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\*Corresponding author

Natale Salvatore Bonfiglio, Department  
of Psychology, University of Bologna,  
Bologna, Italy

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# Treating Nicotine Addiction with Virtual Reality: From Playful to Therapeutic Tools

Natale Salvatore Bonfiglio\*

Department of Psychology, University of Bologna, Italy

## Opinion

It is estimated that 269 million people worldwide have used drugs at least once a year, corresponding to 5.4% of the world population aged 15 to 64, representing almost 1 in every 19. The number of drug users in the past year has increased from 210 million to 269 million (partly due to the growth of the world population). Hence, the prevalence of drug use increased in the adult population by 5.4% in 2018 (WHO, 2018). It is estimated that in Europe, around 96 million (29%) aged 15 to 64 and 20 million young adults (16.6%) aged 15 to 34 have used illicit drugs, including a trend towards poly-dependence ranging from experimental to habitual and dependent use [1]. One of the most commonly used methods of treating addictions is Cue Exposure Therapy (CET) [2], a technique based on classical conditioning, one of the fundamental theories of the behavioral sciences. The goal is to decrease the desire to take the substance (so-called craving) by moderating the conditioned response to certain stimuli naturally linked to it, such as a bottle of beer or a pack of cigarettes. Continuous exposure to these trigger stimuli in the absence of the conditioned stimulus, or the substance, gradually neutralizes the connection between them, with the consequent decrease in craving and withdrawal symptoms. One of the technologies that have undergone more significant development in the therapeutic field in recent decades is Virtual Reality (VR). This technology allows users to immerse themselves in a virtual world (similar to the real one or completely invented) using more senses. It is possible to vary the degree of immersion. Interaction with the world is generally made possible through tools such as controllers, headsets, VR headsets, and a computer capable of managing the software. This technology, initially conceived for use in simulation and playfields, has seen a gradual increase in interest in the therapeutic field in recent decades.

One of the most effective techniques in the VR field is Virtual Reality Exposure Therapy (VRET), an implementation of CET in a VR environment. In many cases, such as in tobacco addiction, VRET has had comparable results to traditional technic [3,4], but with the advantage of using a more controlled, naturalistic environment, and usually even more fun. For example, in the VRET used in a study by Girard and colleagues [4], it was asked to crumble virtual cigarettes to reduce craving in subjects addicted to tobacco. This study showed a significant reduction in nicotine consumption in just four weeks of treatment and a low smoking cessation rate. Similarly, in a similar study conducted by Metcalf and colleagues (2018), CET was used with Augmented Reality (AR), an alternative similar to VR but which allows interaction with virtual elements by mixing them with real ones. In this case, much like the previous study, alcohol or tobacco addicts were asked to hit or kick trigger objects related to their addiction, such as bottles of wine or cigarettes, causing them to explode. The performance was also ranked with a final score to increase engagement. In this case, during the study, a decrease in both substances was found, with extended benefits also in areas such as self-efficacy. Addictions research that uses VR technology is in its infancy. However, several studies found potent effects of a virtual environment embedded with addiction cues. In addition, the increasing availability of various VR tools on the market and the consequent development of different easily accessible software continues to favor the introduction of this technology as a practical support tool for many therapists and treatment models, such as cognitive behavior.

Although this treatment methodology is proving effective in treating addictions [5], there are still several limits to the use of this technology as a complete support tool for more traditional methods, ranging from cyber sickness, caused to some people in the use of viewers, to the request for a good level of technical skills and availability of adequate and effective software. Furthermore, nicotine addiction is one of the most widespread and most challenging to treat because of its triple addiction: physical, psychological, and social. The interaction among multiple factors that cause and maintain the addiction makes quitting very complex. According to the theories of the dual process, dependent behavior can be considered as guided by two cognitive systems: An automatic associative system and a controlled executive system [6] (Wiers et al. 2007). The behavior is activated by automatic processes (e.g., implicit cognition) unless the person engages in controlled behavior, such as inhibitory control. VR can be useful directed to better control automatic behaviors and the tendency to relapse [7,8], but is less efficacy in modifying implicit processes linked to addiction. This type of intervention can therefore reduce attention to substance-related stimuli and, on the other, decrease the time that people with substance use disorder spend on substance-related stimuli once detected [9,10]. Treatments such as VRET focus mainly on explicit decision-making processes but are less effective in interrupting implicit processes. Many other studies will be necessary to demonstrate the effectiveness of virtual reality as a technique alongside traditional and behavioral therapies. However, this reality is still closer than it seems, and it is not certain that in a few years, we will come to see an increasingly widespread use to become an indispensable standard.

## References

1. EMCDDA-European Monitoring Centre for Drugs and Drug Addiction (2020) European Drug Report 2017: Trends and Developments. Luxembourg: European Drug Report.
2. Hone-Blanchet A, Wensing T, Fecteau S (2014) The use of virtual reality in craving assessment and cue-exposure therapy in substance use disorders. *Frontiers in human neuroscience* **8**: 844.
3. Baumann SB, Sayette MA (2006) Smoking cues in a virtual world provoke craving in cigarette smokers. *Psychology of Addictive Behaviors* **20**(4): 484-489.
4. Girard B, Turcotte V, Bouchard S, Girard B (2009) Crushing virtual cigarettes reduces tobacco addiction and treatment discontinuation. *CyberPsychology & Behavior* **12**(5): 477-483.
5. Amista NF, Kim JJ, Kim N (2017) Trend and future of virtual reality for addiction treatment of substance use disorders: A systematic review. *Journal of Digital Contents Society* **18**(8): 1551-1560.



6. Bechara A (2005) Decision making, impulse control and loss of willpower to resist drugs: a neurocognitive perspective. *Nature neuroscience* 8(11): 1458-1463.
7. Houben K, Nederkoorn C, Wiers RW, Jansen A (2011) Resisting temptation: decreasing alcohol-related affect and drinking behavior by training response inhibition. *Drug and alcohol dependence* 116(1-3): 132-136.
8. Houben K, Wiers RW, Jansen A (2011) Getting a grip on drinking behavior: training working memory to reduce alcohol abuse. *Psychological science* 22(7): 968-975.
9. Metcalf M, Rossie K, Stokes K, Tallman C, Tanner B (2018) Virtual reality cue refusal video game for alcohol and cigarette recovery support: Summative study. *JMIR serious games* 6(2): e7.
10. WHO (World Drug Report) (2020) Drug use and health consequences. Preventing violence by reducing the availability and harmful use of alcohol. Austria, p. 1-52.