

# VR Addictions Research: State of the Field and Promising New Technologies

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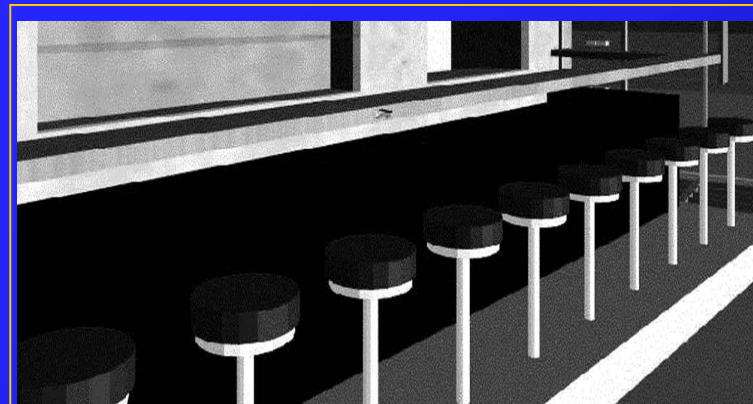
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# VR Addictions Research and Cue Reactivity

- Few studies applying VR to addictions
- Research focus on assessing cue reactivity
- Cue reactivity: use of conditioned stimuli to activate craving or addiction-related urges
- Early findings support VR cue exposure in eliciting craving response

# Cue Reactivity Study 1

- Very few published studies on cue reactivity, all are promising
  - Uncontrolled study for heroin exposure (Kuntze et al, 2001)
    - Cue exposure in bar
      - Heroin powder
      - Swabs
      - Syringe
      - Needle
      - Bloodied material
  - 5 participants reported craving and autonomic arousal



## Cue Reactivity Study 2

- Between-subjects controlled study for nicotine exposure (Lee et al, 2003)
  - Cue exposure comparing VR environment with pictorial representation
    - Alcoholic drink
    - Pack of cigarettes
    - A lighter
    - An ashtray
    - Avatars smoking cigarettes



# Cue Reactivity Study 2

## ➤ Study Outcomes

- VR condition: statistically significant change from pre to post ( $t = -2.54, p < .05$ )
- Pictorial condition: no statistically significant change from pre to post ( $t = 1.25$ )
- Post-test comparison effect size:  $d = .43$

## Cue Reactivity Study 3

- Within-subjects, repeated design study for nicotine exposure (Bordnick et al, 2004)
  - 2 cue exposure settings
    - Inanimate room with:
      - Burning cigarettes
      - Cigarette packs
      - Ash trays
      - A bar
      - Percolating coffee pot



# Cue Reactivity Study 3

## ➤ Animate room

- People smoking and drinking
- Interaction with offer of a cigarette



## ➤ Significant group main effects in cue exposure settings compared to baseline and neutral settings



# Technological Advances in VR Cue Reactivity

- VR environments used in most studies are computer-generated
  - VR environments more realistic over time
  - Recent innovations: video of people in computer graphics environment
- Panoramic videos provide naturalistic VR environments
  - Naturalistic cues may be more salient for activating craving
  - Faster to produce and potentially less expensive



# Technological Advances

- Provides opportunity to create novel VR environments
- Distribution less costly
- Example: 11-lens spherical camera for 360° video
- Interfaces with HMD for greater immersion



# Technological Advances in VR Cue Reactivity

- VR environments are naturalistic
- Viewer able to look in all directions
- Technology amenable to branching



# Evaluation of Panoramic Video & Cue Reactivity

- Planned nicotine cue reactivity study to evaluate:
  - Effects of display modality (flat screen vs HMD)
  - Efficacy of panoramic, naturalistic VR environment
- Randomized, controlled cue condition
  - Controlled comparisons between interventions of varying cost and complexity

## Summary

- Few VR addiction studies, more research is needed
- Results support effectiveness of VR for stimulus cue reactivity
- Advances in technology expand methodologies to create naturalistic VR environments

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