

# oxfordvr

White Paper



**GAME ON: HOW VIRTUAL REALITY THERAPY IS MAKING MENTAL HEALTH TREATMENT MORE ENGAGING AND MORE EFFECTIVE**



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## SECTION 1: INTRODUCTION



In his 2011 science fiction novel *Ready Player One*, Ernest Cline imagines a mid-21st-century where users work, attend school, socialize, fight, fall in love, compete for treasure, and generally navigate their lives inside a vast, immersive world called the OASIS.

About 15 years earlier, sibling filmmakers, the Wachowskis dreamt up a similar concept set in a more distant future, which became the basis for their influential 1999 hit *The Matrix*. Both these dark fantasies were hugely popular, expressing a shared skepticism about the dangers of spending an ever-increasing proportion of our lives in mediated worlds, conjured by endless lines of code.

On a deeper level, these stories express profound sympathy for the sort of person who has found solace in the digital world, whether via Twitter and Reddit or via the kind of full-sensory VR experience that has the potential to reach far beyond escapism and entertainment.

Mental illnesses have devastating consequences for people's quality of life, they also represent striking challenges for health and social care systems.

The fast-evolving capability and declining cost of VR technology have at last put this innovative and clinically proven psychological intervention within reach of mental health providers and even those communities that have been inadequately served by more traditional means.

## SECTION 2:

# THE LURE OF THE GAME: INCREASING ENGAGEMENT, REDUCING DROP OUT



Through its increasingly sophisticated ability to replicate real-world experiences, VR is driving significant advances in treating populations most likely to disengage from traditional courses of mental health treatment.

Global rates of disengagement from therapy are difficult to ascertain. One study published in 2009 in the *Journal of Social Psychiatry and Psychiatric Epidemiology* found that 30 percent of mental health patients were disengaging from therapy.

In the UK, the latest NHS Digital annual report on the 'Improving Access to Psychological Therapies' program showed that 60 percent of all referrals that ended in 2018 did not 'complete' treatment. Given that the definition of treatment completion is having 2 sessions or more, the cited figure likely masks higher rates of dropout.

### Tackling patient dropout in mental healthcare

In VR therapy, gamification is utilized to powerful effect, enabling problem-solving whereby patients learn how to overcome trigger situations. As one patient who had VR therapy attests:

*"It's a fun thing to do. You put on the headset and you can see, and you can hear those daily situations you find really difficult. You use the virtual reality to help you with your thoughts and feelings in that experience, whether it's walking down the street or getting a bus you can use the VR to practice being in those places to overcome the negative intrusive thoughts to build your confidence, so when you go back into the real world you feel a lot better because you say to yourself I was able to do that in VR it's ok."*

## SECTION 2:

### THE LURE OF THE GAME: INCREASING ENGAGEMENT, REDUCING DROP OUT (cont.)



Frequently individuals are unable to access therapy because of a shortage of skilled clinicians for the growing number of patients. But even if the capacity barrier can be addressed, a challenge remains. For conditions triggered by the patient's environment - fear of heights or anxious social withdrawal for example - a therapist, no matter how skilled, cannot in most cases recreate the circumstances that induce their symptoms. They can say, "Imagine you are standing on the roof deck of a tall building overlooking the Thames at sunset," but any exercise that proceeds from here will only serve to treat a hypothetical problem. This leads many patients to become frustrated and to discontinue treatment.

Professor Daniel Freeman, Professor of Clinical Psychology and NIHR Research Professor at the Department of Psychiatry, Oxford University has spent most of the 21st century studying how VR technology might be used to treat severe mental health conditions. He believes that harnessing VR technology to automate and "gamify" therapy, to use his verb - is the key to improving clinical outcomes while also reducing costs.

Giving users goal-oriented tasks to perform, focuses the patient's emotional and physiological energy - a fact to which anyone who has ever sat on a sofa next to a gamer will testify. Playing a game of football or riding a stationary bike for 90 minutes theoretically provides the same amount of physical exercise, but in which environment is one less likely to be conscious of feeling bored or tired? In which context is he or she likely to exert maximum effort in the final moments of the workout?

## SECTION 2:

### THE LURE OF THE GAME: INCREASING ENGAGEMENT, REDUCING DROP OUT (cont.)



VR therapy operates on the same principle and draws on gamification techniques to enable individuals to repeatedly experience and overcome trigger situations through different challenges and to level up to overcome their condition.

A review of evidence led by Freeman in 2017 and published in the *Journal of Psychology Medicine* showed the capability of VR to simulate reality could greatly increase access to psychological therapies and enhance treatment outcomes.

Freeman concluded that treatment possibilities will only be realized if the user experience is at the heart of design and the best immersive VR technology is combined with evidence-based psychological science.

The capability of VR to simulate reality could greatly increase access to psychological therapies, while treatment outcomes could be enhanced by the technology's ability to create new realities. As a demonstration of VR's clinical potential, this study was persuasive.

## SECTION 3:

### THE VIRTUAL REVOLUTION: FROM LAB TO LEADERSHIP



In 2016, Freeman co-founded Oxford VR with co-founder CEO, Barnaby Perks, an entrepreneur with a record of bringing pioneering digital concepts to maturity. Barnaby previously spent seven years as CEO of Ieso Digital Health, which provides live online cognitive behavioral therapy via the NHS in the UK as well as to Medicaid subscribers in the United States. Perks nurtured Ieso from its first clinical trial, demonstrating he has the relevant experience to help grow Oxford VR to a position that will maximize the number of patients it can assist.

In 2018, Oxford VR's first clinical trial for fear of heights was published in *The Lancet Psychiatry* and showed how automated VR therapy can produce large clinical benefits. This landmark trial demonstrated how automated VR therapy achieved results that were significantly better than the best alternative i.e. psychological intervention delivered face-to-face by a therapist.

To make their firm's "gamified" simulations as compelling and cinematic as possible, the team tapped Benn Garnish, a seasoned animator and visual effects artist whose work has been featured in several high-profile movies, including 2017's superhero hit *Wonder Woman*. Garnish is Oxford VR's Head of VR Development. He's the kind of talent Oxford VR needs to translate its clinical prerogatives into compelling programs with production values to rival those of commercial games. Garnish says:

*"I joined Oxford VR due the rare nature of being able to mix art and science with the extra benefit of actually making a difference in the world. Being able to interact with animated characters within the VR world is a fantastic way at simulating experiences that translate into the patients' everyday lives."*

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## SECTION 3:

### THE VIRTUAL REVOLUTION: FROM LAB TO LEADERSHIP (cont.)



Oxford VR built this heavyweight roster in anticipation of the world's first-ever large-scale trial of VR technology 'gameChange' to treat serious and complex mental health illnesses such as psychosis, which aims to make Oxford VR's technology widely available to patients. Professor Daniel Freeman is leading this trial along with Oxford University, Oxford Health NHS Foundation Trust, The McPin Foundation, The Royal College of Art, NIHR, MindTech, and several NHS mental healthcare trusts. That level of buy-in indicates a growing acceptance of VR as a treatment method.

In addition to providing VR therapy via the NHS and private and charitable providers in the UK, Oxford VR has partnered with AXA Hong Kong and The Chinese University of Hong Kong (CUHK) in a first-of-its-kind pilot to test VR's potential to support better mental health outcomes in Asia. In the US, Oxford VR has a strategic partnership with the National Mental Health Innovation Centre (NMHIC) where it is running multiple pilots using Oxford VR treatment programs to advance mental health outcomes in the US.

Clinical psychologist, academic and Director of Digital Mental Health at NMHIC, says the research showing that VR therapy is equally effective as in vivo therapy for treating conditions such as acrophobia has been firmly established for more than a decade. Her organization works with innovators in the behavioral healthcare space. *"It's not hype anymore. We reached that tipping point where you can try the products we have now and say, 'damn, that really works. VR is real. The tipping point is that the cost of VR has finally come down,"* says Boeldt.

With such a large and diverse mental health patient pool, the stakes are high. But so is the potential to help far more people than have been treated successfully using older methods.





## SECTION 4:

### THE RULES OF THE GAME: HOW VR THERAPY IS DIFFERENT

Confidence is high Oxford VR can succeed because this therapy is evidence-based, automated and doesn't look or feel like therapy. Powerful psychological science is filtered through the interpretive talents of OVR's team of clinicians, programmers, designers, artists and animators who apply their skills to help ensure the treatments are engaging, imaginative, and even enjoyable, which promotes a greater likelihood of a patient completing the treatment. For example, the fear of heights simulation isn't just about walking across bridges or looking over a ledge. It also asks patients to rescue a cat from a tree, paint a picture while standing on the edge of a balcony, and even ride in a hot air balloon.

Mimi McFaul, Deputy Director at NMHC one of Oxford VR's strategic partners said *"We thoroughly vet technology companies and look for specific quality metrics. This includes whether or not the technology is backed by research, is scalable, and has the potential for significant clinical impact. OVR meets all of these criteria and approaches mental health innovation with scaling and clinical impact in mind."*

The use of an avatar coach in place of a flesh-and-blood clinician is an obvious and scalable benefit in an equation where the number of patients in need of care will always be far greater than the number of providers with the right credentials to treat them.

In over 20 years, and 285 studies across a range of mental health conditions, the results unequivocally confirm that VR is a proven modality for delivering rapid, lasting improvement for patients. The findings, published in the Lancet Psychiatry, showed results that were better than outcomes typically delivered by premium face-to-face therapy.



## SECTION 4:

### THE RULES OF THE GAME: HOW VR THERAPY IS DIFFERENT (cont.)

The Oxford VR platform is delivered to a clinic or therapy center with everything needed to get started with delivering services: the VR headset, the VR therapy applications, training and ongoing support. This 'plug-and-play' proposition overcomes potential internal barriers to technological change and IT interoperability issues.

All the hardware that therapists and their support teams require is provided. Thorough training is delivered to extract the maximum value from therapy sessions and ongoing hardware and training support services are guaranteed. The therapy set-up is equally versatile, recognizing that some patients are homebased and are unable, by their very clinical conditions, to travel to clinics. The solution is therefore portable to bring benefits directly to patients beyond the traditional walls of the hospital, clinic or therapy setting.

## SECTION 5:

# GAMIFICATION FOR GOOD: REAL WORLD CLINICAL IMPACT



Freeman's landmark randomized trial of VR therapy to treat acrophobia published in *The Lancet Psychiatry* in July 2018 illustrates the potential of automated VR therapy. Previous research using VR for treatment of mental health disorders has relied on having a therapist present, typically to deliver exposure therapy.

In this trial, automated VR therapy was delivered over six, 30-minute treatment sessions in a two-week period. A virtual coach - a motion-capture figure performed by an actor guides the user through levels of increasing difficulty. The coach provides encouragement and advice and also explains how fear of heights persists, helping patients to understand the origins of their unfounded emotional responses. Throughout the treatment, the coach leads users through a series of graduated tasks: Initially, the user simply approaches the edge; in time the user is directed to throw objects off the edge. One of the more advanced challenges encourages the user to venture out onto a platform to rescue a cat.

In the final analysis, on average, the reduction of fear of heights was 68 percent, and there were no adverse events. That reduction was maintained at the four-week post-treatment follow-up. *"That's extraordinarily good,"* Freeman says.

One of Freeman's colleagues June Dent, Oxford VR's Clinical Partnerships Director, says that *"Patients report that the VR environments feel very realistic and evoke the sorts of emotions and thoughts that are unpleasant and usually avoided. On the one hand, they don't feel safe. But on the other hand, they know they are in VR therapy and are safe."*



## SECTION 6:

# EVERYBODY WINS: HOW AUTOMATED VR THERAPY WILL EXPAND ACCESS TO CARE AND ENGAGE PATIENTS

Disabling mental health problems far outstrip the number of licensed therapists available to treat patients across the globe. Treatment itself can be inconsistent, and outcomes can be variable. By automating high quality mental health care – Oxford VR’s treatments can be delivered without any drift from protocol and without a therapist present, as the virtual coach can guide patients through the treatment. This means that many more people will not only be able to access care, but they will be able to receive first-rate care.

Currently, Oxford VR treatments are being delivered to patients through providers such as the NHS in the UK and MNHIC in the US in-clinic and in Asia through AXA healthcare, and Freeman believes VR therapy could soon be mobile and made available in patients’ homes.

The sophistication of VR headsets has increased even as these devices have become far less costly. While other firms have shown an appetite to compete in this space, Oxford VR is unique in the degree of care it has brought to developing its content, and the resources, clinical and aesthetic, it has devoted to making its VR convincing and focused, according to Boeldt and other observers.

When these powerful tools are available to patients at home, the last barriers preventing those who suffer from schizophrenia, paranoia, and other debilitating types of mental illness from receiving care to restore their quality of life will be removed.

That means that while VR therapy may be gamified, it’s far from a gamble.

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The logo for OxfordVR, featuring a large, dark blue lowercase 'o' followed by the lowercase letters 'vr' in white. The entire logo is set against a solid teal background.

**o**vr

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