
NAATP
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Artificial Intelligence & Virtual Reality: The Future of Technology in Treatment Services

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IMAGINE A FUTURE

Current Limitations In Treatment

systemic barriers, societal barriers, individual barriers, innovation gaps

Pandemic Silver Linings

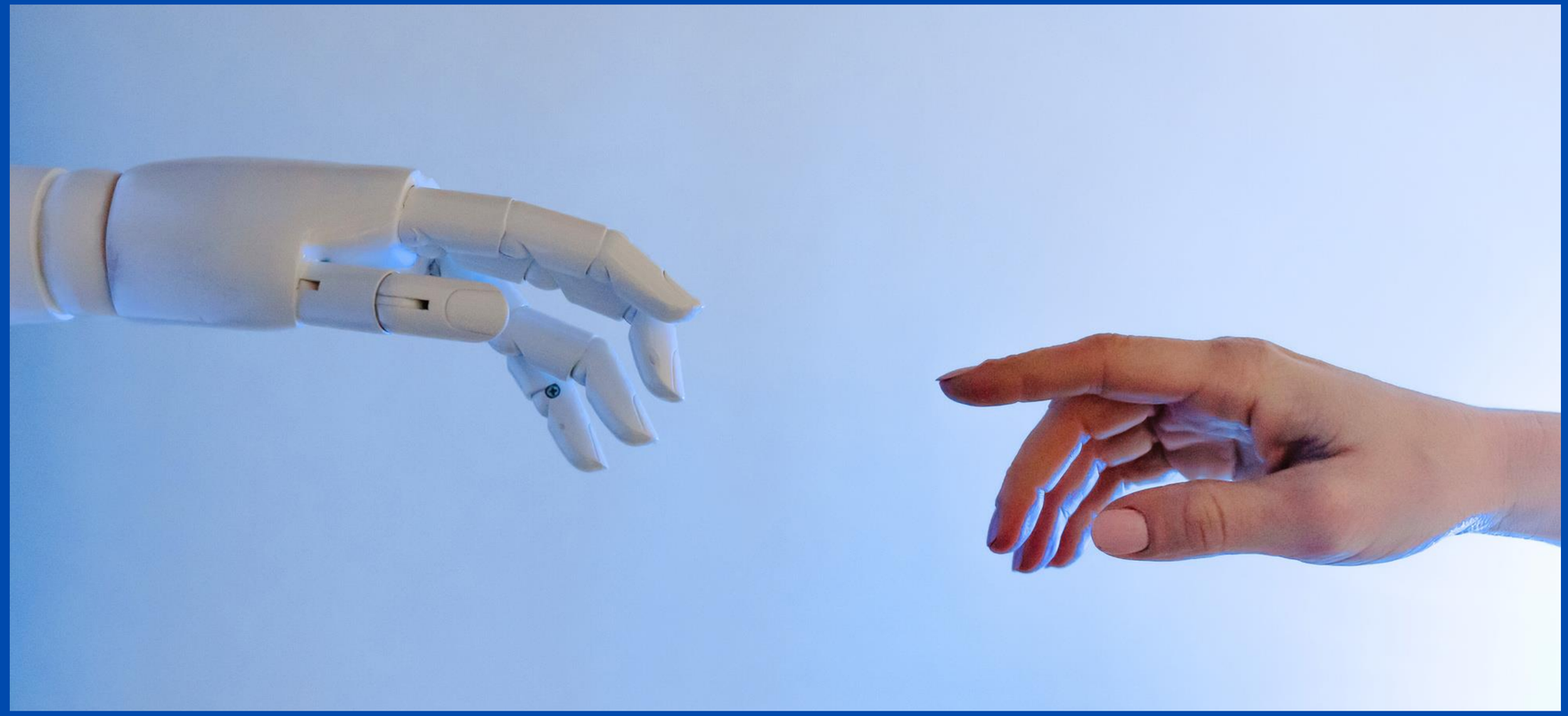
exposed vulnerabilities, enter

telehealth,

new technologies

PRESENTATION OBJECTIVES

Role of AI
Role of VR
Integration of AI & VR
Future Possibilities

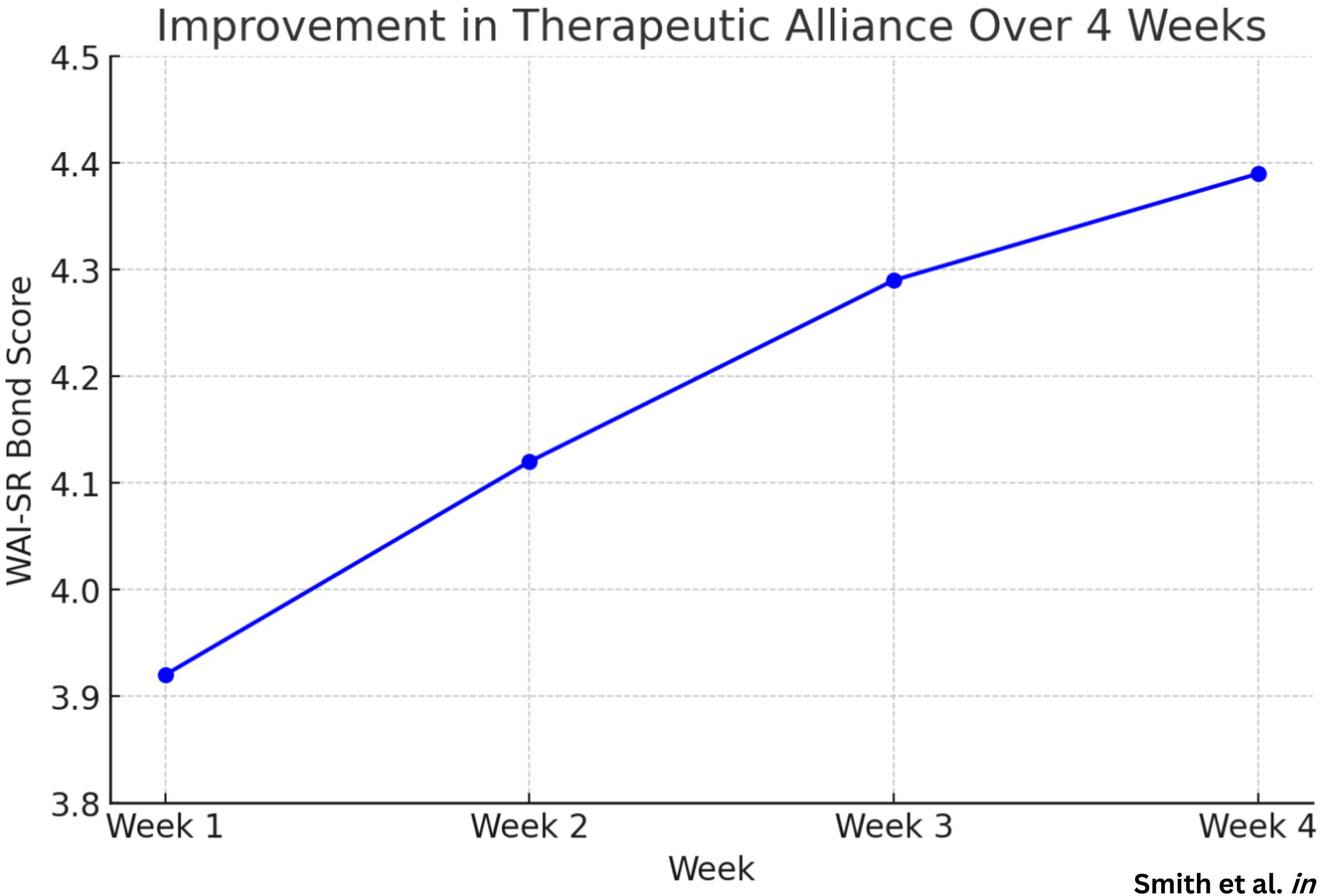


ARTIFICIAL INTELLIGENCE IN SUD Treatment

CURRENT APPLICATIONS AND RESEARCH

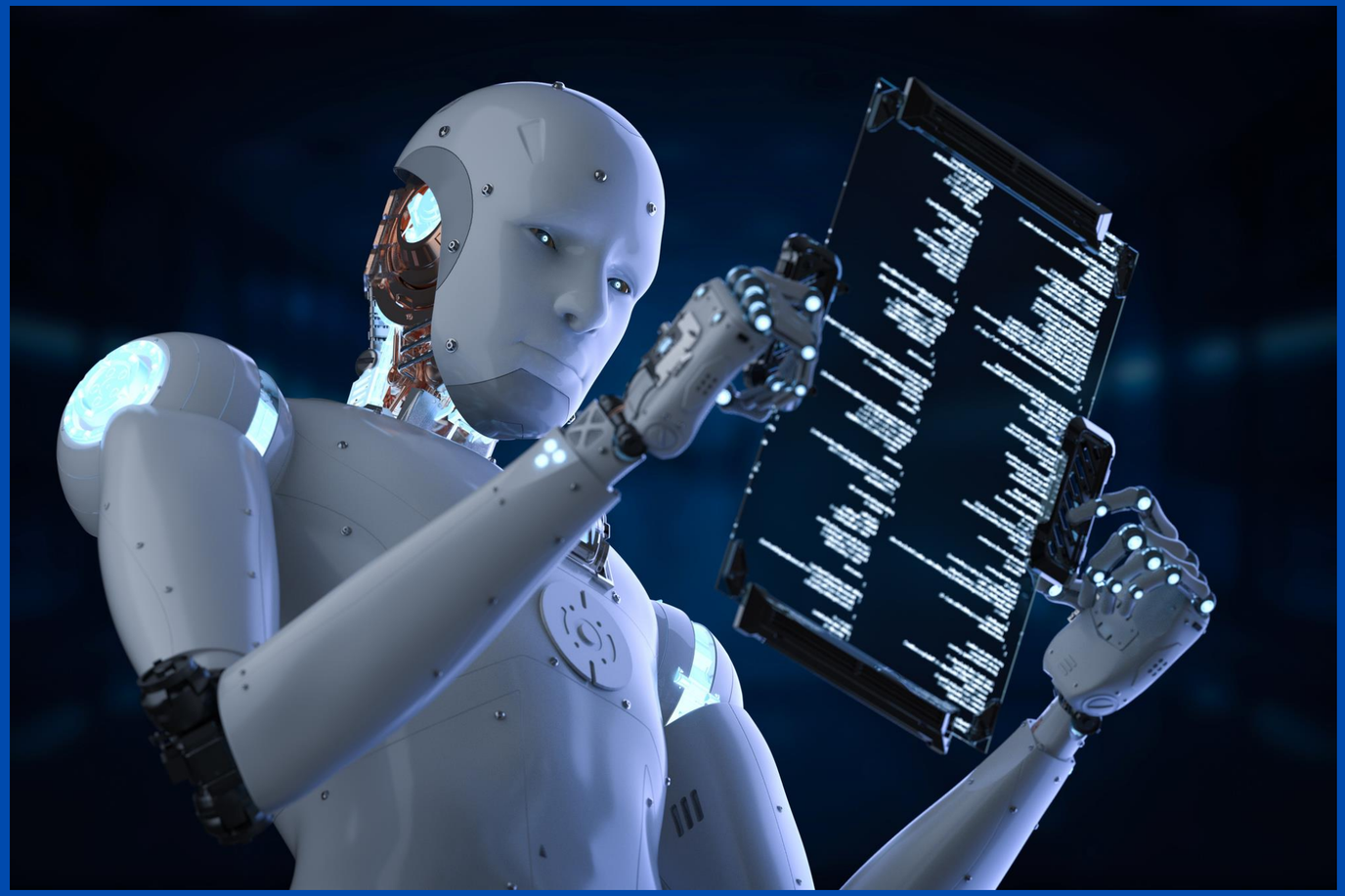
therapeutic alliance

Beatty et al. 2022



Smith et al. ***in preparation***

CURRENT APPLICATIONS AND RESEARCH



artificial intelligence treating SUD

Prochaska *et al.* 2021

AI CONSIDERATIONS AND CONCERNS

privacy, bias, depersonalization,
ethics, accuracy, equity,

AI FUTURE POSSIBILITIES

documentation, predictive analytics, personalized treatment, digital therapeutics, behavioral monitoring, data collection

IMMERSIVE VIRTUAL REALITY

- Powerful illusion that comes through visual, audio, and other senses
- Visual display + 3D audio synced with vestibular inputs: brain logs ‘reality’

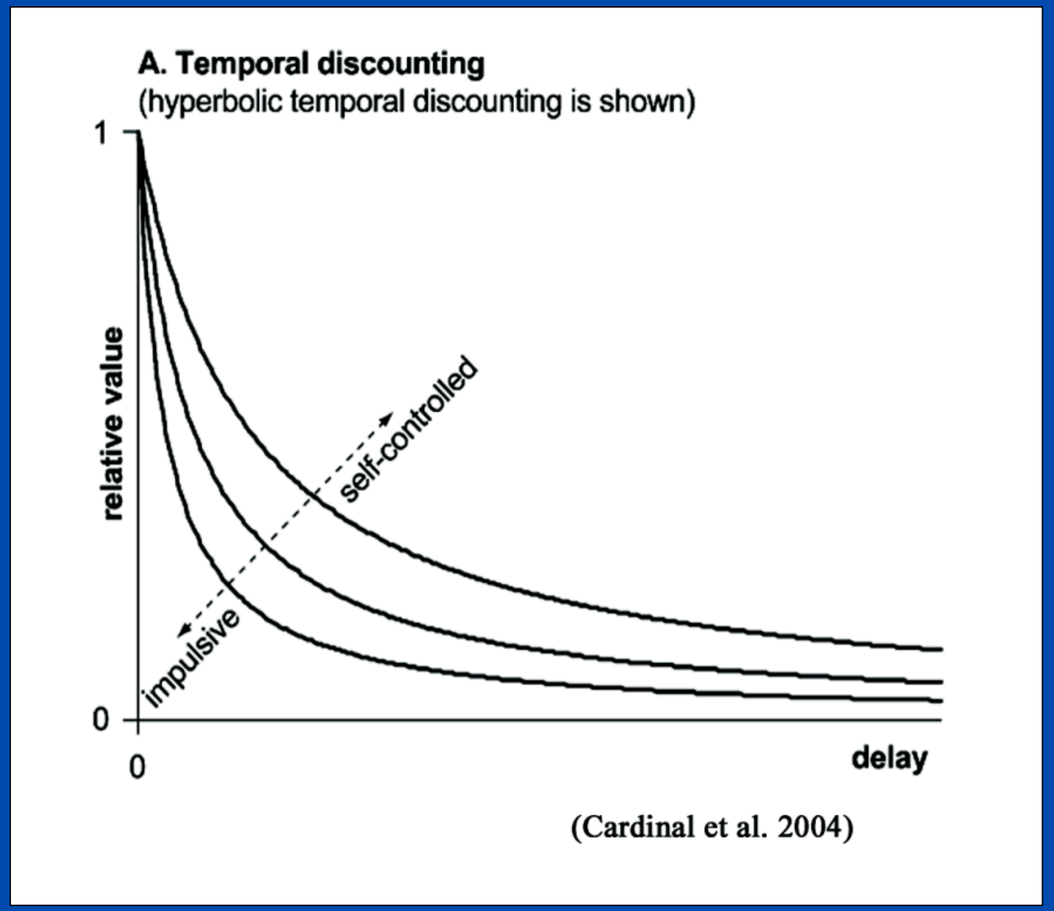
- “Presence”—the perception of actually being in the virtual place
- The experience is not real, but the emotional responses *are* real

VIRTUAL REALITY & SUD

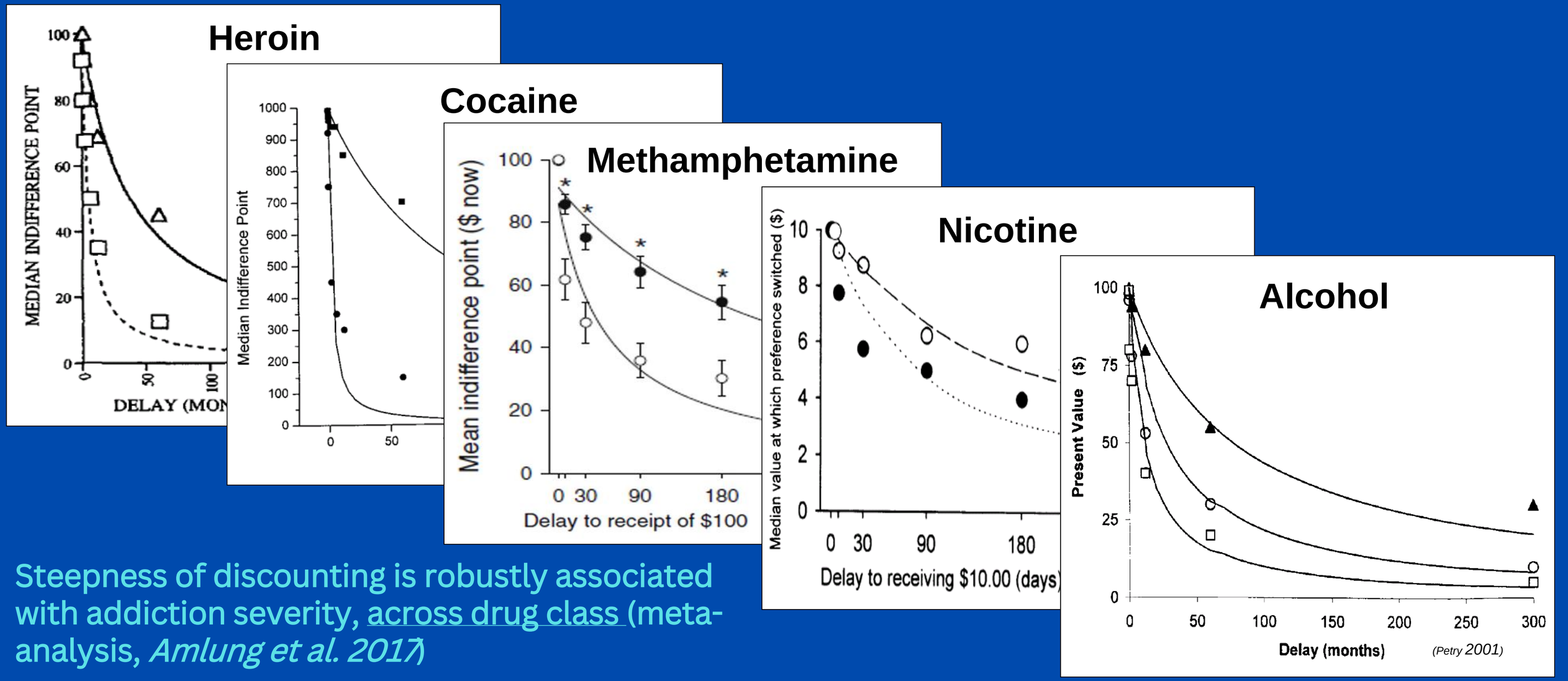
- Drug cue habituation
- Virtual therapists
- Scenario skills training
- Experiential psychotherapy

IMPULSIVE CHOICE

- “Myopia for the future”
- Choosing smaller immediate rewards over larger delayed rewards *(Rachlin & Green 1972)*
- Delay discounting tasks bargain with participants to quantify delay tolerance

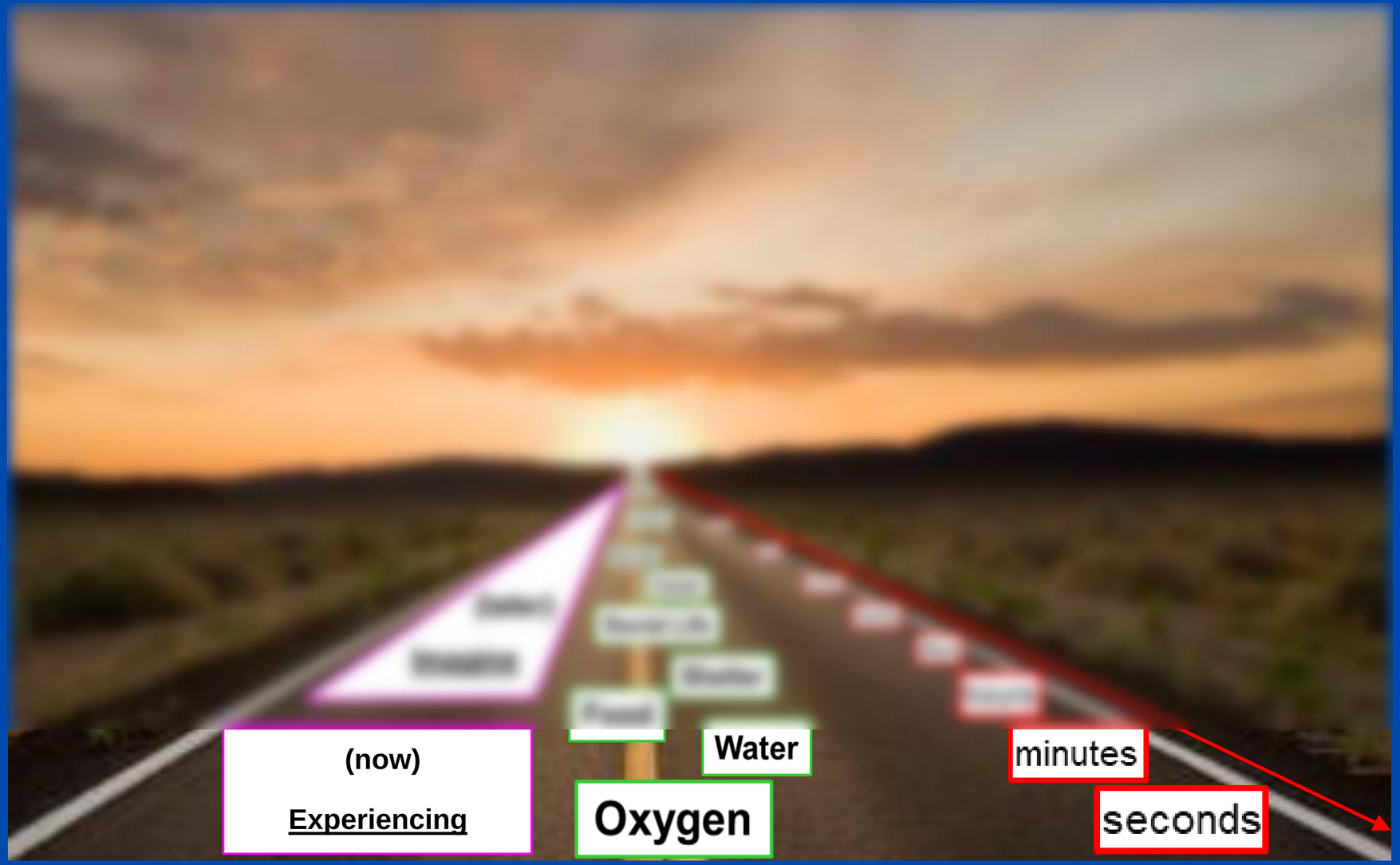


IMPULSIVE CHOICE: A HALLMARK OF ADDICTION

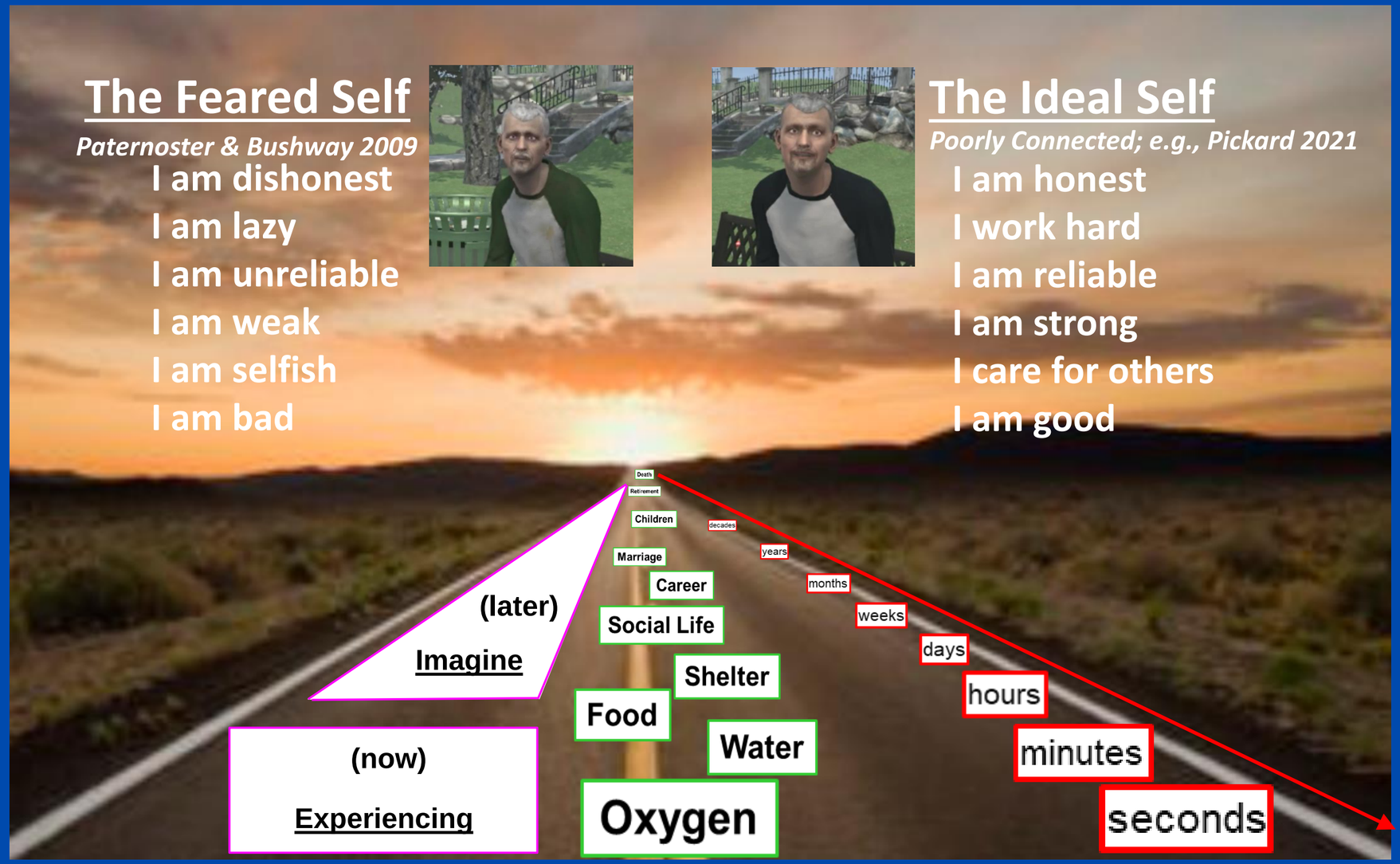


Steepness of discounting is robustly associated with addiction severity, across drug class (meta-analysis, *Amlung et al. 2017*)

TIME HORIZONS AND SUD



TIME HORIZONS AND SUD



EXPERIENCE A PERSONALIZED FUTURE

- Future self-continuity and self-discrepancy *(Hershfield et al., 2011, Higgins 1987)*
- Effective elements of future thinking
  - -Episodic *(Atance & O'Neill 2001)*
  - -Autobiographical *(Daniel et al., 2013)*
  - -Future-oriented *(Lin & Epstein 2014)*
  - -Vivid *(Rösch et al. 2021)*
  - -Content-specific *(Chiou & Wu, 2017)*
- Increase valuation of the future through connection with the future self *(Hershfield 2011)*
- Uniquely personal

TWO PLAUSIBLE FUTURES

Your two future selves (year 2039) speak to you *in your own voice* about your loved ones, fears, hopes and dreams for your future

Addiction Self

Recovery Self

“The path you choose depends on what you do *today*”

OPEN-LABEL PILOT STUDY

Habituation VR

Future Reality Portal VR

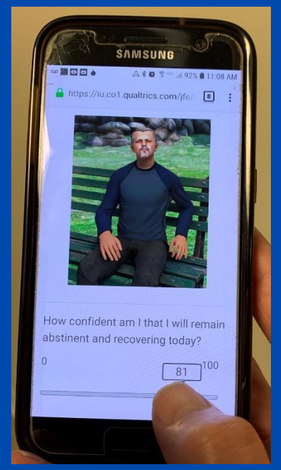
- Delay discounting
- Future Self Similarity
- Self Efficacy

fMRI

- Delay discounting
- Future Self Similarity
- Self Efficacy

Study Day

Daily Reminders

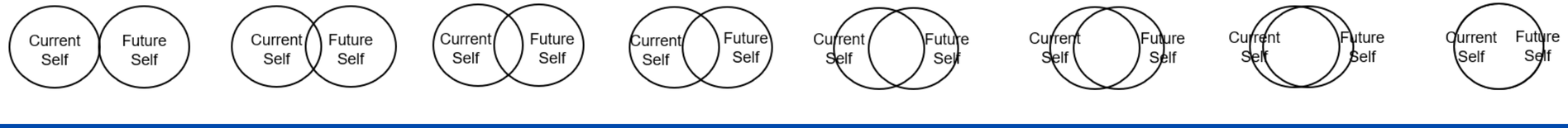


30-day Follow-up

- Delay discounting
- Future Self Similarity
- Self Efficacy
- Drug use

No Connection

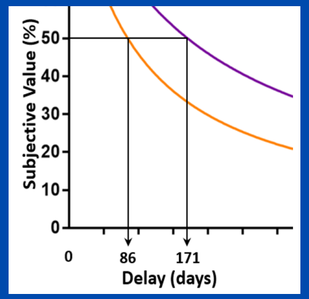
Full Connection



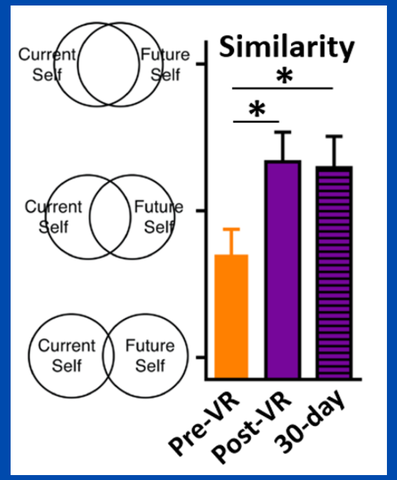
RESULTS

The Future Reality Portal:

1. Increased delay tolerance

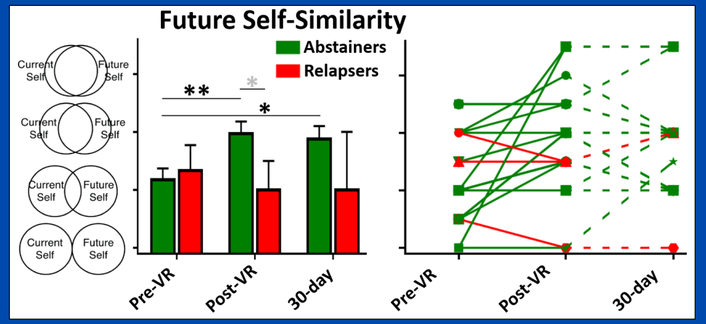


2. Increased future self similarity



3. Increased introspective brain activation

4. Resulted in 86% 30-day abstinence



PUBLISHED AND FUNDED

Discover Mental Health

Discover

Research

Virtual reality intervention effects on future self-continuity and delayed reward preference in substance use disorder recovery: pilot study results

Yitong I. Shen[1,2] · Andrew J. Nelson[3] · Brandon G. Oberlin[1,2,4,5]

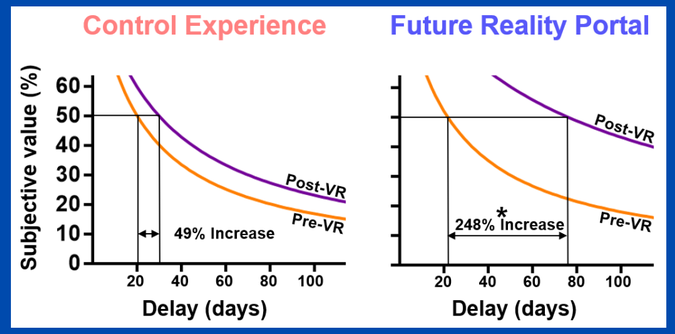
NIH-Funded Virtual Reality Randomized Controlled Clinical Trials:

- NIAAA R01; Clinical trial NCT06302413
  (Alcohol: Single & 30-day VR; 30-day & 6 mo. follow-up; VR control)
- NIDA R34; Clinical trial NCT05835921
  (Stimulants: Single VR; 30-day & 6 mo. follow-up; TAU control)
- NIDA R41 (STTR); Clinical trial NCT05908097
  (Opioids: Single VR; 30-day follow-up; TAU control)

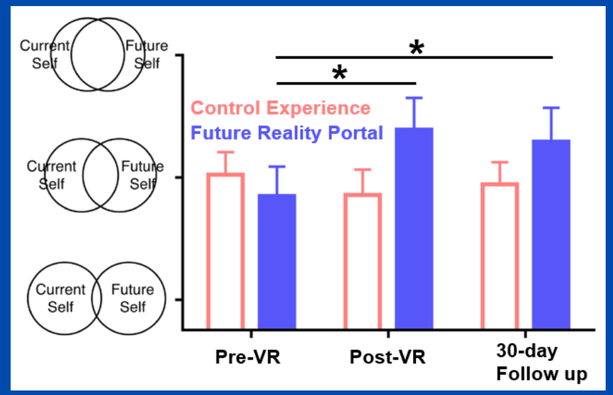
PRELIMINARY DATA

Randomized Controlled Trials: Significant effects (*n*=44, ongoing)
Control Experience and Future Reality Portal in Early Recovery (<1yr)

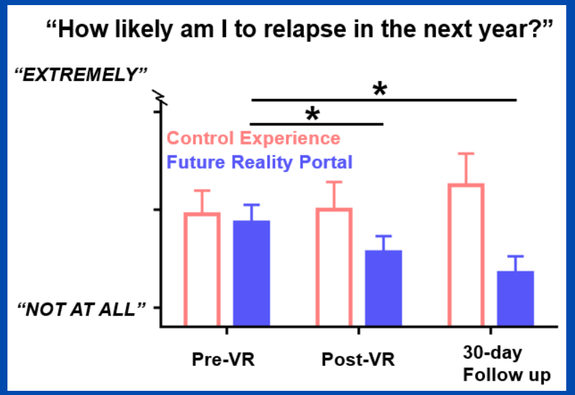
1. Greater delay tolerance



2. Greater future self similarity



3. Greater self-efficacy



4. Subjects with no gain in future self-similarity were twice as likely to relapse as gainers (89% abstinence rate)

FUTURE REALITY PORTAL FEEDBACK

STUDY DAY DEBRIEF (FRP only)

PARK0100: “It really got me, because it just made it more real. And the fact that I don’t wanna be like that in 15 years.”
“It will be on my mind everyday, to stay clean and why I am doing this, and I just really enjoyed this.”

RENTS0123: “There was a time to reflect in the VR experience. How two different paths give totally different futures. The experience with the path of not using... those promises of the life that you can expect, was enticing.”

PARK0091: “Just assuring myself what I will look like in the future, how I will act... not regretting anything if I stopped using... making the most of today, like wise decisions”

VIRTUAL REALITY CONSIDERATIONS

CONCERNS

Practical

1. Barriers to adoption
    a. Cost
    b. Burden on therapists
    c. Skepticism from patients
2. VR sickness or discomfort

Ethical

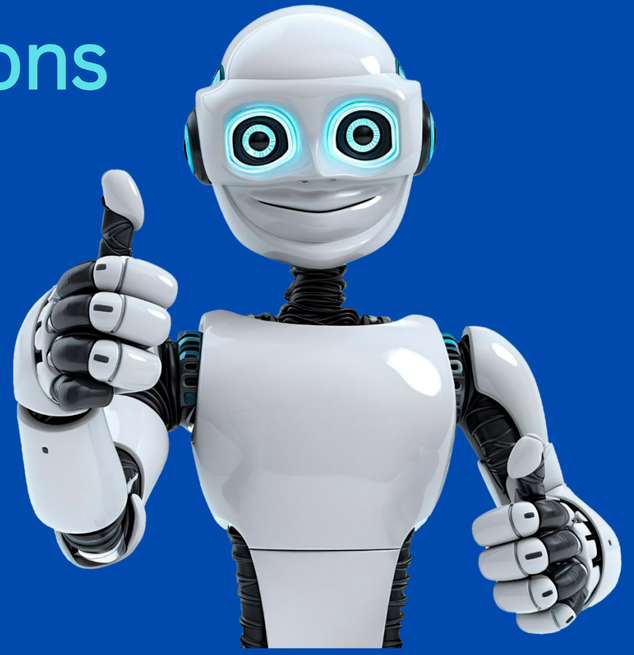
1. Social impairment
2. VR escapism

STRENGTHS

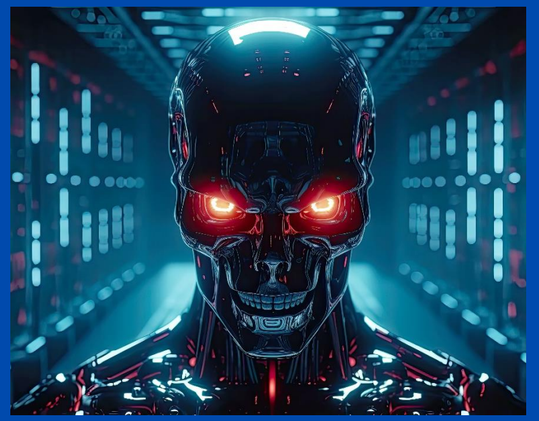
1. New types of therapies, e.g., scenarios otherwise impossible
2. Increasing adoption
    a. Declining cost, increasing value
    b. Virtual therapists
    c. Enhanced therapeutic alliance
3. True anonymity
    a. Increased disclosure
    b. Remote participation
    c. Increased inclusivity

INTEGRATING AI AND VR

1. Extremely powerful interventions
    a. Immersive
    b. Interactive
    c. Personalized
    d. Persuasive
    e. Available on demand



2. Automated manipulation
    a. Unsupervised
    b. Potentially unhealthy relationship
    c. Bad actors with machine access
    d. Loss of autonomy; dependence



FUTURE OF TREATMENT

assessments and personalization

FUTURE OF TREATMENT

immersive therapy sessions

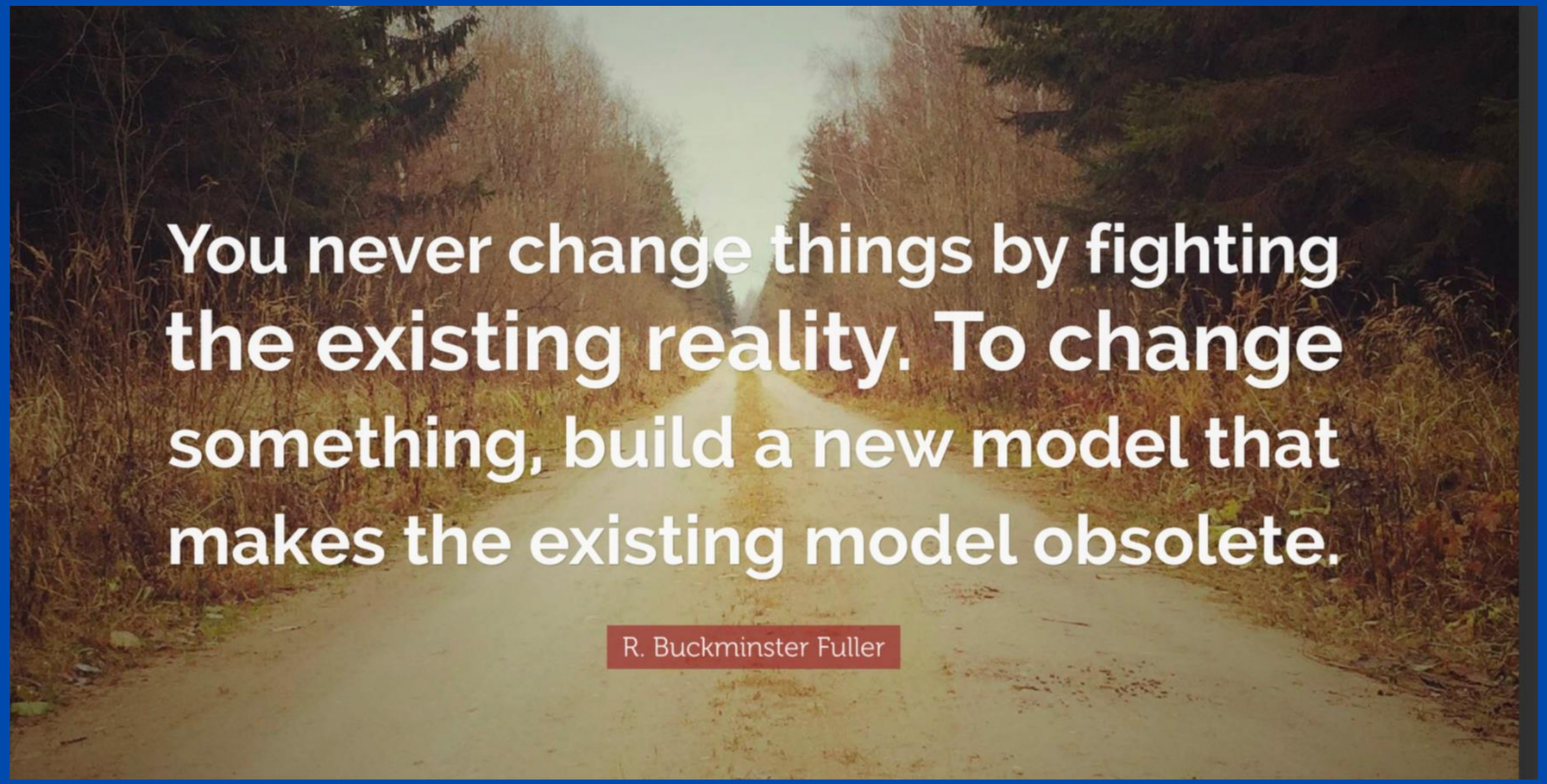
FUTURE OF TREATMENT

continuous support

FUTURE OF TREATMENT

skills training and relapse prevention

BREAKING BARRIERS



PARADIGM SHIFT

FINAL THOUGHTS

ACKNOWLEDGEMENTS

Innovative Realities LLC

https://innovativerealities.org/eabt/quiz

Oberlin Lab

https://medicine.iu.edu/faculty-labs/oberlin

Relate XR, LLC

https://relatexr.com/

INDIANA UNIVERSITY
DEPARTMENT OF PSYCHIATRY
School of Medicine

HALF FULL NELSON

SERENITY LANE
Alcohol & Drug Treatment Services

NIH/NIAAA R01 AA029396
NIH/NIDA R34 DA055304, R41 DA055405

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