size was found. Indicating that there was a significant difference between pre and post-VR immersion (13.5 vs 11) with the negative affects being reduced post-VR.

A significant difference between negative affect scores pre and post-walk scores was identified (Wilcoxon's T (N = 10) = 1.5, z = -1.633, p = .05, d = 0.73, one-tailed) with pre-walk negative affect scores being higher than post-walk scores (13.5 vs 10.5) indicating a significant reduction in negative affect after the walk in nature.

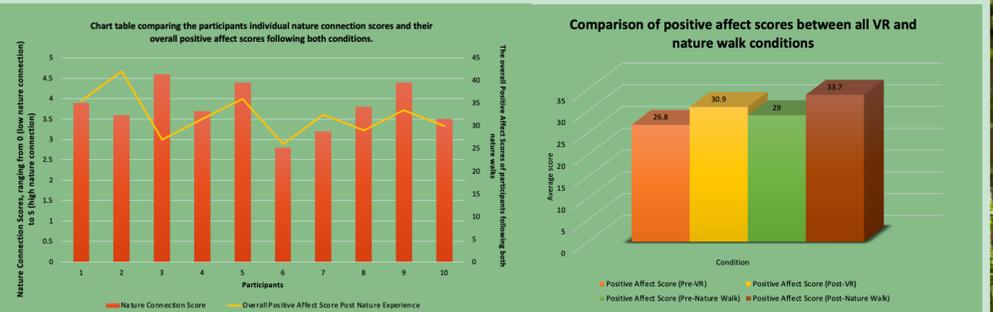
The difference between the two groups, post-VR (11) and post-nature walk (10.5), showed a moderate decrease in negative affect scores, therefore indicating that to an extent a VR 360° nature immersion can cause negative affect to decrease.

Positive affect- Increased in both VR and Nature walk conditions

There was a significant effect of a 360° nature immersion VR walk on mood (t = -2.845, df= 9, p= .010, one-tailed, d= -0.69) such that positive affect scores recorded prior to the VR walk (Mean = 26.8, SD= 6.25) were significantly lower than those recorded after the VR nature walk (Mean = 30.9, SD= 5.59).

There was a significant effect of a nature walk on mood (t= -3.615, df= 9, p= .003, one-tailed, d= -0.80) such that positive affect scores recorded prior to the nature walk (Mean = 29, SD= 6.68) were significantly lower than those recorded after the nature walk (Mean = 33.7, SD= 4).

Positive affect scores significantly increased post-VR (30.9) and post-nature walk (33.7), however, the difference between the two conditions is slightly bigger, indicating that walking physically in-nature increases positive mood more than walking in a VR nature immersion.



Some of the findings in this study support those found by Browning and others (2020), positive affect also was found to increase post-nature exposure, however, Browning and others did not find any change in the positive affect scores of participants in their VR group. Whilst this study has found a significant increase in positive affect scores post-VR walk, even though this study had a smaller sample.

When comparing nature connection scores and overall positive affect scores (after intervention) no significant relationships were found, therefore indicating that mood changes after interacting with nature do not differ depending on an individual's personal connection to nature.

Participants were asked to compare their experience of walking in VR to walking in nature, 3 out of 10 participants filled this out. All 3 reported negatives about the VR experience, such as, "headset is distracting" "groggy feeling and tired eyes" "doesn't stimulate all 5 senses" "less bored when walking in nature than in VR"

Conclusion

- 360° nature immersion can increase positive affect scores and decrease negative affect scores of participants, therefore indicating that psychological affect (mood) can improve post-intervention.
- This study has found similar findings to previous research (Browning et al., 2020; Calogiuri et al., 2018), however, unlike previous research, it did find that positive and negative affect scores improved post-VR.
- No relationship was found between participants' nature connection scores and their post-nature (and post-VR nature) affect scores.
- Participants reported that VR-nature immersion does not feel the same as physical nature, with it not stimulating all 5 senses, being more boring due to standing rather than physically walking and causing a groggy/tired feeling.

