previous studies were constructed with an exclusive in-house program or relatively expensive professional software. To reduce cost and improve access, several research teams have successfully employed VEs created from inexpensive Game Level Editors (GLE) to treat arachnophobia and claustrophobia [3,4]. Ipso facto, our objectives are twofold. Firstly, the study measured the isolated effect of VREBT when compared to a combined treatment of VR and cognitive therapy. The efficacy of the treatment was assessed using self-report questionnaires, behavioral tests as well as physiological measures. Our secondary objective focused on demonstrating that affordable means, such as a GLE, allow the experimenters to construct various VEs realistic enough to induce a feeling of presence and to obtain therapeutic efficacy.

**Methodology**

Eighteen participants diagnosed with agoraphobia were recruited for the clinical trial. They were randomly assigned to two therapeutic groups: one group receiving VR only (VRO); and one group receiving VR and cognitive therapy (VRC). The protocol included 10 weekly sessions of 90 minutes each for the two groups; eight sessions of VRET for both groups; two neutral initial sessions for the VRO group; and two initial sessions of cognitive therapy for the VRC group. The eight sessions of VREBT comprised an exposure to nine different context graded VEs related to agoraphobia (airplane, subway, driving, etc.) supplemented with interoceptive cues (heartbeat sounds, tunnel vision, etc.) To explore the VEs elaborated with a selected GLE, participants donned a Head Mounted Display with a motion tracker. Questionnaires, behavior tests and physiological measures were registered before and after the treatment procedure.

**Results**

Means and ANOVA F values of the dependent variables evidenced a significant time effect for all measures. There was no significant interaction (time/group) for these scores. PQ rating indicated that the patients felt immersed in the VEs.

**Conclusion**

The present clinical trial demonstrated the therapeutic effectiveness and presence eliciting effect of VEs constructed with a GLE. Results also revealed the isolated positive outcome of VREBT for agoraphobia. The addition of cognitive therapy did not generate any significant difference. Future research should explore the use of other components in addition to cognitive therapy and VREBT (relaxation, mindfulness, etc.)

**References**


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**Youths are More Apprehensive and Frightened Than Adults by a Virtual Environment Used to Treat Arachnophobia**

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**Abstract**

To overcome their fear, phobic adults are more attracted to a Virtual Reality (VR) exposure-based treat-

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ment than an in vivo exposure-based treatment. Even if they are born in the technological era, anxious children don’t seem very enthusiastic with idea of using VR to overcome their anxiety’s problem. For some phobic children, VR exposure can be apprehended as a frightening experience. This study examines the difference between children and adults’ perception toward stimuli used in VR to treat arachnophobia. Expectations of 313 participants aged younger than 18, and 210 aged 18 and older were measured while immersed in VR just before opening a door that would lead to an environment used to treat arachnophobia. Results show a significant difference between children and adults’ perception toward how large, scary and dangerous the spider would be. Apprehension toward a virtual rabbit was used as a control variable. The findings are clinically very important as they suggest that before using VR to expose a child in therapy, the therapist should carefully describe the virtual stimuli, a precaution that is not necessary or routinely done with adults.

**Keywords**: Virtual Reality, Children, Virtual Phobic Stimuli, Apprehension, Arachnophobia, Virtual Reality Exposure

**Introduction**

To overcome their fear, phobic adults are more attracted to a Virtual Reality (VR) exposure-based treatment than an in vivo exposure-based treatment. Even if they are born in the technological era, anxious children don’t seem very enthusiastic with the idea of using VR to overcome their anxiety’s problem. For some phobic children, VR exposure can be apprehended as a frightening experience. This study examines the difference between children and adults’ perception toward stimuli used in VR to treat arachnophobia. Expectations of 313 participants aged younger than 18, and 210 aged 18 and older were measured while immersed in VR just before opening a door that would lead to an environment used to treat arachnophobia.

Results show a significant difference between children and adults’ perception toward how large, scary and dangerous the spider would be. Apprehension toward a virtual rabbit was used as a control variable. The findings are critically important as they suggest that before using VR to expose a child in therapy, the therapist should carefully describe the virtual stimuli, a precaution that is not necessary or routinely done with adults.

**Conclusion/Discussion**

The approach to introducing children to exposure-based interventions for childhood anxiety is much similar to what is done with adults, including how to present VR-based treatments [4]. The results of this study show how children’s perception toward phobic virtual stimuli is quite different from adults. These results are clinically important, especially for professionals who might use VR exposure to treat children anxiety.

A key issue that emerges from this study is the importance of carefully preparing anxious children prior to VR-based exposure. Knowing that children usually have a very creative imagination and that anxious children have a greater tendency to anticipate future events in a negative way [2], restructuring excessive apprehension toward what therapeutic 3-D stimuli entails becomes almost essential since children can be over apprehensive.

**References**


