INTRODUCTION

The upcoming public release of the Oculus Rift (©2015 Oculus VR, LLC) Virtual Reality Headset has attracted national attention. Although public regard has been mainly focused on the Rift’s entertainment purposes in gaming and movies, this technology has sparked the interest of many scientists since its prototypical release in 2012. Most significant of all is the vast range of possibilities that comes with virtual reality headsets.

For example, PTSD is a fairly common mental disorder that affects millions of Americans daily. The Oculus Rift technology has the capability to be used to treat patients suffering from post-traumatic stress disorder, as an exposure-therapy technique. I support whole heartedly that the Oculus Rift can be successfully used to treat PTSD, as well as dozens of other psychological ailments. The world today has developed a casual attitude towards those suffering from mental disorders, as if they do not equal the importance of physical disorders. This flippancy must come to an end. We must help those who need help, by making virtual reality therapy a feasible option for patients, through development, resources, and funding.

OCULUS RIFT: HOW IT WORKS

The Oculus Rift is a headset designed to be its own blackout chamber. This allows the user to totally immerse themselves in their chosen virtual environment. In the April 2015 issue of Popular Science, cofounder Palmer Luckey, and Nirav Patel, an engineer from Oculus VR, explained the Rift platform’s basic components. To aide in the perception of depth the Rift headset comes equipped with a pair of lenses that create a focal point- a demanding component to depth perception. The display is another component that facilitates depth perception by manipulating human’s binocular view to trick the brain into believing it is in the environment which it is processing. The engineering at Oculus VR accomplished this by warping two-dimensional images very near the subject’s eyes. Oculus Rift adds to the realism by using an onslaught of tracking technology to match physical reactions to that in the simulated world. Inner components such as a gyroscope and compass keep track of the location of the user’s head. Rift’s adaptability to movement tricks the brain into believing that what the visual cortex is processing is true. 3D audio sums up the headset by adding realistic audial cues to the visual experience. The system analyzes which ear should be processing certain sounds during the experience, and sends these cues to the corresponding microphone. In summarization, the Oculus Rift uses the innate adaptability of the brain, with synthesized software adaptability to immerse the subject in a realistic virtual environment [1].

POST-TRAUMATIC STRESS DISORDER

Overview

Post-Traumatic Stress Disorder is a psychiatric disorder that can befall victims or witnesses of traumatic, perhaps life-threatening, events. PTSD has gained a large portion of its notoriety through war veterans. However, this disorder can be a result of experiencing many other terrifying situations, such as robbery, rape, motor-vehicle accidents, and so on. The fear response is a natural reaction to protect oneself from potential harm. However, with PTSD patients, this fear does not subside once the causal environment has been neutralized. The Nebraska Department of Veterans’ Affairs estimates that 7.8% of Americans (approx. 25 million people) will experience PTSD in their lives and that women are twice more likely to develop symptoms than men [2].

Symptoms

Symptoms of PTSD can be subdivided into three main groups: re-experiencing symptoms, avoidance symptoms, and hyperarousal symptoms. Manifestation of symptoms must typically be present from all three groups in order for a formal diagnosis to be made. Re-experiencing symptoms include nightmares and flashbacks involving the experience. Avoidance symptoms are comprised of feelings of guilt,
worry, select amnesia regarding the event, and evading similar situations or the place of the experience. Hyperarousal symptoms include tense feelings, high levels of stress or anxiety, and moodiness. These can lead to other dysfunctions such as anxiety, depression, and emotional bipolarity [3].

**Oculus Rift as Therapy for PTSD**

The current standard for PTSD treatment is a combination of psychotherapy and medication. This psychotherapy is a therapy method based on talking and working out the emotional turmoil causing the PTSD symptoms. Medication is used to combat symptoms like depression, anxiety, and other symptoms that may prevent a victim from seeking help or living a normal life. It is important to note that every patient differs from the next, so no one therapy will be exactly the same as another. This is precisely why the Oculus Rift has the capability of revolutionizing PTSD therapy. By having the ability to choose the environmental settings, the patient can be exposed to the cause of their symptoms at a pace for which they are comfortable. Meanwhile, they remain completely safe in reality. For example, a victim of robbery who is now suffering from severe anxiety can enter a virtual reality in which they can slowly learn how to walk alone in a city without the overwhelming fear that someone is about to attack them. Although virtual reality may require the participant to relive their experience, they can do so of their own free will and will overcome their fears through prolonged exposure. The use of virtual reality (VR) as a form of exposure therapy will also lessen the chance of support dependence from the patient. Sometimes after a traumatic experience, the victim can become very anxious to be alone, but in a VR environment the participant can be alone, without being in danger. The point of VR therapy is to confront the fears and emotions causing the PTSD symptoms, so that they may be overcome. Chris Merkle, an Iraq veteran, underwent VR therapy after he endured multiple tours in Iraq and Afghanistan. Merkle is quoted saying, “I was angry, I was stressed. I tried a lot of things, but when I tried virtual reality it was like a toxic release” [4]. Clearly VR therapy worked for this veteran, while other methods apparently did not, which led him to trying virtual reality. Whether it be through exposing oneself to the environment they fear, to using VR to talk about one’s emotions, the practical uses of the Oculus Rift as a therapy method are unbounding.

**WHY THE OCULUS RIFT IS THE MOST SUITABLE VIRTUAL REALITY HEADSET**

**Improving Previous Virtual Reality Technologies**

VR technology is not a new challenge facing the world. In fact, it has been approached as a topic of interest for decades. However, a major issue that arose from previous VR systems was the physical side effects, such as motion sickness. The Oculus Rift may have finally overcome this downside to VR headsets. Christopher Kent, Senior Editor of Review, wrote, “The Oculus Rift allow(s) the visual to follow our changing gaze so quickly that the brain can’t detect a delay” [5]. By solving this side effect, the participant can be more immersed in their environment, which is crucial to overcoming PTSD.

**Cost**

Furthermore, systems today that aim to simulate virtual realities are substantially expensive. Scientific American estimates that laboratory systems can start at $20,000. Beyond this, smaller systems can still cost thousands of dollars to develop and maintain. The Oculus Rift has completely changed the game in this regard, as it is being released to the public in the first quarter of 2016 at the comparatively low price of $350 [6]. This price is expected to decrease as the headset becomes more acclaimed. When asked about the Oculus Rift technology Albert Rizzo, project leader of Virtual Iraq, stated, “This has the capacity to turn virtual reality therapy into a mass market treatment” [7].

**Albert Rizzo and Virtual Iraq**

A pioneer in the field, Albert “Skip” Rizzo, Director of Medical Virtual Reality, Institute for Creative Technologies, has been studying virtual reality as a feasible means of treating PTSD for more than a decade. Most notably is his leadership in the program Virtual Iraq. This VR program was created specifically for veterans returning from Iraq with PTSD symptoms. The participants were exposed to environments similar to wartime in Iraq, such as driving Humvees in desert convoys. The setting was clearly effective as physiological effects, such as increased perspiration and heart rate, began almost immediately following exposure. The intensity of the experience was systematically increased, from casual situations such as driving the Humvee to stressful, intense situations such as hearing gunfire. After being exposed to the VR environments for four 50-minute sessions, the patients showed a decrease in self-report scores on their symptoms, shown below, which indicates an improvement of their mental status.

**FIGURE 2** [8]

PTSD Symptom Scale-Self Report (PSS-SR) scores across sessions.
This indicates that the virtual reality therapy did work to improve the veterans’ PTSD symptoms. VR Technology was able to lower their stress-levels by providing a safe environment in which the veterans could face their fears. As they became more at peace within themselves they were able to be in the virtual reality with less stress than when they started, even though the intensity of the virtual reality had increased [8].

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pretreatment</th>
<th>Posttreatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAPS Total</td>
<td>106</td>
<td>47</td>
</tr>
<tr>
<td>CAPS Re-experiencing</td>
<td>33</td>
<td>16</td>
</tr>
<tr>
<td>CAPS Avoidance</td>
<td>39</td>
<td>11</td>
</tr>
<tr>
<td>CAPS Hyperarousal</td>
<td>34</td>
<td>20</td>
</tr>
<tr>
<td>PSS-SR</td>
<td>35</td>
<td>10</td>
</tr>
<tr>
<td>BDI</td>
<td>13</td>
<td>11</td>
</tr>
<tr>
<td>STAI-S</td>
<td>53</td>
<td>39</td>
</tr>
<tr>
<td>CGI Severity</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>CGI Improve</td>
<td>N/A</td>
<td>1</td>
</tr>
<tr>
<td>CGI Self-rating</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

Note: Decrease in score indicates improvement. CAPS= Clinically-Administered PTSD Scale; PSS-SR= PTSD Symptom Scale Self Report; BDI= Beck Depression Inventory; STAI-S= State-Trait Anxiety Inventory- State; CGI= Clinical Global Impression

FIGURE 3 [8]
Table of Virtual Iraq Results

THE IMPORTANCE OF OCULUS RIFT TECHNOLOGY

I feel very strongly that the Rift should be recognized as a viable treatment strategy for PTSD. In October of 2014, as I was beginning my senior year of high school, I was in a very serious car accident. I was driving, and was the only person in my vehicle. The other driver was alone as well. Both cars were totaled, but mine had the most significant damage. My legs were almost crushed, by a matter of centimeters, and I could have easily lost my life. Had I been transporting a passenger, they would have probably suffered more severe injuries than myself. My finger was badly injured in the collision and, even a year later, fails to bend properly. But, I was able to walk away. Yet I still suffer extreme, increased anxiety while driving, and even more so being a passenger. After the crash I felt extreme guilt over what happened, even though I knew I wasn’t to blame, and I can still recall every moment of the collision. The vivid memories still manage to invade my mind—particularly the moments just before and during impact. I will never forget the sound of crushing metal around me. Since talking about my experience is difficult for me, I am intensely drawn towards the prospect of the Oculus Rift. This technology gives people like me the opportunity to face our emotions, without adding on the anxieties of a formal meeting with another person. Not everyone is attracted to the idea of “talk” therapy. I believe it is critical that the Oculus Rift is given its proper chance to surpass its gaming-identity to become a useful and practical therapy to treat PTSD.

Even for those who are not suffering from the debilitating symptoms of post-traumatic stress disorder, this cause should be important. Probability indicates that you probably know someone who has experienced PTSD, or another disorder such as social anxiety. If a loved one was suffering, you would want them to get the treatment that they deserve. The Oculus Rift VR Therapy could be that treatment. Do not let the stigma of mental illness to shroud the truth and goodwill.

CONCLUSION

The Oculus Rift virtual reality headset will prove to be a useful and cost effective therapy for treating patients suffering from PTSD. Studies such as Virtual Iraq prove that VR has the ability to decrease symptoms of PTSD. Post-traumatic stress disorder affects millions of Americans and needs to be solved, for the sake of those who endure it. No person should have to remain trapped in their own body, unable to do or act as they pleased, based on bad memories and fear. Support the Oculus Rift, and give these people the chance they deserve to reclaim their own sense of selves. Support the Oculus Rift, and virtual reality will work to better the reality of millions.

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**ADDITIONAL SOURCES**

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