iSenseVR: A Cost Effective Virtual Reality Gradual Exposure Therapy Approach

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1. Introduction

Many individuals with hidden disabilities such as Autism, acute sensory hypersensitivity, mental health conditions and anxiety experience extreme difficulties with heightened noise and/or crowded situations within environments. These sensory cues can act as social barriers, impeding them doing what most may consider as everyday activities.

On the one hand, there are established strategies such as Social Stories™ (Karayazi et al., 2014); and organised pre-visits of facilities as reasonable adjustments, already in place to help individuals with hidden disabilities to cope with critical places, however they often fail to contribute to the development of tolerance mechanisms for sensory hypersensitivity. On the other hand, conventional exposure therapy, among others, remains helpful (Botella et al. (2015)), however it can become quickly too complex to set up due to difficulties to control specific environment cues, as those typically found in busy wide spaces.

Virtual reality (VR), as an immersive computing experience which empowers an individual to interact within a digital environment, can induce presence, the psychological sensation of being present in a virtual environment (Lombard and Ditton (1997)), which arises from the perceptual illusion of non-mediation within the digital environment. Immersion and presence in VR are believed to enable triggering of strong emo-

tional responses and more particularly the physiological components of anxiety, capable of provoking psychophysiological arousal in all individuals (Diemer et al. (2014)). When controlling specific environmental in the real world become unachievable in the context of traditional exposure therapy, VR offers opportunities for highly controllable settings empowering sensory exposure which would not be possible otherwise. For this reason, VR is considered as a promising facilitator of exposure therapy for the improvement of psychological wellbeing offering opportunities to tackle mental and developmental disorders (Botella et al. (2015); Diemer et al. (2014)). Nonetheless, most endeavours to apply VR to exposure therapy have been limited to the laboratory settings (Grynszpan et al., 2014).

This demo presents iSenseVR, the outcome of an ongoing research project funded by the European Social Fund and the Social Innovation Fund from the Scottish Government, which aims to explore how Virtual Reality made available to most, can help those with hidden disabilities to overcome stress eliciting situations by allowing them to remotely experience controlled exposure to busy environments.

2. iSenseVR

iSenseVR is a mobile application for Android and IOS VR-ready smartphones and tablets. It aims to help individuals with hidden disabilities to develop tolerance to the environmental stressors that are typically found in busy environments. It was developed building upon a co-design process which involved 26 volunteers with hidden disabilities who helped identifying typical environmental stressors that often lead them to experience high levels of anxiety and stress; and 7 other volunteers who helped assessing the user experience of a prototype version and proposing refinements for the final design of the proposed gradual exposure experience. Thus, iSenseVR proposes gradual increase of the density of crowd and those audio cues previously identified defined as critical, in digital reconstructions of busy environments that cannot be controlled for the purposes of conventional exposure therapy, such as the Aberdeen International Airport and a Job Centre at Shettleston, Glasgow. Five environments of interest have been identified in the Aberdeen International Airport (Figure1), the entrance hall, gender-specific toilets, the boarding areas, a café, and a plane. The digital reconstruction of Shettleston Job Centre for gradual exposure to crowd and audio stimuli is currently under development.
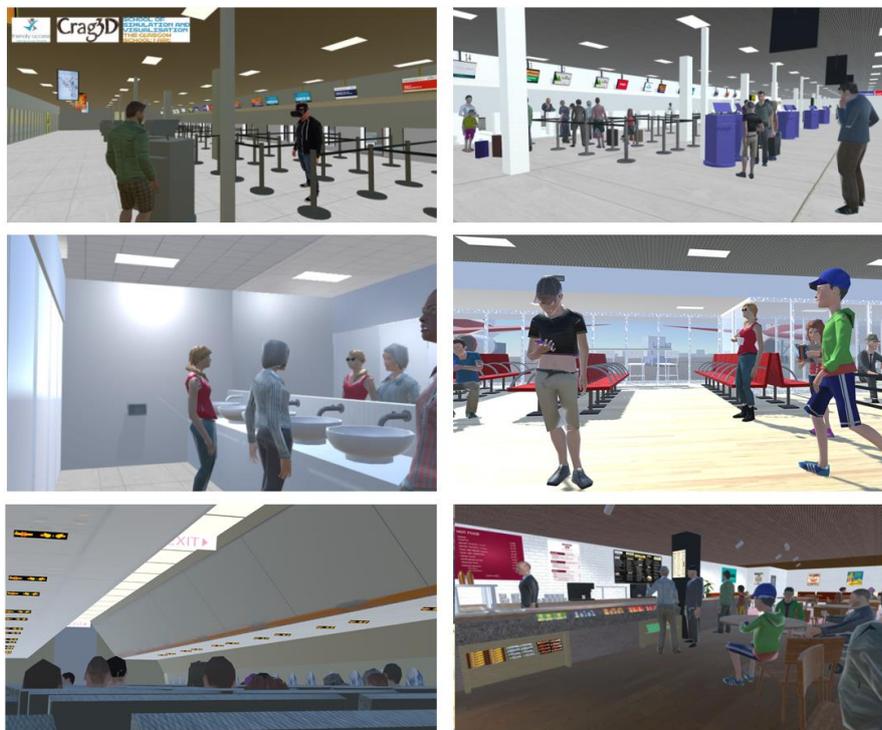

Figure 1. Digital reconstruction of the environments of interest at Aberdeen International Airport: top - Entrance hall; middle left - toilets; middle right - boarding area; bottom left - in flight plane; bottom right - café.

Users can thus either immerse themselves into several areas of the proposed environments using their own smartphone mounted in an affordable VR headset, or more traditionally experience controlled exposure through their tablet. In both cases, users are encouraged to use headphones to appreciate spatialized audio.

Within each digital environment, users are assigned a sequence of short missions to complete. The experience in each virtual environment is expected to last no more than 4 minutes in order not to overwhelm users.

The internal validity as the effectiveness to familiarise and desensitise to environmental stressors in a digital context, and the external validity as the ability to transfer to the real world, of iSenseVR are currently being assessed through two experimental studies; Positive and Negative Affect Schedule (PANAS) questionnaires are being used to explore the internal and external validities through a longitudinal pre-test vs. post-test experimental study. In addition, simplified PANAS questionnaires have been embedded in VR to monitor participants stress and anxiety resulting from the completion of each digital environment throughout of the proposed gradual exposure.

Acknowledgements

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