

Is Virtual Reality better than Non-Virtual Reality Clinical Applications? A Discussion of Six Studies

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A Simple Assertion: VR Works

- Various uncontrolled and controlled studies have suggested that VR therapies work for several behavioral disorders
 - VR Therapeutic Exposure for Anxiety Disorders
 - VR Distraction for Pain Analgesia
 - VR Cue Exposure for Addictions
 - Experiential Cognitive Therapy for Eating Disorders

VR Works, But Other Therapies Work Too

- Although VR therapies are likely effective, why use them in favor of non-VR equivalents?
 - ~~VR~~ Therapeutic Exposure for Anxiety Disorders
 - ~~VR~~ Distraction for Pain Analgesia
 - ~~VR~~ Cue Exposure for Addictions
 - ~~Experiential~~ Cognitive Therapy for Eating Disorders

Show Me The Data...

- Research investigating the incremental validity, mechanisms, and generalizability of VR in behavioral health has been slow to proceed

The Incremental Validity Of VR Therapies

- Not only “Do VR therapies work?”, but also...
- *What does VR therapy provide that established therapies do not?*
 - Additional randomized, controlled research needed to establish whether there are advantages in efficacy
 - Controlled research needed to determine whether there are advantages over less expensive technology



The Generalizability of VR Therapies

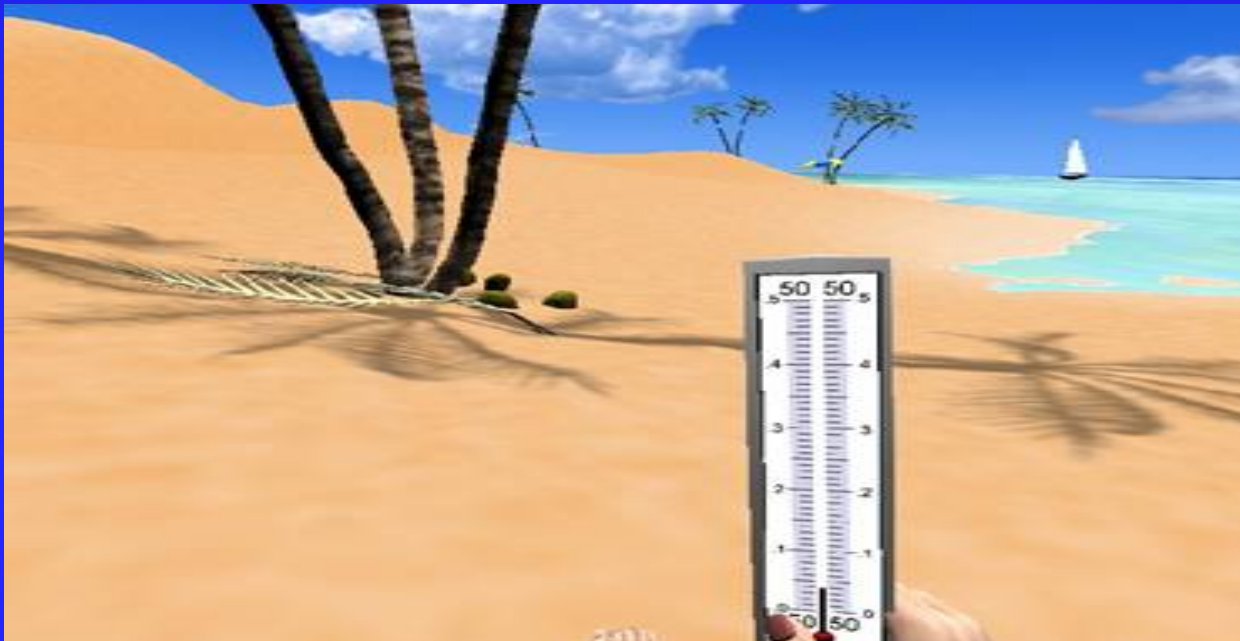
- Do VR therapies work across specific disorders, settings, and groups?
 - Generalizability should be sought within current applications of VR therapies
 - Generalizability should be sought beyond current applications of VR therapies

Walking the Walk...

- Pacific Telehealth & Technology Hui is conducting six studies that are designed to evaluate incremental validity and generalizability of VR
 - Biofeedback Assisted Self-Regulation in a Virtual Reality Environment
 - Virtual Reality Displays for the Presentation of Stimulus Cues for Nicotine Use: Panoramic Videography, Computer-Generated Graphics, and Flat-Screen Images
 - The Influence of Image Type on Reactivity to Anger Stimuli: Virtual Reality vs. Flat-Screen Imagery
 - A Comparison of Guided Imagery and Virtual Reality for the Treatment of Chronic Pain
 - Treatment Efficacy of Virtual Reality Distraction in the Reduction of Pain and Anxiety during Cystoscopy
 - The Efficacy of Virtual Reality in Treating Post-traumatic Stress Disorder in U.S. Warfighters Returning from Iraq and Afghanistan Combat Theaters

1. Biofeedback Assisted Self-Regulation in a Virtual Reality Environment

- Study to investigate potential benefits of VR for thermal regulation



Biofeedback Assisted Self-Regulation in a Virtual Reality Environment

- Three randomized, controlled conditions
 - Standard biofeedback training presented on a monitor
 - Standard biofeedback training presented in a HMD
 - Biofeedback training presented in a VR environment
- Conditions allow controlled comparisons between interventions of varying cost

Biofeedback Assisted Self-Regulation in a Virtual Reality Environment

- Results would inform future clinical trials for VR biofeedback treatment for several syndromes as yet uninvestigated
 - Hypertension
 - Migraine headaches
 - Raynaud's Disease
 - Chronic pain

2. Virtual Reality Displays for the Presentation of Stimulus Cues for Nicotine Use

- Two randomized, controlled conditions
 - Nicotine craving cues presented on a monitor
 - Nicotine craving cues presented in a panoramic, naturalistic VR environment
- Controlled comparisons between interventions of varying cost and complexity



Virtual Reality Displays for the Presentation of Stimulus Cues for Nicotine Use

- One of a limited number of randomized, controlled investigation of VR for the stimulus cue reactivity of craving
 - To date, only two published studies of VR cue reactivity for nicotine addiction
 - Only one randomized, controlled study
- One of few investigations evaluating panoramic, naturalistic VR for the stimulus cue reactivity of craving

Virtual Reality Displays for the Presentation of Stimulus Cues for Nicotine Use

- Results would inform future clinical trials for VR cue reactivity
 - Providing interventions specific to the patient
 - Predicting treatment outcome
 - Determining treatment success

3. The Influence of Image Type on Reactivity to Anger Stimuli

- Two randomized, controlled conditions
 - Anger eliciting scenarios presented on a monitor
 - Anger eliciting scenarios presented in a panoramic, naturalistic VR environment
- Controlled comparison between VR and a less expensive monitor presentation



The Influence of Image Type on Reactivity to Anger Stimuli

- One of few studies to investigate potential advantages of VR for stimulus cue reactivity of emotion
- Results can inform future clinical trials for VR cue reactivity treatment for anger and for syndromes characterized by anger

4. A Comparison of Guided Imagery and Virtual Reality for the Treatment of Chronic Pain

- One of few studies to investigate potential advantages of VR guided imagery for chronic pain management
 - Prior research on VR for pain has focused primarily on acute pain



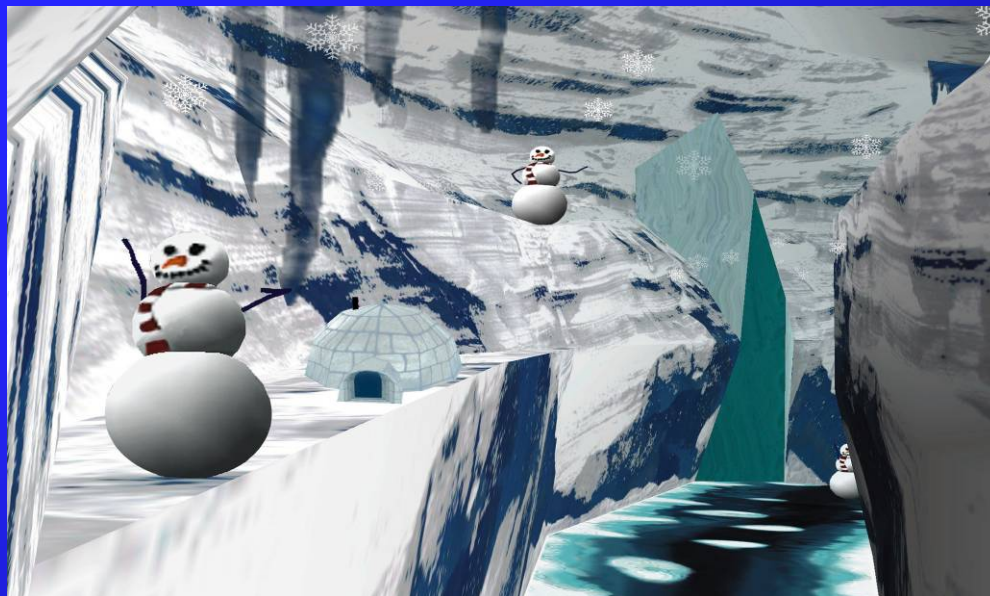
A Comparison of Guided Imagery and Virtual Reality for the Treatment of Chronic Pain

- Incremental Validity
 - Within-subjects, repeated measures design
 - Standard therapist guided imagery
 - Audio-tape guided imagery
 - Therapist guided imagery presented in a VR environment
 - A preliminary investigation comparing interventions of varying cost

5. Treatment Efficacy of Virtual Reality Distraction in the Reduction of Pain and Anxiety during Cystoscopy

- Controlled and case study research on pain has focused on burn pain
- First controlled study to investigate VR pain analgesia for cystoscopy
- Assesses less severe condition

Courtesy of Hunter Hoffman,
U. of Washington



Treatment Efficacy of Virtual Reality Distraction in the Reduction of Pain and Anxiety during Cystoscopy

- Two randomized, controlled conditions
 - Standard of care
 - VR environment for distraction from pain and anxiety
- Future research should evaluate advantages of VR distraction over other forms of distraction

6. The Efficacy of Virtual Reality in Treating Post-traumatic Stress Disorder

- One of the few randomized, controlled study of VR-based exposure for Post-traumatic Stress Disorder (PTSD)
- One of the few studies to investigate VR-based exposure with active duty soldiers

The Efficacy of Virtual Reality in Treating Post-traumatic Stress Disorder

- Two randomized, controlled conditions
 - Minimal attention control
 - VR-based cognitive behavioral therapy (CBT)
- Future research should evaluate advantages of VR-based CBT over standard CBT

Conclusions

- The promise of VR interventions is established
- Current and future research should emphasize advancement of the field
 - Randomized, controlled comparisons with active treatments
 - Biofeedback
 - Cue reactivity
 - Guided imagery
 - CBT

Conclusions

- Comparisons with less expensive technologies
 - Television monitor presentations
 - Less immersive presentations
- Generalizability
 - Establishing effectiveness with all exemplars of a category
 - Evaluating novel applications of VR interventions
- Value Added
 - Offers an immediate benefit
 - Keeps the bean counters happy
 - Improve chances of acceptance in the health care community
 - Helps insure the viability of future funding

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