Affordable virtual reality tools for the treatment of mental health problems

Jill M. Newby and Michelle Y. W. Jiang

School of Psychology, The University of New South Wales (UNSW), Sydney, Australia

Freeman *et al.* (2017) provided a comprehensive overview of the *scientific literature* into virtual reality (VR). In particular, evidence supporting the efficacy of VR in the delivery of graded exposure therapy (Powers & Emmelkamp, 2008) highlights its usefulness in the treatment of anxiety and related disorders, where exposure is a key ingredient of effective treatment. Enabling clinicians to set up VR exposure situations that are too costly, or impractical to re-create in real life, and deliver them in a controlled and safe manner are particularly appealing aspects of VR.

Freeman *et al.* (2017) claim that progress has been '…slow because hardware and software have been expensive and expertise limited' but acknowledged 'this is about to change'. We argue that the technology has already progressed, but the literature has fallen behind. Affordable VR and augmented reality tools and technologies are already available for gaming and other uses, but their full potential has not been realized in the mental health domain. For example, using 360° cameras, we can take images and videos of real-life situations and view them in 360° surround view using a smartphone and low-cost VR headset (costing under \$25). These VR tools hold great potential to assess how individuals with mental health problems respond in 'emotionally charged' environments, and to individualize and tailor exposure scenarios to target specific fears, whilst maintaining immersion and presence thought to be key components of VR (Ling *et al.* 2014).

Freeman *et al.* argued that treatment trials have 'seldom been conducted to the standards now expected in clinical research'. Although we agree, a more concerning problem is that free VR tools that claim to 'cure' mental health problems are being released to the public without being evaluated, similar to the majority of 'mental health' apps that have been released without evidence (Donker *et al.* 2013). For example, one VR program – *Arachnophobia* by IgnisVR – claims to help people overcome 'irrational fears of spiders', but instead of gradually exposing individuals to spider situations, it floods the VR environment with virtual spiders, potentially worsening spider fears, and contributing to misperceptions of what exposure therapy entails (Fahey, 2016). Another program, Samsung's *BeFearless Heights* program, claims to help people overcome heights fears, but has never been evaluated in a peer-reviewed study, leaving it unclear whether it is safe or effective.

In addition to the three treatment questions outlined by Freeman *et al.* (2017), the lack of empirical scrutiny of freely available VR programs in the public domain also needs to be urgently addressed. Our challenge will be to ensure freely available VR programs are tested with the same scientific rigor expected of any mental health intervention. The technology is, as the authors state, 'developing fast'. A consequence of this fast-developing technology is that there is more technology available in the public domain than research to support it. We also need to keep abreast of rapid developments in affordable and accessible VR technologies, so that their potential to further our understanding, assessment, and treatment of mental disorders is realized, not wasted.

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