



Virtual Reality and Mental Health

Where are we now and where might we go?

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- Immersive VR allows users to interact with a computer-generated world/simulation
 - The users natural sensory perceptions are replaced with a digital 3D alternative
 - The environment can be interacted with in a realistic way using electronic equipment
 - Typical viewed with a head mounted display (HMD)



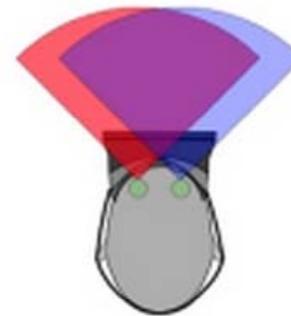
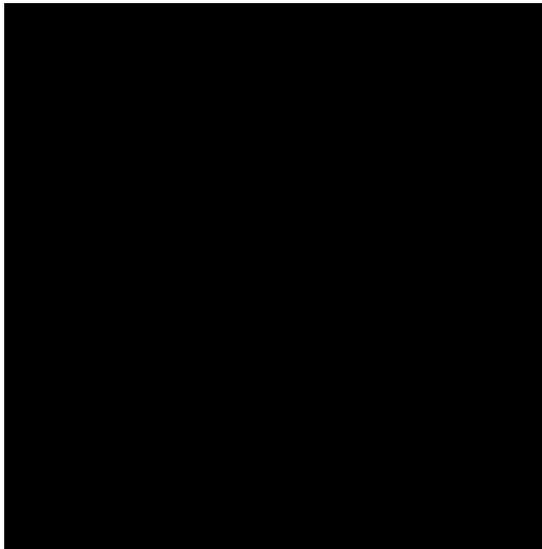
Achieving ecological validity in a virtual environment?

Immersion and Presence

- Place illusion the notion of being there in the virtual environment
- Plausibility illusion refers to the interactive nature of the environment

Technological advances

Screen resolution, field of view and FPS (frames per second)



90° FOV



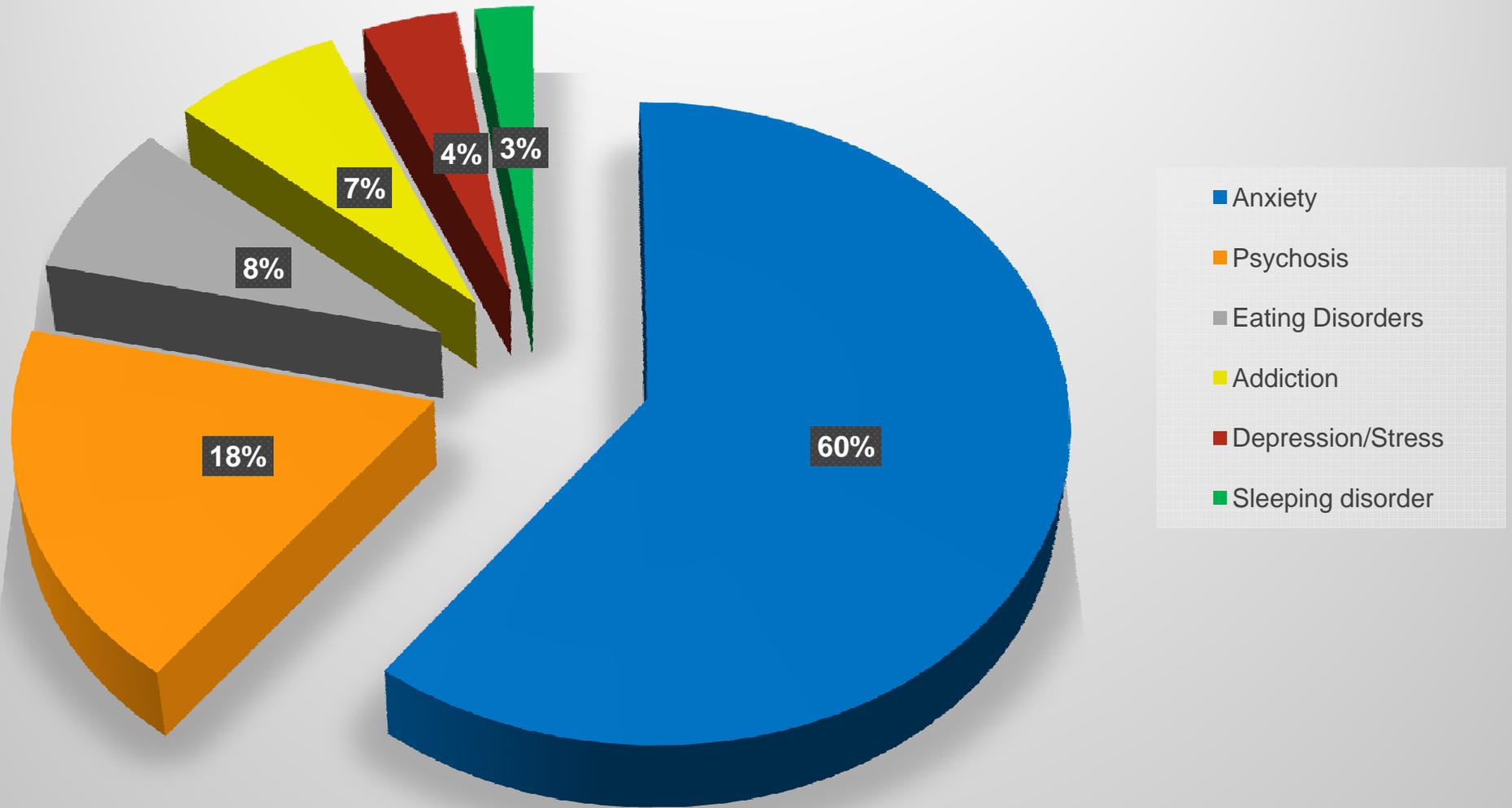
45° FOV

Virtual Reality and Healthcare

- First met in the 1990s as a simulation tool within medical education
- 2D virtual environments have been used to train students, interact with patients and provide medical advice
- Offers the freedom to design adaptable environments/scenarios used for the assessment of behaviours, emotions and cognitions
- This adaptability and access to instant analytical data makes it an ideal platform for behaviour change



Mental Health Research 2012-2017



Virtual reality compared with in vivo exposure in the treatment of social anxiety disorder: a three-arm randomised controlled trial

Stephane Bouchard et al 2016

- Virtual reality exposure therapy (VRET) has been used to expose patients to fearful stimuli. (Proven to be an effective intervention for PTSD and a range of specific phobias)
- Aimed to show that conducting VR exposure with cognitive behaviour therapy (CBT) for SAD is effective and is more practical for therapists than conducting exposure *in vivo*
- Participants were randomly assigned to either VR exposure ($n = 17$), *in vivo* exposure ($n = 22$) or waiting list ($n = 20$).
- Conducting exposure in VR was more effective at post-treatment than *in vivo* on the primary outcome measure and on one secondary measure. Improvements were maintained at the 6-month follow-up.

Virtual Reality Exposure Therapy Versus Cognitive Behaviour Therapy for Panic Disorder With Agoraphobia: A randomized comparison study

Antoine Pelissolo et al 2012

- Comparing the effects of Virtual reality exposure therapy (VRET) versus cognitive behaviour therapy (CBT), and a waitlist control condition in patients with panic disorder with agoraphobia. (n = 92)
- The therapists conducted the computer program while taking into account the verbal and non-verbal reactions of the patients.
- 12 sessions were conducted, both groups witnessed a comparable reduction in symptoms including 9 month follow up
- Authors concluded “VRET seems to be an effective treatment for PDA with short-term and long-term therapeutic results equivalent to those obtained with CBT”

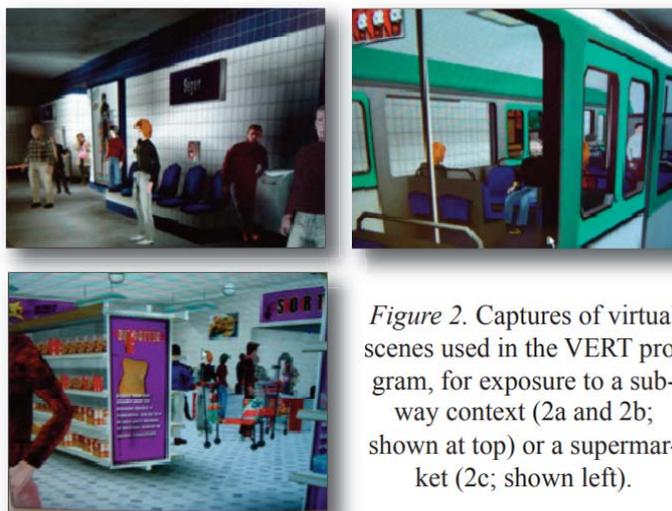


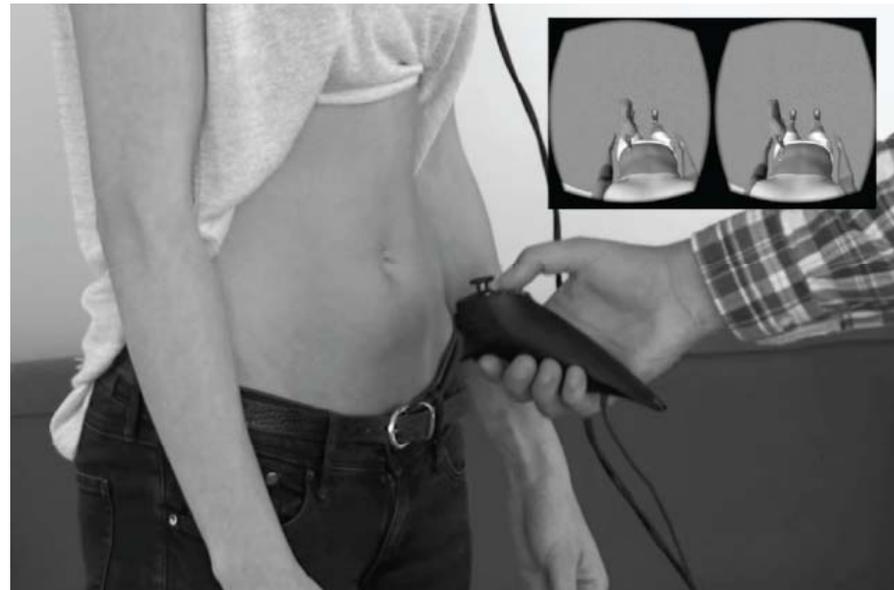
Figure 2. Captures of virtual scenes used in the VERT program, for exposure to a subway context (2a and 2b; shown at top) or a supermarket (2c; shown left).

A Virtual Reality Full Body Illusion

Improves Body Image Disturbance in Anorexia Nervosa

Keizer et al 2016

- Asked participants to estimate their body size (shoulders, abdomen, hips) before the **Full Body Illusion** was induced, directly after induction and at 2 hour 45 minutes follow-up
- Upon follow up size estimates of their shoulder width and circumference had normalized and no longer significantly differed from a health control group percentages of misestimation
- Patients also showed decreased overestimation of hip circumference
- Results lead us to conclude that the disturbed experience of body size in anorexia nervosa is flexible and can be changed, even for highly emotional body parts



Efficacy of the Virtual Reality-Based Stress Management Program on Stress-Related Variables in People With Mood Disorders: The Feasibility Study

Shah et al 2015

- Conducted in a tertiary hospital in Singapore the study aimed to investigate the effect of a VR-based stress management program on people with mood disorders.
- The program comprised three daily 1-hour sessions incorporating psychoeducation and VR-based relaxation practice.
- Participants who completed the program had significantly lowered subjective stress ($t = 6.91$, $p < 0.001$), depression ($t = 5.62$, $p < 0.001$), and anxiety ($t = 5.54$, $p < 0.001$); and increased skin temperature ($F = 17.71$, $p < 0.001$), perceived relaxation ($F = 26.20$, $p < 0.001$) and knowledge ($F = 13.77$, $p < 0.001$).
- Relaxation practice, Positive Stimuli?



Summarising where we are now

- VRET already a viable alternative to imaginal exposure due to the realism of fearful stimuli
- VR not yet ready to be clinical option on its own, despite initial positive findings. A platform to deliver traditional therapies
- More needs to be done to assess VR's ability to promote positive stimuli. Induced relaxation combined with health knowledge could prove to be a powerful tool for health perception
- Researchers using out dated equipment, results being obtained on systems with low specs compared to marketed versions today



Resolution	FPS	Field of View	Weight	Released
800 x 600	60 max	40°D	227g	2005

eMagin z800



Resolution	FPS	Field of View	Weight	Released
2160 x 1200	90max	110°D	470g	2015

Oculus Rift





Where might we go?

“There's a saying in technology: It's often easier to predict what the world is going to be like 20 years from now, than it is to predict what the world is going to be like three years from now”

Mark Zuckerberg

- Further technical improvements – 4K display
- Eye tracking/Foveated rendering
- Lower prices and increased accessibility
- Mobile VR that doesn't require smartphones
- Personalised spaces



Acknowledgements



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Thank you for your attention!

