UNIVERSITY OF CALIFORNIA, SAN DIEGO

War, Trauma, and Technologies of the Self: The Making of Virtual Reality Exposure Therapy

A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of Philosophy

in

Communication and Science Studies

by

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DEDICATION

I dedicate this dissertation to all of the people around the world have suffered trauma as a result of the Global War on Terrorism. May we never give up on peace.

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

ABBREVIATIONS

DSM	*Diagnostic and Statistical Manual of Mental Health Disorders*
HITlab	University of Washington Human Interface Technology Laboratory
HMD	Head-mounted display, also known as VR goggles
ICT	Institute for Creative Technologies
IED	Improvised exploding device
MedVR	The Medical Virtual Reality Laboratory at ICT
NMCSD	Balboa Naval Medical Center San Diego
PE	Prolonged exposure
PTSD	Post-traumatic stress disorder
RPG	Rocket-propelled grenade
STS	Science and technology studies
USC	University of Southern California
VA	Veterans Administration
VR	Virtual reality
VRE-AC	Virtual reality exposure with arousal control
VRET	Virtual reality exposure therapy
VRMC	Virtual Reality Medical Center

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ABSTRACT OF THE DISSERTATION

War, Trauma, and Technologies of the Self: The Making of Virtual Reality Exposure Therapy

by

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Doctor of Philosophy in Communication and Science Studies

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This dissertation research follows the development of Virtual Iraq, a virtual reality system designed to assist clinicians conducting a prolonged exposure therapy among military service members diagnosed with post-traumatic stress disorder. Research was conducted using a mixed methods approach, employing both textual analysis and multi-sited ethnography, following the system from the designers' computer screens to public demos to clinicians' offices.

I argue that in remediating therapy through a VR system, Virtual Iraq not only impacts therapeutic practice, but also impacts cultural conceptions of therapy. The system's resemblance to video games has provided a justification for its development by suggesting that it will help to destigmatize therapy and thereby attract young male "digital generation" service members from the to seek mental health care for PTSD. However, it was not designed for play: rather, the system uses multimedia representations of war to enhance an empirically supported psychotherapy. The inventors had to negotiate competing concerns to design, research, and promote a tool clinicians will accept that also makes therapy look "cool" enough to garner popular support and military funding. Not actually a game, Virtual Iraq has been made to perform as game-like in order to create a cultural place for it as a tool for transforming the public image of therapy to conform to concepts of military masculinity—a performance sometimes at odds with medical legitimacy. The development of VR exposure therapy (VRET) is therefore a site wherein issues of medical legitimacy, militarized masculinity, and technological innovation are negotiated. As the first large-scale clinical trial of VRET began in April 2011, the project charts the development of a technological practice that may fundamentally change psychotherapy. As a biography of a technology in the making, this is the first major investigation of clinical VR from a cultural perspective, providing historical, ethnographic, and discursive insight into a young field that has the potential to affect how thousands of people receive mental health care, as well as the kind of care they expect.

INTRODUCTION:

THE CULTURAL WORK OF MAKING VR THE RIGHT TOOL FOR TREATING MILITARY PTSD

Elaine Zimmerman's 2007 *Salon* article, "Getting Blown Up Again and Again," opens with the following paragraph:

> Kevin Smith and his unit have just finished an unsuccessful search for snipers inside a house in Fallujah and are headed back to their base. Smith is behind the wheel of a Humvee, the seat beneath him vibrating from the familiar roaring engine. He makes a left turn and suddenly there is an ear-splitting boom, an explosion right behind him that rocks the vehicle. The sky goes dark and smoky, and Smith senses the piercing pain of shrapnel in his neck and hands. The Humvee's radio crackles with voices asking for information, as his mind races. Will there by more explosions or a hail of bullets from unseen snipers? Are his fellow soldiers hurt? Time seems at once to speed up and slow to a crawl. Then, just as suddenly, a voice cuts into the nightmare: 'What are you thinking right now? (Zimmerman, 2007)

Zimmerman goes on to explain that Smith was not actually having a nightmare about his deployment with the United States Army in Iraq; rather, he was engaged with "a cutting-edge therapy that uses a high-tech virtual reality system to treat war veterans afflicted by post-traumatic stress disorder" (ibid.).

Post-traumatic stress disorder, or PTSD, is the current official name of a category of long-term mental illness arising in the wake of a traumatic experience, such as those

incurred by military service members during times of war.[1] Historians have often placed PTSD within a genealogical lineage that traces it back to shell shock, combat fatigue, and a plethora of other earlier terms used to describe the psychological effects of war service on combatants. Though acute responses to the overwhelming stress of war have been recognized by military medicine for over a century, modern psychiatry only began recognizing these as long-term psychological effects after the Vietnam War as a result of political activism. In the late 1970s, a coalition of veterans and psychiatrists petitioned the American Psychiatric Association (APA) to include a relevant diagnostic category for the long-term psychological effects of war in the profession's "diagnostic bible," the *Diagnostic and Statistical Manual of Mental Health Disorders* (DSM). Because of the APA's influence on military medicine and bureaucracy, the inclusion of PTSD in the third edition of the DSM, published in 1980, effectively held the government accountable

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[1] There are six diagnostic criteria for PTSD in the DSM-IV, which at the time of this writing was the most current edition of the manual. The first (Criterion A) is that "The person has experienced, witnessed, or been confronted with an event or events that involve actual or threatened death or serious injury, or a threat to the physical integrity of oneself or others" (A1) and that "The person's response involved intense fear, helplessness, or horror" (A2). The most common experiences leading to a PTSD diagnosis are sexual assault, childhood abuse, automobile accidents, natural disasters, and military combat. Symptoms must fall within a number of categories: re-experiencing the traumatic event (Criterion B); avoidance-related symptoms, including emotional numbing and detachment, avoiding reminders of war, and alcohol abuse (Criterion C); and hyper-arousal symptoms, including irritability, nightmares, and insomnia (Criterion D). All of these must persist for at least a month (Criterion E) and produce significant impairment in the sufferer's life (Criterion F). PTSD is what philosophers call a polythetic category: the symptoms that count as indicative of PTSD are a family, whereas monothetic categories rely on a set of specific features (Bowker & Star, 1999, p. 62).

for providing treatment and disability compensation for veterans with debilitating psychological wounds as a result of the war service.[2]

Though many of the political activists and health care professionals who had fought for PTSD's inclusion in DSM-III had hoped that the diagnosis would help to caution the government against getting involved in unjust wars, the United States nevertheless continued to engage in military enterprises.[3] The longest of these has been the Global War on Terrorism, which began when the U.S. invaded the countries of Iraq and Afghanistan in response to the terrorist attacks of September 11, 2001. By the mid-2000s, the War on Terror presented the largest population of military service members and veterans that could be potentially be diagnosed with PTSD since the Vietnam War, and therefore the largest population that the military was faced with treating, and if necessary, supporting with disability compensation. Innovations in body and vehicle armor, anti-artillery weaponry, and remote operations using robots and unmanned aerial

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[2] Historians have excellently documented the social movement through which PTSD came to be included in the DSM. The most comprehensive historical work was done by sociologist Wilbur J. Scott (Scott, 2004, 2007). Readers interested in this history should consider Allan Young's important ethnography of PTSD treatment in the late 1980s and early 19980s, *The Harmony of Illusions* (Young, 1995), historian Ben Sherphard's history of the American and British military's relationship with psychiatry *A War of Nerves* (Shephard, 2001), historian Gerald Nicosia's history of Vietnam veterans' movement, *Home to War* (Nicosia, 2004), and chapter four of *The Empire of Trauma,* written by anthropologists and therapists Richard Rechtman and Didier Fassin (Fassin & Rechtman, 2009).

[3] It does appear that the Vietnam War itself did have an effect on the U.S.'s willingness to engage in war for over two decades, even if not directly resulting from the invention of the PTSD diagnosis. In his book *Echoes of Combat,* communication scholar Fred Turner describes the phenomenon of "Vietnam syndrome," the United States' population's collective reluctance to engage in foreign wars that the country was not guaranteed to win after the traumatic loss of the Vietnam War (Turner, 2001). However, the successes and relatively low human resources costs of short-term conflicts made possible by the strength of advanced military technology, such as the first Gulf War (August 1990 – February 1991) combined with the terrorist attack on American soil may have helped cure Americans of the Vietnam syndrome.

vehicles had greatly improved the physical safety of American combatants; but they have not protected them from mental injury. Estimates vary, but reports have predicted rates of PTSD among combat veterans ranging between 13 and 20% (Hoge et al., 2004; Institute of Medicine, 2012; Tanielian & Jaycox, 2008). Sadly, by 2008, suicide superseded in-theater violence as the number one cause of death among service members (Thompson, 2010). The medicalization of PTSD through its inclusion in the DSM brought its treatment under the authority of clinical psychology and psychiatry; therefore, as the reported cases of PTSD increased throughout the 2000s, an increasing amount of government funding became available for these fields to develop and use ever more efficient and effective treatments.

During this time the virtual reality system described in Zimmerman's article became a mainstay of reporting on promising new treatments for PTSD. Virtual reality (VR) refers to a form of media technology that uses a combination of audiovisual stimulation, first person perspective, and interactivity in order to create a feeling of being inside a digital mediated space.[4] Zimmerman's article and hundreds of others like it

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[4] When the term "virtual reality" first entered the vernacular in the early 1980s, it was used to describe either interface with screen-based technologies that presented viewers with a "fish-bowl" perspective on a virtual environment, with or without the user represented as an on-screen avatar ("soft VR") or interfaces that gave users a first-person perspective on a virtual environment and allowed them to interact with it as though their bodies were physically immersed in it ("hard VR") (Heim, 2000). I will use the term virtual reality or VR exclusively to refer to "hard" VR, as this is how the term is primarily used currently. VR entails four components: a computer with a graphics engine, software presenting the user with a virtual space, a tracking device that monitors the users body movements, and user interface technologies.

VR and the virtual environments they allow users to enter are also distinctive from "virtual worlds." Anthropologist Tom Boellstorff defines virtual worlds as "places of human culture realized by computer programs through the Internet" (2008). The "worlding" of virtual

described how Dr. Albert "Skip" Rizzo, a Los Angeles-based clinical psychologist with funding from the Office of Naval Research, had developed a multi-sensory immersive VR system fashioned to resemble war-torn Iraq in not only sight and sound, but also smell and feel. Rizzo and his collaborators had designed this "Virtual Iraq" as a tool for therapists conducting a PTSD treatment called virtual reality exposure therapy (VRET). During VRET, therapists would use Virtual Iraq to help military patients to remember and emotionally "relive" the traumatic experiences from their deployment in the Middle East, and thereby relieve their PTSD.[5]

VRET sounded like the stuff of science fiction. And yet, in these articles Virtual Iraq appeared to be "the right tool for the job" for treating PTSD among combat veterans, confirmed by not only Rizzo, but clinicians, military personnel, and patients themselves (Clarke & Fujimura, 1992). This dissertation is the result of almost five years of research on the making Virtual Iraq. As a biography of a technology-in-the-making, the purpose of this research has been to explain the technical, social, and cultural practices through which Rizzo and his collaborators have positioned Virtual Iraq as a valuable

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environments is only possible through the networked social interaction of human users, and some scholars argue that a necessary feature of virtual worlds is their persistence—meaning that time and activity continues within them independent of the presence of any given user. One might argue that when used in therapy Virtual Iraq becomes a temporary world for the patient and therapist. This is a perspective worth investigating; however, in order to describe the system itself, it is most accurate for my purposes to use the term VR.

[5] "Relive," here, is a technical term, one that was used by the creator of the prolonged exposure method and her students until around 2010, when the community switched to the term "revisit." The term "relive" makes ontological arguments about the status of memory and experience that therapists decided was inaccurate. On the other hand, the term "revisiting" suggests that the patient is going back to a place, but that the experience as a whole is not being lived again, and hence will not retraumatize or reinforce unhealthy cognitive and emotional associations.

technological resource for the military, clinicians, and service members—each groups deeply affected in their own ways by the problem of PTSD. I show how long before they had scientifically established Virtual Iraq's clinical value, Rizzo's team brought together cultural currents, institutional networks, and technological resources in order to design and promote the system in a way that made it make sense to each of its audiences as a treatment for PTSD among military service members. Because of this, I argue that Virtual Iraq was a work of science fiction that over the course of a decade became a science fact.

A Cultural Biography of a Technology-in-the-Making

One of my goals in analyzing the making of Virtual Iraq has been to investigate an important issue in the public understanding of science and technology: how people construct and negotiate the meanings of a new technology within the specific contexts of its manifestation and promotion. In order to do this, my methodological approach has been to generate data through a balanced use of the tools of communication studies—including discourse and media analysis—with those of science and technology studies (STS)—ethnographic and historical accounts—and using situational analysis in order to allow these diverse data to speak (Clarke, 2005). I drew on these specific approaches in order to create an analysis of Virtual Iraq that could appreciate its status both as a fetishized technocultural artifact and as tool used in a legitimate system of knowledge-production, and in so doing build a empirically grounded theory of its development.

As a field, STS has an imperative to analyze "how the specific material-discursive apparatuses through which contemporary relations of humans and machines are rendered

intelligible and made real" (Suchman, 2007, p. 284). The goal of this work is to show how people create and embed technologies within sociotechnical systems of knowledge production and cultural practice, and in so doing reveal the processes through which they align and delegate forms of agency in ways that make the technologies make sense.[6] This kind of research cannot be done through textual analysis alone, but rather necessarily requires following processes, practices, and transformations, and seeing technologies as always temporally embedded and often temporarily stabilized material artifacts that must be studied diachronically rather than as static, synchronic entities. However, scholarship in this field often overlooks the ways in which cultural imaginaries are brought to bear in the process of bringing a technology into fruition; that is, it does not analyze how "making sense" is part of the active constructive practices of those with a stake in a technology's success. To use the terminology of anthropologist Clifford Geertz, cultural analysis is necessary for accessing the ways that new technologies are made meaningful within a culture's webs of signification (Geertz, 1977).

Communication studies is a field premised on the importance of analyzing texts and how they structure the cultural imagination through representational patterns and

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[6] In focusing on one specific technology and its associated meanings, I appreciate the view provided by feminist science studies scholar and cultural historian Donna Haraway, who suggests that "Technologies and scientific discourses can be partially understood as formalizations, i.e., as frozen moments, of the fluid social interactions constituting them, but they should also be viewed as instruments for enforcing meanings" (Haraway, 1990). Therefore, to a degree, technologies can themselves be "read" as texts, especially for the ways that they as inscribed with particular forms of agency. This semiotic approach to STS was also suggested by scholars such as Steven Woolgar, Madeleine Akrich, and Bruno Latour in the early 1990s (Akrich, 1992; Latour, 1992; Woolgar, 1991). The limitation of this material-semiotic approach is that is that it cannot help us to understand how particular meanings came to be associated with an object in the first place, or why those meanings made sense within their particular cultural-historical context.

framing. By bringing the tools of communication studies to STS, I provide an approach to conducting a cultural analysis of a technology-in-the-making that takes seriously how many levels of mediation shape its meaning. By mediation I am referring not only to the use of media technologies to convey content, but to the diverse technical, social, and cultural processes through which artifacts as mediational agents structure the conditions for thought and action.[7] These range from the ways that ideas about the technology are created in the public imagination to the ways that the technology is used to structure subjective experiences during therapy. By defining mediation in this way, I argue that when they are being used, all artifacts mediate activity because their affordances shape how activities are conceptualized and carried out. Many STS scholars have recognized the importance of technical and social mediation in creating the human/non-human networks necessary for a technology's success. And while an increasing number of STS

[7] Drawing on diverse thinkers, cognitive scientists Michael Cole and Jan Derry write that, "In our usage, an artifact is an aspect of the material world that has been modified over the history of its incorporation into goal directed human action. By virtue of the changes wrought in the processes of their creation and use, artifacts are simultaneously ideal (conceptual) and material. They are material in that they have been created by modifying physical material in the process of goal-directed human actions. They are ideal in that their material form has been shaped to fulfill the human intentions underpinning those earlier goals; these modified material forms exist in the present precisely because they successfully aided those human intentional goal-directed actions in the past, which is why they continue to be present for incorporation into human action." They differentiate three levels of artifacts, each of which mediate human thought and action in different ways. *Primary artifacts* include tools and other materials used by a culture, including bowls, axes, and virtual reality systems. Other artifacts have less apparent materiality. *Secondary artifacts* are structures that enable the transmission and preservation of modes of action using primary artifacts and give meaning to their use. These secondary artifacts include schemes, scripts, forms of kinship, and social forms of organizing action. *Tertiary artifacts* are forms of representation that are used to constitute worlds of imaginative praxis (Cole & Derry, 2001). Seen in this way, all artifacts are materializations of cultural ideals that serve to mediate activities for their users. They mediate activity because their affordances shape how activities are conceptualized, and carried out. Bruno Latour provides a thorough explanation of this view of artifacts and mediation in "On Technical Mediation" (Latour, 1994).

scholars have attended to the importance of cultural mediation in research on technology, communication studies approaches remain underrepresented in STS. This work aims to illustrate the benefit of using these approaches to study technological development.

Additionally, little work has been done on from an STS on the processes of mediation within the context of therapeutic technology. Though considerable work has analyzed the ways that psychopharmaceuticals transform how doctors and users understand the nature of mental illness and healing,[8] we do not know much about how technologies used only within the clinician's office during psychotherapy shape how this activity is understood. As a novel therapeutic modality, Virtual Iraq presents a useful case for understanding the intersection of technological innovation and therapeutic culture. As a media technology, Virtual Iraq's specific meditational modalities and semiotic content need to be analyzed as cultural texts. But the object itself also needs to be analyzed: the VR modality allows for a radical reimagining of what therapy is and what it looks like which are shaped by how we understand VR and the cultural valences attached to it.[9]

The advent and proliferation of Virtual Iraq offers a site for the empirical study of how knowledge about selves, and how to intervene in their dysfunction, are constructed

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[8] See for example Joseph Dumit's work on the pharmaceutical self as a form of "objective self-fashioning" by which users create identities and self-understanding in relation to the drugs they take (Dumit, 2003); Andy Lakoff's work on "pharmaceutical reason" which he defines as "the underlying rationale of drug intervention in the new biomedical psychiatry: that targeted drug treatment will restore the subject to a normal condition of cognition, affect, or volition" (Lakoff, 2005, p. 7); and David Healy's work on the history of the pharmaceutical industry's efforts to sell diagnoses alongside the selling of psychotropic drugs (Healy, 1999).

[9] Roger Silverstone argues that media technologies are "double-articulated" in that they are both "the means (the media) whereby public and private meanings are mutually negotiated; as well as being products themselves, through consumption, of such negotiations of meaning" (Silverstone *et. al*. 1992, p. 28 quoted in Silverstone & Mansell, 1996, p. 14).

through the military-funded collaborations of psychotherapists and technologists designing virtual technologies to treat the psychological wounds of war. I argue that an analysis of the making of this technology tells about the ways we understand war, technology, and trauma.[10] It tells us especially about how the history of VR in mental health care and the history of concepts of war trauma have been brought together in the contemporary moment in the service of an instrumental way of thinking about military service members' subjectivities and how to intervene in them when they become disordered in the course of war fighting. Virtual Iraq may represent a shift in how therapeutic cultures understand and deploy the use of digital media as interventions in mental processes, and these interventions may in turn affect the way that the mind itself is understood as an object of intervention.[11]

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[10] Fassin and Rechtman argue that PTSD represents the dovetailing of science of memory with moral category of victimhood (2009). I agree with their argument that the history of combat stress treatment reveals ways of thinking about soldiers and moral relationship to war, which over the past century has shifted from thinking of war trauma as an indication of cowardice to evidence of the atrocities of war. Even though in practice the application of treatment often appears pragmatic, based on available resources, there are nevertheless trends and historical shifts structured by larger institutional factors that serve to indicate cultural currents in the way that military war trauma treatment is understood.

[11] Adapting Lakoff's concept of "pharmaceutical reason" elsewhere I have referred to the belief that well-designed human-computer interaction can help therapists to cure mental illness as "cybertherapeutic reason" (Brandt, 2013). I argue that cybertherapeutic reason underlies the development of new media technologies as therapeutic tools. Whereas drug treatments use specially designed molecules in order to fix malfunctioning physiological systems in order to improve psychological health, cybertherapeutic treatments entail sessions of human-computer interaction designed to improve overall psychological health. In addition to VR therapy, cybertherapeutic reason can be seen in the use of health-promoting videogames, smartphone-based expert system applications, and avatar therapy in virtual worlds. This "cybertherapy" movement represents an era of renewed faith in the field of *psychological* intervention, made possible by the affordances—and affordability—of new media technology.

Impersonal Trauma and the Media Environment

Among the diverse new treatments for PTSD making news headlines during the War on Terror, Virtual Iraq initially piqued my interest because of the apparent disjuncture between the technology and therapeutic culture. Even though the dominant public image of VR during the 1990s portrayed the technology as one that could entrap people in synthetic environments where they could lose all sense of reality, in fact, all virtual environments are limited to programmed content. Given the deeply personal nature of trauma, the idea that a VR system could be pre-programmed to allow therapists to recreate diverse patients' traumatic experiences seemed impossible. Indeed, many conceptions of trauma have recognized that traumatic memories are very individual—what is traumatic for one person is not necessarily for someone else. How, then, could a VR system represent something called a "traumatic event"? Additionally, whereas normal memories can be remembered and narrated, many schools of thought have argued that traumatic memories resist access and representation, instead coming forth in nightmares and flashbacks, replayed by the mind against the sufferer's will, threatening his or her agency. Freud believed traumatic memories were repressed, while Janet believed that people dissociated during trauma and therefore do not form memories of them. Lacan argued that they resist articulation in the language of the Symbolic Order, while neuropsychologists suggested that they were inaccessible because they were stored in the amygdala rather than in brain's cortex. In all cases, the work of therapy is to transform these memories in order to restore a subject's agency, thereby allowing them stop responding to threats no longer materially present.

The existence of VRET as a serious therapeutic technology suggests a shift in thinking about trauma and traumatic memories. It suggests that what is traumatic about war is already known, and therefore a well-designed piece of software can help people with PTSD restore their agency by enabling them to face these experiences repeatedly within a clinic. In the contemporary war environment, war imagery has become commonplace—from service members' blogs to embedded journalists to documentaries like *The Ground Truth* (Foulkrod, 2006)—shot using helmet-mounted cameras—and *Standard Operating Procedure* (Morris, 2008)—which reconstructed the prison abuse scandal at Abu Ghraib using the digital photography archives of the military guards invovled. It does not require the work of a therapist to uncover the traumatic violence of war. In this media environment, it appears that war trauma becomes something that not only *can* be represented, but representations of which are readily available. Therefore, technologies of representation make sense as valuable tools for clinicians who believe that facing traumas should be part of PTSD treatment.

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In the next section, I lay out the primary discourses Virtual Iraq that circulate in cultural texts about the project. As the primary representative of Virtual Iraq, its inventor, Dr. Skip Rizzo is responsible for the majority of its media appearances, scientific papers, and presentations, and therefore it should not be surprising that I have traced most of these discourses to him. Rizzo's discourses underpin the master narrative; therefore, an overview of these discourses provides a useful base from which to begin a cultural study of Virtual Iraq. Following this discourse analysis, I will review how a few scholars have employed these discourses in cultural studies, and then will contrast this work against my

own interdisciplinary approach to cultural analysis of the technology. In the remainder of this introduction, I will provide three vignettes from my ethnographic research that demonstrate the insufficiency of discourse analysis alone for understanding Virtual Iraq's success in transitioning from science fiction to science fact.

What is Virtual Iraq? The Technology According to Its Maker

In the way that Rizzo uses the term, Virtual Iraq refers to both a set of virtual environments and the interface system through which therapists and patients interact with those environments. When I first encountered the system in 2008, two scenarios were available. In the Humvee convoy driving scenario the user could drive down a desert road past landmarks including an overpass, a checkpoint, a palm grove, and "ramshackle" buildings. In the 18-block Iraqi city environment the user could walk past mosques, through outdoor markets, and even enter a few buildings (Rizzo & Pair, 2004; Rizzo et al., 2005). In order to enter the environment, the user wears a stereoscopic head-mounted display (HMD, also known as VR goggles) and headphones while standing or sitting on a platform that vibrates and rumbles to mimic the tactile effects of a nearby explosion or being jostled while riding through the desert. An optional olfactory palette can release up to eight different smells designed to trigger memories of combat in Iraq including gasoline, burning rubber, "Iraqi spices," and cordite, a smokeless propellant often used instead of gunpowder in firearms. To navigate the environment, the user turns in the desired direction and presses buttons on either a conventional gamepad (driving scenario) or one mounted on a mock M-4 rifle (Iraqi city), in order to go forward and backward. Figure 1 is a photograph of a typical Virtual Iraq clinical set-up with the woman in the

therapist-user position and the man in the patient-user position. Most of what happens in the environment, however, is under the therapist's control. With the click of a button on the control panel, the therapist-user is able to teleport the patient to different locations in the environment, change the time of day, cue sounds and smells, add or remove people from the streets, trigger gunshots and explosions, and vary the amount of damage they do.

Figure 1: A typical Virtual Iraq clinical set-up. The woman on the left is in the therapist-user position, while the man on the right is in the patient-user position. Image courtesy of Skip Rizzo.

In promoting Virtual Iraq, Rizzo always makes a point of highlighting his institutional affiliation. He and his team developed the system at the Institute for Creative Technologies (ICT), university-affiliated research center at the University of Southern California. When describing ICT, Rizzo fondly refers to his employer as "the unholy marriage of Hollywood, the military, and academia" (e.g. Halpern, 2008), but also an ideal locus of resources and expertise for making Virtual Iraq. In 1999, the U.S. Army granted USC $5 million in order to "stand up" ICT—meaning to fund its physical

building and basic infrastructure but not its staff or projects—with the mission of developing cutting edge interactive multimedia technologies and researching how they could be used to serve military needs. These needs included but were not limited to creating appealing recruitment tools and engaging training applications.[12] The Army chose USC because of its renowned film and media production programs, which had already been supplying the entertainment industry in Los Angeles with much of its talented labor force.[13]

Rizzo often describes how he was inspired to make Virtual Iraq by one of ICT's first projects, *Full Spectrum Warrior,* a piece of interactive software released as both a commercial video game and a unit commander training simulation (Korris, 2004). Many of his papers describe how when they began their project, he and his team recycled digital assets from *FSW* in order to create Virtual Iraq, which they described as a novel approach to making clinical software.

FSW was not the only inspiration for Virtual Iraq Rizzo mentioned in interviews and scientific papers. Rizzo credits earlier researchers who established clinical precedents for using VRET in the treatment of PTSD, the most influential and important being Virtual Vietnam, a system for veterans of the Vietnam War. In the late 1990s, researchers

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[12] www.ict.usc.edu/about.

[13] ICT has been called the heart of the "military-entertainment complex." The term military-entertainment complex (Lenoir & Lowood, 2005; Lenoir, 2003) or military-industrial-entertainment complex (Der Derian, 2001) denotes the collusion of the military and entertainment industry to create engaging media for recruiting and training service members. Authors like James Der Derian, Timothy Lenoir, Robert Stahl (2009), and many of the contributors to the edited volume *Joystick Soldiers* (Huntemann & Payne, 2009) have described the particular iteration of this work in the post-Cold War era centered on digital simulation technology.

in Atlanta conducted small clinical trials establishing that Virtual Vietnam was a safe treatment that helped several veterans reduce their symptoms. Though the adjective "primitive" is usually used to describe this system (as opposed to Virtual Iraq, which is often described as "cutting-edge" and "sophisticated"), the Virtual Vietnam researchers conducted their studies in a manner considered clinically rigorous, which Rizzo pointed out as validation for the potential efficacy of Virtual Iraq.

Nearly all articles about Virtual Iraq, in both journals and the popular press, have made three similar claims about how the technology would improve therapy: First, that VR would enhance an empirically supported treatment for PTSD by giving clinicians more control over patient experiences; second, that it would make therapy itself more engaging; and third that it would attract members of the digital generation to therapy.

Articles about Virtual Iraq argue that it enhances the practice of prolonged exposure therapy. In 2007, the Institute of Medicine had determined that prolonged exposure therapy (hereafter PE) was the form of PTSD treatment with the most empirical support (IOM, 2007). PE gets its name through its effort to repeatedly expose the patient to stimuli associated with a trauma by using his or her recalled memories of the event as the source of stimulation. The technique is grounded in Foa and Kozak's "emotional processing theory of anxiety" (Foa & Kozak, 1986).[14] According to this theory, PTSD

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[14] In designing the prolonged exposure treatment model, Foa drew on the work of Terence Keane's work on veterans a Mississippi VA. Keane used a version of exposure therapy called "the implosive technique" in which the therapist used details from the patient's life in order to tell produce evocative verbal stimuli. That is, he would describe traumatic scenarios in great detail, creating a kind of verbal "virtual reality" for the patient that would desensitize them to their "fears." Both Keane and Foa and Kozak's work contributed to the transition between behaviorist

symptoms are natural responses to traumatic experiences. As in classical conditioning theory—recall Pavlov's dogs—the etiology of PTSD is seen as the attachment of a strong fear response to previously neutral stimuli as the result of a particularly terrifying or life-threatening event. In the face of danger, these "fear structures" are adaptive; in Foa and Kozak's terms, a fear structure is "program to escape danger" (p. 166). In normal healing, fear structures dissolve a few weeks after the danger subsides. However, if a person begins avoiding stimuli that trigger his or her fear responses, this may disrupt the normal healing process. While avoidance provides a way to control symptoms that provides temporary relief, it keeps the fear structure in tact long after the danger is over.[15]

According to emotional processing theory, veterans with PTSD are still responding to the war long after they have returned stateside because they have not been able to emotionally process their experiences. Rather than confront his experience, a veteran may try to emotionally numb himself, become socially isolated, or take comfort in alcohol. However, the fear structure is still there, and triggers like the sound of a car backfiring or the sight of an Arabic child may cause him to respond physically and emotionally to a memory that he has not allowed himself to confront consciously.

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and cognitivist views of self during the shift that took place in academic psychology in the 1980s, after the release of the DSM-III. Keane has discussed his struggle to stay behaviorist during this time, because he wanted to treat cognitions, such as memories and beliefs, among his veteran patients (Keane & Marx, 2007). Emotional processing theory was appealing to Keane as a theoretical explanation for his own work, because it re-theorized behaviorist practices in ways that included mental constructs.

[15] "We propose that what distinguishes PTSD from other anxiety disorders is that the traumatic event was of monumental significance and violated formerly held basic concepts of safety. That is to say, stimuli and responses that previously signaled safety have now become associated with danger. In this way, one's world becomes less predictable and controllable" (Foa & Kozak, 1986, p.166).

According to this view of PTSD, these uncontrollable feelings may lead him to step up his efforts to avoid triggers, leading to him to become even more withdrawn and less likely to heal from his trauma.

Drawing on the emotional processing theory she helped to create, Dr. Edna Foa started developing PE as a treatment for PTSD in the 1980s. She posited that the key to treating anxiety disorders like PTSD was to conquer avoidance and activate the fear structure by exposing the patient to stimuli associated with the trauma. By repeatedly having his or her fear structure activated within a safe context, the therapy could add "new information" to the patient's fear structure, ultimately helping to dissolve it. Neutral stimuli would become neutral again and involuntary emotional responses extinguished.[16]

Traditional PE, as designed by Foa, consists of two forms of exposure: imaginal exposure and *in vivo* exposure. Imaginal exposure takes place both in the clinic, where patients are directed to repeatedly revisit their trauma memory by narrating it, and at home, when they listen to recordings of their narrative as therapeutic "homework." During imaginal exposure, therapists guide patients to imagine their traumatic experiences and encourage them to engage with them in their full emotional intensity. *In vivo* exposure takes place as between-session homework. Patients agree to challenge themselves to complete activities from everyday life that they avoid and can no longer enjoy because of their PTSD symptoms. This usually starts with relatively easy activities

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[16] Though considered a cognitive-behavioral therapy, it is primarily behavioral, based on learning theory and operant conditioning. It is less about changing what a person thinks about an event consciously than transforming unconscious associations.

and gradually steps up in difficulty.

Advocates of VRET often highlight the drawbacks of traditional exposure therapy methods. *In vivo* exposure can be dangerous or impractical. Yet, many service members are skilled at emotional disengagement as a result of their military training, making imaginal exposure challenging. VR as an exposure therapy modality would enable the therapist to use the scenes and virtual elements to recreate the details of the trauma narrative. Advocates argued that it offers all of the vividness and "immersion" of in vivo exposure, with the safety and convenience of the clinic.

Rizzo also points out that Virtual Iraq offers the therapist greater control over the patient's subjective experiences during therapy. In traditional PE, the therapist has to rely on the patient's willingness and ability to do the very painful work of remembering their trauma in its fully emotional intensity. Some might resist engagement by leaving out details or refusing to imagine what they described. Others might have difficulty tapping into their imagination in an emotionally engaged way. As Rizzo put it, "You just don't know what's on with a person in the world of imagination."

> VR provides a tool that's an equalizer so that somebody's who a good therapist who understands exposure can do exposure therapy more effectively with the VR application than if they have to be real creative and artistic in how they help guide a person through the treatment, never knowing if the person's really imagining or engaging in that imagery or if they're even relevant. At least we know what the person is seeing there on the outside. We don't know what they're seeing in their *minds*, but we know what they're seeing, what they're hearing, what they're smelling,

> [and] the vibrations that we've pumped in through the floor system. (Rizzo, interview) [17]

As a tool, VR would afford the therapist the ability to bring evocative imagery into the clinic without the skillful labor of verbally stimulating the imagination—a technique that some practitioners call *in virtuo* exposure. Rizzo argued that by giving therapists control over much of the sensory stimuli the patient received through the VR interfaces, Virtual Iraq would increase their overall ability to conduct effect exposure therapy.

The final claim commonly made in the discourses about Virtual Iraq was that it would potentially decrease the stigma associated with therapy for young service members

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[17] While this comment implies that VR is a professional equalizer that could serve to deskill therapeutic practice, Rizzo emphasizes that the work of modulating anxiety with Virtual Iraq also requires skill and interpersonal attention: "You don't want them to get too amped up at first, but you do want them to feel a little bit. You need them to be engaged to work, to engage with the trauma," says Rizzo of initiating the patient into the system. Anxiety may be the target of control, but the therapist can only influence this feeling by using the material interfaces of the technology. As Rizzo explains:

> If all of a sudden somebody's getting choked up, you may want to pull back. You may want to say 'Hey, do you want to stop right now? You want to go on?' You know, it's hard medicine for a hard problem, but the people who do this work are very well trained in knowing how to read a patient, to pay attention to what they're experiencing. So basically the therapist's goal is to modulate their anxiety, so that the person gets a little bit of stress, something they've been avoiding feeling but not enough to retraumatize them or push them over the edge. And by feeling a little bit of that anxiety in measured doses, eventually, the things that bring up that anxiety no longer elicit it. It's the basic rules of the laws of conditioning and learning. (interview, Rizzo, 2008)

For the therapy to be effective, the therapist must exercise care in how and when she delivers the stimulus: She must choreograph her clicks not only in accordance with the narrative of the patient's recounted memory, but also in response to the patient's declared willingness to be exposed to stimuli. A microphone and speaker embedded in the headset allow the therapist and patient to speak with one another. While this compromises total immersion —the sense of "really" being present in a digitally generated world—it also provides a link through which the two can maintain vocal communication.

of the "digital generation," those born since the 1980s who have grown up with digital media as a part of everyday life.[18] The argument is that members of this population may feel more comfortable about the prospect of interacting with technology, than they would divulging personal information to a therapist. As the authors of one early study argue, "This treatment appears to be timely for this population of mostly young men experienced with seeking technological solutions to many day-to-day challenges" (Reger & Gahm, 2008).

Literature Review: Medical Miracle or Militarized Therapy?

Only limited published literature examines VRET from a cultural perspective. Though several cultural critics have explicitly referenced Virtual Iraq in their work, for the most part they have mentioned it only briefly within larger analyses of either military investment in digital media or the application of game technology for social good. It is also clear from their language and use of discourse, that the majority of these authors have relied almost entirely news media accounts or Rizzo's scientific articles alone.

While mainstream discourse represents Virtual Iraq as an innovative and culturally appropriate solution to the PTSD epidemic, others have suggested instead that it represents the militarization of therapy. Several cultural critics have drawn attention to

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[18] The idea of a new generation of "digital natives" was advanced by Mark Prensky in the late 1990s and early 2000s, especially in his influential essay "Digital Natives, Digital Immigrants" (Prensky, 2001). However, the idea that such a generation exists—due to the exigencies of the digital divide—or that such individuals have the particular capacities that Prensky claims has been hotly contested both on blogs written by media studies scholars and in formal reviews (Bennett, Maton, & Kervin, 2008; Helsper & Eynon, 2010).

Virtual Iraq's similarity to other militaristic virtual technologies (Brady, 2012; Dyer-Witheford & De Peuter, 2009; Ghamari-Tabrizi, 2011; McSorley, 2012; M. Power, 2007; Marcus Power, 2009). As these critics point out, during the War on Terror, the military has funded the development of numerous video games and immersive training systems designed that use the interactive capabilities of new media technology to create entertaining and engaging experiences of war not only for spectators, but also for service members themselves.[19] Many critics have argued that these digital media act as a form of virtual theater in which users are encouraged to "play war" so that they can learn how to fill a military role (Der Derian, 2003; Ghamari-Tabrizi, 2004; Kontour, 2012; Lenoir & Lowood, 2005; Leopard, 2010; Stahl, 2006).[20]

Even after being turned into clinical software, there remained several structural similarities between Virtual Iraq and *Full Spectrum Warrior*, the video game/training simulation software that inspired Rizzo to make the VRET system. Each employs a first person perspective on digital war imagery and interface technologies like gamepads in

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[19] The first Gulf War was often referred to as the Videogame War because the on-screen imagery in the mass media portrayed the conflict as a videogame, with sophisticated technology, night vision glasses, and clear conflict between good and evil (Stahl, 2007). But the post 9/11 war-scape has seen the expansion of the military-entertainment complex, especially in the area of immersive digital media. The U.S. military has sponsored videogames such as *America's Army* and *Full Spectrum Warrior* in order to stoke players' interest in military careers by virtually transporting them into a military role in foreign combat zones (Payne, 2009). Though official spokespeople for the military have denied that these are recruitment tools, these games nevertheless introduce players to military culture and encourage them to identify with the warrior subject position.

[20] Recent cultural analysis has drawn attention to the fact that the interfaces being developed for controlling military technologies such as unmanned aerial vehicle (UAV) resemble computer video game interfaces. See, for example, the work of media scholar Peter Asaro.

order to create immersive and engaging virtual combat zone environment.[21] It is compelling to ask why Virtual Iraq would be able to help a traumatized veteran if video games and training simulations could not shield his from the psychological trauma of war. What makes us think that more of the same will fix them? From recruitment to training to therapy, in each phase of Soldier 2.0's military career, it appears that virtual technologies both orient him to combat and provide a bridge between geographically and temporally distinct realms of his life. Critics of the militarization of therapy are concerned that Virtual Iraq is part of the military's dangerous technocultural imaginary which sees virtual technologies a cybernetic tools for programming—and when necessary reprogramming—service members' minds.[22]

The problem with these cultural critiques is that they do not consider the relationship between Virtual Iraq and PE. Because of this, they cannot account for why any clinician would consider it a legitimate tool. Nor do such critiques consider what the technology is contributing to the militarization of therapy above and beyond PE itself. Seeing Virtual Iraq as a new instrument of the military-entertainment complex does not appreciate the difficulty of transforming therapeutic practice within large bureaucratic health care institutions, such as those of the Veterans Administration or U.S. Department of Defense. However, seeing Virtual Iraq as only a medical tool would overlook the

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[21] *Full Spectrum Warrior* should not be confused with first-person shooter videogames, a game genre which place the player in the subject position of a weapon-toting killer who navigates an environment trying to shoot enemies before being shot.

[22] For more on video games and the cybersoldiers critiques prior to the development of Virtual Iraq, see Kevin Robins and Les Levidow, "Soldier, Cyborg, Citizen" in the edited volume *Resisting the Virtual Life* (Levidow & Robins, 1995) and the work of Chris Hables Gray (e.g. 2003; 1989).

importance of military culture to its success, and in particular the figure of Soldier 2.0 as an imagine user of military-funded virtual technologies.

Some other scholars have referred to Virtual Iraq briefly as evidence the power of games and simulation technology used for good (Blascovich & Bailenson, 2011; Demaria, 2008; Gilsdorf, 2009; Mileham, 2008; Zagalo & Morgado, 2011). Many authors in recent years have lauded "gamification" as a solution to a wide variety of problems, ranging from how to get children engaged in their education to promoting brand awareness. Even critics who are otherwise critical of the impact of game technology on the psyche and express concern about video game violence look to Virtual Iraq as evidence that this kind of technology can be used to promote healing. Like critics of the militarization of therapy, authors writing about the gamification of therapy do not question what makes this particular use of VR in therapy legitimate. They do not explain how the technology was designed, or what kinds of features were considered important for making it a legitimate tool. Additionally, in hailing a digital media as a promising new treatment technology they do not explain why VR has become so visible as a treatment for military PTSD and not other kinds of PTSD or other disorders. Drawing attention to digital media's power elides the social, political, and historical factors that have brought it to the fore in this particular context.

The most in-depth attention to date has been paid by Elizabeth Losh, who included it as a case study in her book on how the U.S. government has responded to digital media technologies, *Virtualpolitik.* Drawing primarily on scientific articles by and

interviews with Rizzo, Losh suggests that Virtual Iraq serves as a "palace of memory" for evoking memories[23] and that it is a Latourian "thing public" created for political audiences that opens a door to the traditional private space of the clinic to the larger public.[24]

While I agree with Losh's characterization, our approaches differs in that she confines her study to rhetorical analysis of Virtual Iraq, rather than a biography of its making. She mentions that there has been a lot of media coverage—almost universally positive—but does not analyze the meanings created through the discourses or representational practices (p. 124). She mentions that Rizzo is very media savvy and good at doing demonstrations, but we do not learn what makes his presentation style so compelling specifically within the context of promoting a technology for treating combat-related PTSD among young American service members (p. 125). She tells us that VR has been used to create other traumatic scenes, but does not look at the history of VRET as a psychotherapeutic technique. She tells us that "military-funded games and simulations do not always capitalize on the particular efficiencies in learning and other forms of psychic

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[23] "In the virtual environment of traumatic combat for Virtual Iraq, the mnemonic assets acquired in moving through the 3-D world are associated with emotional rather than intellectual value systems. In the final analysis, this virtual reality simulation is designed to solve a much more difficult problem than merely remembering traumatic circumstances, since the user must ultimately also distance him or herself from these violent events by relegating them to the past using the discursive device of the personal narrative. As Cicero tells of the orator Themistocles's interactions with a discipline who inquires what the art of memory could do for him, the rhetorician retorts that the student would oblige his teacher much more 'if he could instruct him how to forget, rather than to remember, what he chose'" (p. 110).

[24] In his proposal for "object-oriented democracy," science studies scholar Bruno Latour analyzes scientific and political visual culture and suggests that "things" and how they are "re-presented" need to be integrated into contemporary theories and definitions of politics (2005).

integration, which the method of loci offers" (p. 109) but does not explain either the design practice or other factors that might have shaped this choice, especially given that ICT is so savvy. While she does consider it as a medical object, she does not include evidence that she interviewed clinicians nor does she investigate the emotional processing theory model of PTSD (Losh, 2009).

In writing the biography of Virtual Iraq in-the-making, my goal is to explain the processes through which it was developed and legitimized without either participating in the technophilic hailing of new treatment technologies nor to unleash indictments of post-industrial regimes of military subject-formation. Having studied Virtual Iraq in depth, I see its existence as neither the militarization nor the gamification of therapy, but rather as Rizzo and his collaborator's achievement in negotiating a set of culturally resonant meanings about military service members, therapy, and media technology in order to make a world that they could bring their invention into. This world included different entanglements of interest groups from those involved in the creation of either training simulations or video games. In order to explain Virtual Iraq's success I could not rely on textual analysis alone; I had to also follow the technology into the life-worlds of those it affected.

Research Methodology

Technologies must be studied as sociotechnical actors whose use and meaning is negotiated over time in specific cultural historical contexts. In order to understand Virtual Iraq, my research has added the textual methods of cultural analysis to the interdisciplinary sets of practices that STS scholars call, "following the actors." During

its development, Virtual Iraq has necessarily traveled between several social worlds: academic digital media research and development centers, clinical care sites for military PTSD, military funding institutions, and public media. Therefore, my research entailed a combination of ethnographic fieldwork, historical methods, and media analysis in order to allow me to follow it as it circulated between the desktops of artists, demonstration spaces, clinicians' offices, conference halls, as well as in scientific journals, magazines, and television screens.

In addition to generating an archive of scientific articles, conference materials, and popular media for analysis, I also generated my own texts through field notes and interviews. I traveled to interview people from interest groups related to Virtual Iraq, including clinicians using Virtual Iraq at treatment sites outside of California and VR therapy system designers at Virtually Better, Inc, in Decatur, Georgia. I attended conferences on medical uses of digital technology, on psychological trauma, and on military research where Rizzo presented his work on Virtual Iraq. These conferences included Cybertherapy, Games for Health, the ImTech immersive technology conference, the Navy Combat and Operational Stress Control Conference, and the annual meeting of the International Society of Traumatic Stress Studies. In addition to observing how Rizzo presented his work to diverse audiences, attending these conferences helped me to understand the state of current research and innovations in these fields as well as the political-economic issues and institutional factors shaping them.

From September 2010 through July 2011, I was a visiting researcher at the Medical VR (MedVR) laboratory at ICT. Even though several VR systems have been developed for use in PTSD treatment, I found that Virtual Iraq was the most accessible to

me as a social scientist because it was developed at an academic site, rather than corporate one, and because of Rizzo's generous openness to my presence. Indeed, my research often entailed literally following Rizzo as he oversaw the design process, coordinated clinical research, and promoted the technology to audiences including clinicians, military personnel, other technologists, and journalists.

During my time as a visiting scholar, Rizzo and a team of collaborators received an $11 million grant to conduct a multi-site clinical trial of PTSD treatment using VRET from the Army's Medical Research and Materiel Command. Part of the grant was specifically allocated to rebuilding the Virtual Iraq software on a new game engine and with a wider array of features. Due to the timing of my fieldwork, I was able to interview designers and technical artists at their desks as they worked on the new version of the system and was also able to sit in on several meetings of the design team as they made decisions about its design.

As a visiting scholar, I benefitted from participating in the intellectual life of ICT. This included attending research presentations and special events, and speaking with other visitors and researchers in attendance.

I also gained valuable insight into the process of developing clinical research projects using novel digital technologies through participation in the Virtual Worlds Research Group. Though this group was not an official member of the MedVR lab, during my time at ICT, they were very active in researching how virtual worlds could be used help service members with PTSD. There are few other people to whom I owe more of a debt of gratitude in supporting this work than the head of this group, Jacquelyn Ford Morie. Morie not only secured my ability to study at ICT, but let me spend many hours in

her office and meetings, allowing me to see how her team works and how they interface with both current and potential collaborators in online virtual environments. Thanks to her, I received an inside view of the process of responding to calls for proposals for mental health projects, especially ones aimed at targeting PTSD offered by various military-affiliated funding agencies. [25]

My own position as an academic researcher housed in a communication department structured the research and its conditions for possibility as a visiting scholar at ICT. For example, I was seen by several of the administrators and researchers as Rizzo's protégé, and this allowed me to spend time in the center as a visiting scholar, not only as an observer. Only among less powerful members of the lab, such as the technical artists and designers, did I feel that I was seen as someone interrogating their work. They were not used to having students or speaking to the media, so my interaction with them was far more unfamiliar.

I would also like to reiterate what this project is and to make clear what it is not: This project is about the making the Virtual Iraq, where it originated and how it was developed, promoted, legitimized, researched, and represented to various publics. However, I was not permitted by either my own Institutional Review Board or that governing the clinical trials using Virtual Iraq to speak to service members in treatment

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[25] In following these actors, I encountered the world of cybertherapy. I realized that Virtual Iraq was not a lone invention, but part of a growing movement among researchers to promote the use of interactive media as health promoting tools. I was most attracted to the work being done on mental health: amidst moral panic over Internet addiction, video game addiction, these researchers felt that technology was truly neutral: it could be made to do good in the world and actually promote mental health.

for PTSD or to observe the practice of therapy. Subsequently, this research project does not entail an in-depth discussion or theorization of the role of Virtual Iraq as a technology of therapeutic remediation within clinical practice, nor what the subjective experience of this is like for patients. Instead, the focus of the work is on understanding the various forms of cultural and technical work that have enabled the technology to enter clinics and become the subject of clinical trials. Therefore, I treat the question of what Virtual Iraq does in therapy not as a stable object of analysis, but rather as an epistemological problem that has evolved over time as it has been negotiated by various actors as a part of their work of bringing the technology into being.

Three Orienting Ethnographic Vignettes

The following ethnographic vignettes describe three early formative encounters that fundamentally shaped how I came to understand Virtual Iraq: my first visit to ICT during which I first encountered a Virtual Iraq system; a seminar at the San Diego Veterans Administration Hospital where I learned about the form of therapy that Virtual Iraq was intended to augment; and a conference where research presentations on VR-based treatments for PTSD seemed to be far more prevalent than the available data actually warranted.

Vignette 1: Playing Therapeutic Technology: Visiting Virtual Iraq

I arrived at the building on McConnell Street in Marina Del Rey for the first time on a sunny Friday morning in February 2009. This building was where most of the research groups at ICT conduct demonstrations of their newest projects. Earlier in the

week, I had arranged with Rizzo to come to the lab to attend a demo he was already conducting for some other visitors at the McConnell facility. I hoped this would give me a better idea of the extent to which trauma and its treatment were codified into the design.

The front of the McConnell building was dark, one-way glass, which dimly reflects the adjacent recycling center and storage company. A blonde woman with fashionable eyeglasses answered the door and told me Rizzo had not arrived, but showed me to a kitchenette. I expected a medical building, a sterile environment with pale colors and charts. Instead, the inside reminded me much more of a design studio: three large dry-erase panels stand in the hallways, covered in notes and diagrams. The building appeared to be a recently converted warehouse; it smelled of new paint and new carpet. A dozen computers topped several rows of desks in the main room. Only one was being used. I introduced myself to the young man concentrating on the screen. He said that he was also waiting for Rizzo then returned to typing. Behind him a heavy dark-colored velvety curtain acted as one wall of the room. Peering behind it I saw several equipment stations in a large room: a big-screen monitor with several kinds a gadgets in front of it; a projection screen surrounded by what appeared to be war-movie props such as crates and netting; and near the curtain, a station with three medium-sized monitors, a small platform with a chair on it, and sound equipment.

I was reading a poster describing a “virtual human” recruiter named Sgt. Rocco posted in the kitchenette when three men entered the building. The first had long hair in a ponytail, a flannel shirt, and a leather choker necklace with a skull bead on it. I recognized him as Rizzo. He introduced me to the other two. The man wearing a tie-dyed purple t-shirt was a professor of social work visiting from Texas. The man in business-

casual blue shirt and khakis was a "corporate partner" visiting from Georgia.

After introductions, Rizzo continued a story he had been telling the men about his recent travels. In Washington D.C. he demoed Virtual Iraq to a House Representative he hopes will help him get additional funding for the technology. He had also recently consulted with a prison interested in developing a VR system for identifying pedophiles, installed a Virtual Iraq system at a local university, and made contacts with researchers at two universities in New England interested in using the system. Networking, I could tell, was clearly a very important part of his work.

Rizzo then offered to give us a tour of the facility. At this point, the young man got up from the computer and followed us to the station with the large screen and gadgets. Rizzo tells us that the gadgets were game controllers that stress different kinds of motor rehabilitation. A pair of knob-like controllers let the user pick up a virtual block on the screen and throw it over a virtual wall, the weight of the block signified by resistance in the controllers. A controller mounted on a baseball cap let the user guide a penguin down a ski slope by leaning.

The visiting men asked Rizzo about the cost and availability of the various controllers. Then the three men discussed the cost of setting up a Virtual Iraq system. While the lab provides the software itself free of charge, their corporate partner, Virtually Better, Inc.—the second visitor's employer—charges $10,000 to $11,000 to set up a system and provide technical support. They also discussed licensing issues and fees for the game engine, and the possibility of adding a steering wheel-shaped controller to the system, provided they could make it system-compatible. Nothing was cheap.

Rizzo brought us to a door I had assumed led to an office. As he opened the door

he said, “We call this the ‘Wow Room’.” Inside was a giant black geodesic dome perhaps fifteen feet tall covered in wires, lamps, video cameras, and electrical panels. Us three visitors gawked. We were in the presence of the technological sublime and we were impressed even before Rizzo told us what it was: a cutting-edge video-capture tool.[26]

As we proceeded through other demo stations—an interrogator-training tool modeled to look like a room in Iraq, a virtual Marine recruiter, a smaller motion capture station in the new addition next door—Rizzo would turn to me to say things like, "As a communication person, you should really check this out," and "Let me know if you'd like to collaborate on something about this project." I had come to be an observer, but I felt more and more like I was being enrolled into his network.[27]

The last stop on the tour was the station with the three monitors that I had noticed earlier. This was Virtual Iraq, at last. Handing me a pair of VR goggles—also known as a head-mounted display (HMD)—Rizzo asked if I would like to try it out. Even before I had them on, I could see the virtual environment I was about to enter in the goggles’ stereoscope lens-screens; the brightly lit tan and blue desert scene contrasted with the charcoal gray of the room. Chip, the corporate partner representative, helped to adjust the

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[26] Digital video can be taken of a live actor bathed in a sphere of light that can be dynamically controlled to mimic the lighting in almost any kind of scenario over the course of a scene The video can then be used to place the actor into film scenes—a dramatic improvement in realism over previous blue-screen methods.

[27] During the 1980s, actor-network theorists like Michel Callon contributed to the social studies of science and technology by describing how scientific investigation requires enrollment, a kind of seduction in which actors as diverse as scallops, fisherman, and policy makers act come to create a network wherein each is given a role to play (1986). The resistance or acquiescence of each actant contributes to the formation of new networks wherein power/knowledge can be created, enacted, and shared.

straps; the snug fit helped to keep the environment from moving too much, which could have contributed to simulator sickness and broken the reality effect. As I moved my head, the desert in the goggles did not move with me as a fixed image, the way that it might if regular screens had been before my eyes. Rather, the scene changed in response to my head movements, mimicking natural vision: I looked up and I saw the sky; I looked down and the saw the street. My head movement was being "tracked" in order to produce "presence," the subjective experience of being in a virtual space.

Rizzo sat to my left at a computer control station with two monitors. One monitor displayed what I was seeing, without stereoscopy. The other displayed buttons on several layers of tabs. This was the clinician controller interface, which Rizzo's lab referred to in papers as the "Wizard of Oz" display because it allowed the clinician to teleport the patient to another world from behind her controls, like the Wizard who sends Dorothy back to her home in Kansas in the 1939 film. Considering the world presented in Virtual Iraq, I wondered how to interpret this comparison. Was Iraq "home," or would interaction with Virtual Iraq allow those with PTSD to finally fully come home, stateside, no longer haunted by their traumatic memories of war? Or was the issue of home even relevant? Perhaps the moniker was only supposed to be a reference to the power of the man behind the curtain using controls to produce meaningful illusions.

We started with the Humvee simulation. Chip gave me a small white video gamepad with a plus sign-shaped movement button and two round action buttons. He and Rizzo me directed to sit in the chair on a small wooden platform. Rizzo pressed a button and then suddenly I could tell that I was in the driver's seat of an army Humvee. It was both realistic and cartoonish: all the proportions felt natural, but colors were too even,

angles too sharp, and where was my body?[28] There were only mannish hands holding the steering wheel. My arms had been bare in real life, but these virtual arms were wearing fatigues. The engine rumbled in the headphones. Rizzo directed me to turn around and look up at the gunner standing behind me, from chest up outside the roof of the vehicle. We could take him away, I'm told, and *click*, the gunner was gone. "Now look to your right," Rizzo instructed. My passenger was an ethnically ambiguous man with light brown skin and dark eyes. He looked straight ahead and made subtle movements that gave him a sense of being more than an object, but somehow less than human, which was made all the more apparent because he did not respond as I turned to look at him. We could take him away, too, *click,* or make me the passenger, *click.* I was suddenly seated about three feet to the right of where I had been sitting before, even though my body had not moved. I looked back at the empty driver's seat and then *click* I was back in it, and my passenger was back in his seat. Already my experience of Virtual Iraq was very different from how the *Salon.com* journalist had described the seamless VR experience of Kevin Smith.

I began to drive by pressing the top of the plus sign button with my left thumb. The Humvee advanced down the gray desert street. As I drove, Rizzo changed the light setting: *click,* the blue sky became filled with gray clouds; *click,* the scene took on a

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[28] During the height of interest in VR, copious debate took place about whether VR was a denial of embodiment or another way to think about embodiment. One of the most often-cited articles on the erasure of the body in cyberspace is John Perry Barlow's 1990 article "Being in Nothingness," printed in popular cyberculture magazine *Mondo 2000* (1990). For an extended rebuttal of this disembodied view of VR informed by feminist theory, check out the works of digital media artist and critic Diana Gromala, such as "Pain and Subjectivity in VR" (1996).

bright green hue as though the VR goggles were night vision goggles; then *click,* it became a clear day again. Rizzo told me that a lot of incidents occur during convoys, and *click* another Humvee appeared in front of me. Our convoy was coming up on a few small buildings with car by the side of the road. "See that guy? What's he doing?" I didn't, but before I knew what has happened the platform beneath me shook and a crack appeared on the windshield. "How's your passenger doing?" Rizzo asked. I looked right and saw the passenger slumped forward, covered in blood, missing flesh from his arm. He was still. The gunner was now inside the vehicle, leaning over the seat, checking on the dead soldier. "We can also adjust the level of trauma." I turned towards Rizzo as he said this (an excuse to look away) and when I looked back the passenger had only a small arm wound that he clutched as he rocked himself in pain. I noted that he was surprisingly quiet, but maybe I couldn't hear him over the loud engine sounds. I continued driving, and Rizzo showed me how *click* the lab was making a Virtual Afghanistan, which entailed adding mountains onto the horizon of Virtual Iraq.[29]

Visiting the Iraqi city scenario required a different controller. I was told to stand, the chair was taken away, and I was given a heavy, black plastic model of an assault rifle with a small white gamepad taped to the dorsal side, opposite the trigger. I fumbled with it until Chip showed me how a soldier holds a weapon, placing the butt in my left armpit

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[29] Rizzo leaves to answer his cell phone and Chip takes his place at the control panel. His demeanor is completely different, his voice more quiet, his attention on me. In Virtual Iraq I approach what is left of a red car, flames and smoke flowing out of it. Chip says, "See that car to the right? Do you see any survivors? Okay, there's nothing you can do. It can't hurt you," he assures me, "Just keep driving." Chip gives Rizzo back the controls when he returns.

and my right hand on the gamepad. I was hardly strong enough to do it correctly, but I could still manage the controls. None of the buttons on the controller fired a weapon in the virtual environment. Indeed, though I was holding a weapon in real life, I noticed that, unlike first-person shooter video games, the weapon was not rendered in the space of the simulation.

I found myself standing near an outdoor marketplace while maybe a dozen people, men in t-shirts and women with covered heads, milled around the streets. I heard voices speaking Arabic. At the control panel, Rizzo could adjust the number of people in the marketplace—*click,* their numbers doubled, then shrunk, and for a moment I was alone before he *click* brought a few back. Rizzo directed me to start walking towards an ambulance parked on the other side of the marketplace. As I did so, he made a blue, parked car explode to my left. The platform rumbled again, as it had during the Humvee explosion. The Iraqi civilian men and women screamed and yelled. "How's that guy doing?" I could tell Rizzo was referring to a man in a blue shirt, his body a mass on the ground not far from where the blue car still bellowed a thick cloud of smoke. I walked up to the man, but had difficulty making out exactly what I was seeing. Pieces of his limbs were missing; his face didn't look like a face. I couldn't tell if my confusion derived from poor graphics rendering or that of looking at a deeply mangled face. It startled me to see a dead body in a virtual environment: in video games, when people die, they usually disappear, often in a bloody cloud. "We can also adjust the level of trauma here, too," Rizzo said and the car exploded again but this time the man in the blue shirt had only a small head wound and was wandering the plaza as if in a daze.

Rizzo then took me on a tour of the town. He directed me towards a doorway in the virtual space. I entered a barren room, and moved into another room before exiting onto the street. Outside, he directed me to a stairway with a couple of flights that led to the roof of a building. On the roof, I heard Muslim calls to prayer and turned to see the tiled dome of a mosque. Palm trees and telephone wires decorated the skyline. Rizzo told me to look to the roof of nearby building. "Do you see the sniper over there?" This time I did. The bullets sounded loud, suggesting I was the target, but looking around me I saw no evidence of damage.

In order to turn and move forward in the virtual space, I had to turn my physical body in the direction I wanted to go and then press the plus-sign controller button. Several times I had to step over the controller cable so it would not tangle around my legs. Watching my perspective in the monitor other two men asked, "Are you a gamer?" "I've played video games," I replied, "But not like this, not first person-shooter style games. More like Mario.[30]" Many of the news articles I had read on Virtual Iraq had repeated the claim that the system might help attract young service members to therapy because they were members of the "digital generation," like myself, born after 1980 or so. However, this question invoking a "gamer" as the implied subject/user of Virtual Iraq struck me as odd once I had entered the system. Though Virtual Iraq resembled a military video game due to its first person perspective and war-torn imagery, it did not ask me to employ any skills of "game literacy": puzzle-solving, noticing features of the

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[30] The *Super Mario Brothers* video game series is Nintendo's classic platform game.

environment, using fast reflexes, and keeping track of map plans, let alone shooting. Also, the form of navigation felt unfamiliar, very different from moving an avatar on a screen. Rather, it seemed far more interactively game-like for Rizzo than for me.

Rizzo clicked again and transported me to a checkpoint on the edge of town where he made a few more cars blow up. In this fragile world it seemed that everything could explode…with adjustable levels of trauma. I was not exactly dizzy but I didn't feel quite right. Was this cybersickness? My arms were beginning to ache. I shuffled in my heels. Though the articles I had read claimed that VR would help people to become more engaged in therapy, after 20 minutes, I did not want to be in Virtual Iraq any longer. I wanted to walk around and feel the ground under my feet as I moved, to see what others see, and to have them respond to my actions.

After I took off the goggles Rizzo played some selections from the system's sound catalogue, such as a mosquito buzzing, which had been drowned out by the helicopter and market sounds. I asked about the scent generator that I had read about. Rizzo turned to a device at the station that resembled a VCR and pulled out some small jars of white beads. They had labels like "Iraqi Spices," "Cordite," and "Body Odor." I take a whiff. He said that they don't usually use the scent machine in demos. While there was a good theoretical basis for using smell, because olfaction is closely associated with memory, he told me, no one had yet studied whether the use of the scent machine improve the efficacy of virtual reality exposure therapy. "That would be a good dissertation topic, eh?" said Rizzo. Other disadvantages also deterred regular use of the scent machine: it was expensive, about $2,000, and the jars of scent beads were also expensive and needed to be custom ordered. You could only put eight jars of scent beads

in the machine at a time and over time they began to all smell the same. The balls also sometimes melted or lost their scent.

Virtual Iraq was clearly neither a video game nor an exact simulation of traumatic experience, but neither was it clearly therapeutic. And even though it was a designated practice for making the technology public, the demo was not a performance of therapy. I was not able to learn how closely therapists did —or could—match the actions in Virtual Iraq to those of a patient's traumatic memory. Nor did I understand how patients became engaged with a virtual environment in which they could not be active agents. But divorced from these practices I could nevertheless "play" with Virtual Iraq, making my way through its various features and affordances—like the latest gadget at an electronics store. It was something I could touch, experience, and explore, without gaining any mastery of it.

But Virtual Iraq was able to be "played" in another sense as well: Independent of the specific stories of services members' experiences of trauma, the system could be made to perform digitally mediated scenarios representing what audiences like myself were instructed to understand as what was traumatic about the war in Iraq. In other words, the demo suggested that the scenarios presented could, to some extent, illustrate what was traumatic about war, thereby giving a glimpse of the experience of the traumatic to those who had never been deployed. But was it really possible to understand what was traumatic without understanding what happened during therapy, all of the interactions and coordination of action that were not captured or played during the demo?

Vignette 2: When Does Therapy Require Technological Enhancement? Virtual Iraq's Therapeutic Milieu

In order to understand current PTSD treatment regimes, the summer after my first visit to ICT in 2008, I began attending a weekly seminar on PTSD for the clinical psychology and psychiatry residents at two Veterans Administration hospitals in San Diego. The seminar was particularly useful because one of the seminar leaders was a certified trainer in prolonged exposure therapy, the specific form of exposure therapy that Virtual Iraq was designed to enhance.

After the inclusion of PTSD in the DSM-III in 1980, behavioral medicine was charged with figuring out how to treat a disorder that originated in a past event. The therapies that emerged can be divided roughly into two categories: "Present-centered" or supportive therapies give patients skills for dealing with day-to-day life and managing symptoms, such as anger management and self-calming techniques, but do not require them to recall the event and "trauma-centered" or exposure therapies in which patients are encouraged to face the event that ostensibly traumatized them. [31]

Many social justice-oriented clinicians working with veterans, sexual assault victims, and Holocaust survivors in the 1980s and 1990s advocated a trauma-centered model of therapy as not only psychologically healing but politically empowering for

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[31] Therapeutic exposure has different meanings in different psychotherapeutic paradigms. In behaviorist terms it can be seen habituating to stimuli associated with the event. In cognitive therapies, it can be used to re-evaluate the present meaning of past experiences. In more psychodynamic therapies, it can be used to create a deeper understanding of the role of the experience in the whole of the patient's life.

patients silenced by a society that did not want to hear about or take responsibility for their pain. While their work was culturally influential, they did not amass scientifically validated evidence to establish that constructing a trauma narrative could alleviate PTSD symptoms.[32, 33] Outside of this movement, therapists took a more agnostic stance regarding whether to use present-centered or trauma-centered approaches. At a seminar I attended on the history of PTSD treatment in the VA, the speaker, a clinician with 35 years experience working with veterans, said that for most of his career he and his colleagues gave veterans an option: did they want a war-stories group or a no-war-stories group? In other words, were they interested in trauma-centered or present-centered group therapy. Many chose groups present-centered groups because listening to stories of war trauma can be both politically charged and emotionally exhausting. In the absence of strong scientific data to the contrary, many therapists were also disinclined to use trauma-centered approaches. After all, patients in war-story groups were talking about their traumas every week, with no apparent better outcomes than those learning present-

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[32] The field of trauma studies emerged in the 1990s as scholars began using the concept of the unspeakable traumatic memory as an analytic tool for literary and humanistic scholarship. The most well-known scholar in this field is Cathy Caruth. See for example her book *Unclaimed Experience: Trauma, Narrative, and History* (1996) and her edited volume *Trauma: Explorations in Memory* (1995).A history of trauma studies branch of scholarship is provide by Anne Kaplan in *Trauma Culture* (2005). For critical accounts of the politicization of traumatic memories as a historical process see for example Didier Fassin and Richard Rechtman's *Empire of Trauma* (2009), Kurt Danziger's *Marking the Mind: A History of Memory* (2008), Ruth Leys' *Trauma: A Genealogy* (2000), and Ian Hackings's *Rewriting the Soul* (1998).

[33] This is at least in part because of the newness of PTSD as a diagnostic category. But there may also be social factors shaping study results: according to many clinical psychologists I have spoken with at VA hospitals, Vietnam veterans who joined therapy groups rarely leave once they find a group that they like, finding community and identity through PTSD therapy because it confirms their politicized interpretations of their combat experience.

centered coping skills. In either case, it appeared that veterans who entered PTSD treatment either dropped out or stayed in therapy groups for decades leading many VA clinicians to worry that PTSD was incurable.

As the mental health field has joined the movement towards evidence-based medicine in recent years, the status of traumatic memories in PTSD treatment has been increasingly divorced from questions of social justice.[34] Advocates of empirically supported trauma-centered therapies, such as PE, do not believe that the act of creating a trauma narrative alone can lower PTSD symptoms to sub-diagnostic threshold levels: only through *repeated exposure* to symptom-evoking stimuli, which in imaginal therapy *takes the form of narration* can healing can place. Compared to "war stories," then, the construction of trauma narratives in PE is far more structured and systematic which makes the technique more amenable to standardized practice and clinical study. Indeed, the empirical support for PE was established by the careful manner in which its inventor, Dr. Edna Foa conducted her clinical research on sexual assault victims with PTSD at the University of Pennsylvania—a feat that few other therapeutic methods had accomplished.

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[34] Facing what medical sociologist Charles Rosenberg called "the crisis of psychiatric legitimacy," clinical psychiatry in the United States began moving towards empirically supported methods in the second half of the 20th century (Rosenberg, 1992). This culminated in the publication of the DSM-III in 1980. The DSM-II has derived many of its diagnostic categories from Freudian psychoanalysis, and therefore categorized disorders on origins such as unresolved guilt or an Oedipal complex (See Kutchins & Kirk, 2003). This made it challenging for psychiatrists to produce standard diagnoses, a situation that embarrassed the profession. The DSM-III was an effort to make the field of mental health a more exact science by creating a reliable set of categories and diagnostic tools. Robert Spitzer of Columbia University chaired the APA task force for the DSM-III with the help of a team from Washington University in St. Louis, the first major stronghold of a symptom-based approach to psychiatric diagnosis in the U.S. (See Young, 1995, pp. 95-102).

Questions of political witnessing do not enter into evaluations of empirical support used to test the efficacy of new therapies for PTSD, such as PE. Instead, objective criteria for measuring PTSD symptoms like the PTSD Check List (PCL) and the Clinician-Administered PTSD Scale (CAPS) provide medical evidence of the effectiveness of treatments.

Despite the high esteem of Foa's work in academic circles, major institutions overseeing the standards for PTSD care for combat veterans did not begin promoting and institutionalizing the use of PE until several years into the wars in Iraq and Afghanistan. In 2007 in an unprecedented move, the VA and Department of Defense began to promote several empirically supported trauma-centered therapies for PTSD, including PE, cognitive processing therapy, and eye movement desensitization and reprocessing (EMDR).[35] Health administrators across the country were "rolling-out" this paradigm by setting up trainings for clinicians working with veterans. This included sponsoring a series of PE training sessions taught by Dr. Foa. Subsequently, traditional PE was a relatively new therapy practiced by very few mental health professionals working with veterans during the early years of the War on Terror.

The clinicians I met who had been trained in PE recently and had begun using it with their patients thought that it worked very well. Some even saw it as a magic bullet

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[35] Empirical support for treatments is based on the fluidity of the category of PTSD. Though these therapies have proven a very effective method for reducing symptoms among people who experienced a single trauma in which they were the victims of violence—such as accidents, natural disasters, and sexual assault—there is little evidence suggesting PE is effective in cases of combat PTSD. Combat PTSD is a much more complex disorder. Sufferers have often experienced multiple traumas and frequently were actively involved in the conditions that contributed to them.

for PTSD. When I asked these clinicians their opinion of VR as tool for conducting PE, several specifically told me that, from a clinical perspective they thought it was an unnecessary enhancement to an already effective practice.

The promise that VR would enhance PE was not fulfilling a demand from the community using PE. Indeed, Rizzo had begun promoting Virtual Iraq as a tool for enhancing PE as an empirically supported therapy nearly three years before the VA and Department of Defense had officially acknowledged that PE itself was effective. Few people were conducting this form of therapy that was already considered to be more effective than its predecessors, but here a relatively expensive technology was being promoted as a tool to improve it. Clearly, I needed to talk to therapists who were actually using the technology in order to better understand what they believed it was contributing to psychotherapy.

Vignette 3: Media Attention to VRET Precedes Scientific Evidence

In June 2009 I traveled to the 14th annual Cybertherapy conference in Verbana-Intra, Italy where using VR exposure therapy for PTSD was a key theme. Out of the 12 panels included in the two days of the conference, four featured presentations on treating PTSD with VR. I also attended a full-day pre-conference clinical training workshop on how to use VRET in PTSD treatment, taught by Dr. James Spira, then a psychiatrist at the Naval Medical Center San Diego. Supplementing the dozens of articles I had already read, this abundance of discourse at this conference seemed to confirm that therapeutic culture was on the brink of a technological revolution, and that this revolution was centered on the problem of treating PTSD.

Despite the training and the numerous presentations, I did not anticipate how little was actually known about VR's contribution to exposure therapy. I attended an expert panel discussion titled "Future Directions in the Technological Advances in Prevention, Assessment, and Treatment for Military Deployment Mental Health."[36] Afterwards I approached Dr. Robert McLay, a young blond clinician who had spoken about his experience treating PTSD with VR at the Balboa Naval Medical Center in San Diego (NMCSD) and while deployed in Fallujah during 2008. When I told him that I was researching the topic, he told me that less than 100 people had even been through the system, hardly enough to establish statistically significant results. Noticing my surprise, he continued, telling me that the news media had been calling Balboa before the system was even taken out of its box. In his memoir, *At War with PTSD: Battling Post Traumatic Stress Disorder with Virtual Reality,* McLay recounts how when he joined the VRET project at NMCSD in 2005, Dr. Spira and Jeff Pyne, a psychiatrist from the University of Arkansas for Medical Sciences were running the study (R. N. McLay, 2012). As an officer and a clinical psychology research scientist, McLay had two roles: to help design scientific research protocols and to wear a uniform while speaking to the media.

One of the problems that McLay faced in establishing the therapeutic efficacy of VR in PTSD treatment was that he actually had to test two different treatment models. In addition to Virtual Iraq, the Office of Naval Research had funded the development of two other VRET systems so that they could be compared and studied with different military

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[36] A transcript of the panel was published in *Cyberpsychology, Behavior, and Social Networking*, Volume 13, Number 1, 2010.

populations. Rizzo's system was the “Cadillac” system that would include the gamut of scenarios and stimuli using high-fidelity software and deployable technology that could deliver a wide-array of sensory stimuli. The Virtual Reality Medical Center (VRMC), a San Diego-based for-profit company, was charged with building a similar system for non-combat veterans. A collaborative partnership between researchers at the University of Washington Human Interface Technology laboratory (HITlab) and the Hawaii VA hospital in Honolulu created the "Volkswagon" of the three. The system, which they called IraqWorld was designed primarily to show "proof of concept" and to test the minimum requirements of an effective VRET system. Therefore, it only entailed one scenario, a virtual Humvee ride during which the patient would experience sniper, IED, and RPG attacks.[37]

NMCSD was given both the VRMC system and Virtual Iraq. When McLay began working with the systems, he was surprised to that find that even though they were both ostensibly VRET system, their design actually reflected two very different theories of how to use cognitive-behavioral principles in PTSD therapy (McLay et al., 2009). The differences between the systems became apparent to me when I had the opportunity to try out the VRMC system at the CyberTherapy demonstration hall. On the demonstrator’s

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[37] The patient would ride along as they recounted their trauma narrative, as the therapist cued the sounds, but not the sights, of explosions. Soldiers found it boring and repetitive and many dropped out of the trial, Spira explained. With its single narrative scenario and limited patient interaction with the virtual environment, IraqWorld, it seemed, got in the way of the exposure therapy. Its Iraq was too narrowly construed to act as a stage upon which patients felt engaged in recounting their trauma narratives. Funding sources quickly dried up for the IraqWorld project. Unlike the other systems, I could not find any published scientific papers and relatively few accounts of it being used: one in a VA newsletter and the other in the University of Washington student newspaper.

laptop I could see the scene I was about to enter: I would be in the gunner position of a Humvee driving along a desert road. Like Virtual Iraq, the VRMC system gives the clinician's a screen showing the patient's point of view and another of a control panel that allows the clinician to teleport the patient around environments including Virtual Baghdad, a "PTSD Convoy," and a "PTSD Village," and to add elements like shouting or passing helicopters. Unlike Virtual Iraq, however, before helping me into the HMD and handing me the gamepad, the demonstrator explained to me that I would be conducting a task in this environment: namely, to shoot out a car full of insurgents shooting at me while driving parallel to my Humvee. In this case, my "gamer" skills were lacking: I had a very difficult time hitting the insurgents' sedan, especially because another car, presumably civilians, kept getting in the line of fire. I asked the demonstrator what I should do. "You're authorized to use force, Gunny," he directed.

Later that afternoon, I attended another talk by McLay that helped me to understand my strange VRET demo experience with the VRMC system. McLay explained that while Virtual Iraq had been designed to enhance PE by simulating specific "index" traumas, the VRMC system was based on graded exposure principles and incorporated meditation techniques and biofeedback as part of the therapy. VRMC called their approach VR-exposure with arousal control (VRE-AC). VRMC co-founder, Brenda Wiederhold developed this technique specifically for using VR to treat anxiety disorders. Like Virtual Iraq, patients tell the therapist about traumatic experiences, but this not seen as therapeutic mechanism. VRE-AC emphasizes "skills-building" and self-control. Before using the VR, therapists teach patients meditation techniques to promote relaxation. Then, as I experienced during the demo, therapists use information about

patients' military experience choose relevant tasks, such as holding off insurgent fire while medics evacuate a fallen soldier, or driving to a specific location. Unlike Virtual Iraq, patients can use the gamepad to fire an M-16 rifle as part of task-completion, making VRE-AC a far more video game-like mode of interaction. While repeating their tasks, patients wear physiological sensors of skin conductance, temperature, respiration rate and heart rate, which therapist monitor as dynamic graphs on a third computer screen. When the graphs indicate signs of physiological distress, therapists direct patients' attention to their thoughts and feelings and then direct them to control their arousal with meditation techniques. The goal of VRE-AC is not to make sense of the traumatic event, but rather to learn control over one's own mind and body when confronted with arousing situations or memories.

At the end of his memoir, McLay expresses concern about the large degree of media interest in VR for PTSD in proportion to the small amount of evidence to prove that it is more effective than conventional therapies such as PE. Indeed, his own study of 20 patients remains the largest study using Virtual Iraq, and even this was not published until 2012 (McLay et al., 2012).[38] Even though he conducted clinical trials on both VRET and VRE-AC, he was not able to compare them head-to-head in a controlled manner so he could not say which was more efficacious for patients (McLay et al., 2011). Because of the small numbers of study participants, all he could definitively say was that both approaches seemed reasonable safe and that on average they did seem to help patients

[38] A handful of other small studies and case studies have been published (Gerardi, Rothbaum, Ressler, Heekin, & Rizzo, 2008; Reger & Gahm, 2008; Reger et al., 2011).

who used them more than treatment as usual, such as present-centered group therapy. But for the public, it seemed that the question of whether or not "worked" in therapy seemed less important than the work it did to make therapy seem cool.

Coda: A Real World for a Virtual Environment

In these three vignettes, we see several contradictions. Demos did not show therapy, and yet they were the basis for how various publics including military funders and the media understood what it was. The therapy Virtual Iraq was supposed to enhance was largely not done—meaning that it was speculative, a tool created for a social problem, but not a problem of practice. At finally, when it was receiving a lot of media attention, it was not even established that it was enhancing therapy or through what practices it might do so.

And yet, as I have followed Virtual Iraq, it has become increasingly "real." In addition to becoming the subject of large-scale, multi-sited randomized clinical trial—the gold standard in clinical research—it has become part of a very real sociotechnical world populated by technologists, clinicians, military personnel, journalists, and many members of the broader public who see digital media as obvious tools for intervening in issues of traumatic stress. This became very apparent to me on October 31st, 2012, when I attended a daylong conference at ICT titled "Technology & Innovation for the Prevention & Treatment of PTSD." Nearly 100 people registered to attend the conference,[39] many of them therapists and researchers who were already in town to attend the annual meeting of

[39] Many attendees and several speakers were unable to attend because of Hurricane Sandy.

the International Society for Traumatic Stress Studies, the largest organization dedicated to the study of clinical treatment for PTSD and related disorders, which was taking place in Los Angeles immediately after.

While the topics of presentation were diverse—ranging from the results of a large-scale RAND study of returning veterans to data from studies using acupuncture as a tool for relieving PTSD symptoms—the conference focused primarily on digital media technologies. Several presentations focused on VRET. In the morning session, the co-creator of Virtual Vietnam, clinical psychologist Barbara Rothbaum presented "History of Virtual Reality as an Adjunct to the Treatment of Anxiety Disorders and Virtual Vietnam." Rizzo followed this talk by presenting on Virtual Iraq/Afghanistan, which at this point had been installed in 50 different clinics. He used the opportunity to unveil the newly redesigned version of the system, showcasing its wider array of features and improved graphics. Later, presenting for a collaborator waylaid by Hurricane Sandy, Rothbaum presented research on the use of a tuberculosis drug called D-cyclosterine as a learning-enhancer that could potentially increase the efficiency of VRET by reducing the number of sessions necessary to lower symptom levels.

Rizzo and ICT-based psychometrist Galen Buckwalter presented their work on a project called STRIVE: Stress Resilience Training in Virtual Environments. In this affective training system, service members would learn how to recognize and control their responses to emotionally stressful situations before going to war. The developers were using the assets and environments from the new version of Virtual Iraq to develop

30 "*Band of Brothers*-like" episodes[40] of an immersive digital narrative that would place training service members in a series of increasingly emotionally difficult situations—for example, seeing a child that a fellow soldier had been playing soccer with run into an alley when he accidentally detonates a bomb. Episodes were interspersed with lessons on stress resilience by a virtual character mentor.

Other researchers presented on digital media designed for mental health care support. Eric Forbell, another ICT researcher collaborating with Rizzo presented SimCoach, an online virtual human conversation agent designed to provide veterans and family members with information about mental health issues and services available within the military healthcare system. Built with natural language processing, the rationale for SimCoach was to facilitate information navigation as well as to provide an anonymous interface for those concerned about how care-seeking might affecting their military career. Nancy Skopp of the National Center for Telehealth and Technology (T2) at Joint Base Lewis-McChord presented on several Smartphone applications designed to support PTSD treatment and "Psychological Health Island" in the virtual world Second Life. On this virtual island, service members could access information and tools for managing stress while the "T2 Virtual PTSD Experience" offered friends and family members to get a sense of the experience of military PTSD. The Virtual PTSD Experience included a Humvee ride through a model of a Middle Eastern-style street

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[40] *Band of Brothers* is a ten-part HBO miniseries about 506th Regiments of the 101st Airborne division that follows the men from their training to their campaign in Europe until the defeat of Hitler during World War II.

during a bombing, an airplane flight with informational videos about the stresses of homecoming, and a mall where the shops simulated PTSD symptoms (such as a mattress store in which clicking to make one's avatar lie down triggers a screen on the wall to play nightmarish war imagery). In the demo room after the talks, Jacki Morie showcased her own Second Life veterans' center, Chicoma Island, a rustic setting where service members could run a path, climb, do mindfulness meditation, listen to a samurai and Navajo dog soldier characters tell their stories, and record their own stories based on Joseph Campbell's warrior's journey myth.

The diverse military-funded projects featured at this conference signaled that Virtual Iraq has helped to legitimize the development of virtual technologies for treating military PTSD. Since 2004, many military research funding and mental health institutions have made funds available for the development of virtual technologies designed to destigmatize PTSD and reach digital generation service members. During my fieldwork Jacki Morie commented on the recent proliferation of military-funded calls for proposals for digital projects designed to help veterans tell their stories, including a "power dreaming" activity that would help them to re-write their nightmares and graphic novel authoring tool sponsored by Virtual Iraq's project manager. Meanwhile, several non-profit organization websites like Healing Heroes Networks (www.healingheroes.org) and Real Warriors (www.realwarriors.net) encourage those with PTSD to socially network, share stories, and seek mental health care.

By the time I completed my research in Fall 2012, Virtual Iraq was not only real, but was positioned as a part of a very real world in which digital media were understood to be powerful tools for reaching and helping service members with PTSD. The chapters

that follow chart the processes of cultural, social, and technical mediation involved in the making of Virtual Iraq and explain how it went from existing primarily within the imagination to being a very real object of clinical psychology research that inspired investment in many areas of cybertherapy.

Overview of Chapters

In the following chapter, I analyze Virtual Iraq as a cultural artifact in public media representations in order to explain the kinds of meanings produced through these mediated public appearances. Focusing on the news media and television crime dramas, I show how, as a technically remediated form of therapy, Virtual Iraq serves to transform public understanding of what therapy is and what it looks like. Media portrayals also give a glimpse into the practice of therapy itself—a private experience that is made public as the audience is able to view recordings of journalists and veterans responding to the affordances of the system. Though media images are always partial, they are illustrative of how media-makers try to resonate with hegemonic culture. In analyzing these media representations, I show that PTSD is portrayed in the popular media as a problem especially affecting the gender identity of male service members and that both the disorder itself and conventional treatments for it are marked by the stigma of emasculation. These problems are often enacted in the genre of the "coming home story," which provides a narrative of the struggle to reintegrate into society after military service. Virtual Iraq has been used in diverse coming home stories, wherein masculinity that has been compromised by PTSD is reconstituted through the technologically mediated practice of facing the demons of one's past in a virtual environment. In this context, we

see that stories that focus on innovations in treatment change the focus of coming home stories, creating narratives in which technology serves as an agent of post-traumatic healing that enables men to return to their roles as service members, fathers, husbands, and healthy citizens of who abide by society's laws.

Following up this media analysis, in order to understand how a technology that had hardly even been clinically researched came to be such a prevalent media entity, in Chapter 2, I turned to ethnographic methods. In this chapter, I show the work performed by Virtual Iraq's creator, Dr. Skip Rizzo in creating a public for his invention. I argue that in order to make Virtual Iraq self-evident as the right tool for the job of treating military PTSD, Rizzo has creating ways to perform the technology that themselves are performances of masculinity. Practices of telling the technology's history, scientific presentations, live and virtual demonstrations, and direct conversational engagement all act all act as important sites where Rizzo frames the meaning of Virtual Iraq. I offer the concept of "video game drag" to describe the kind of gendered performative work done by Rizzo in aligning the meaning of Virtual Iraq with video games in these diverse spaces. However, I also show that this alignment has also carried burdensome connotations, due to the widespread cultural critique of the military-entertainment complex. Therefore, I pay special attention to Rizzo's boundary work in articulating to what extent Virtual Iraq should be considered a video game in his promotional work.

Virtual Iraq could not have been taken seriously as a tool for technical remediation of therapy so early in its invention had it not been for the work of Rizzo's predecessors. Therefore, I conducted historical research in order to understand both the cultural context and the techno-scientific conditions under which VR came to be

considered a legitimate therapeutic tool. The third chapter examines the historical precedents for Virtual Iraq up to and including Virtual Vietnam and explains how exposure therapy came to be considered the most therapeutic legitimate use of VR in therapy in the United States. The field of clinical VR emerged in the mid-1990s; just as the VR industry was collapsing under the weight of its own hype. Rather than follow the imaginative speculation of early VR promoters, the development team took a conservative approach to using VR in therapy. VRET the was the product of a collaboration between Barbara Rothbaum, a behavioral therapist interested in using technology to expand clinical control over patient experiences believed to promote habituation and Larry Hodges, a computer scientist interested in studying applications for VR's capacity as a mediation technology to produce the feeling of telepresence. They saw the treatment of phobias using exposure therapy as an existing, scientifically supported practice that could benefit from the modest existing capabilities of VR. I explain how these researchers particular conception of PTSD led them to believe that would be amenable to VR-augmentation in certain treatment populations. This historical research also demonstrates that VRET for PTSD was not an idea that emerged from the military-entertainment complex nor was it believed that it would attract the aging population of Vietnam veterans to therapy.

Virtual Vietnam was a relatively primitive VR system; much changed both technologically and with regards to cultural expectations about features and production values between its development and that of Virtual Iraq. By conducting oral histories with developers and returning to the MedVR lab for ethnographic research, in Chapter 4 I explain the process through which Virtual Iraq was built and rebuilt as BRAVEMIND.

My goal was to understand how the designers understood the challenge of making a traumatic environment and to what extent their design choices reflected particular ideas about their users. I learned that the process was distributed, that no one person had a complete vision of what is traumatic about war or what features Virtual Iraq should have, but rather is the product of an ongoing process of negotiation between desired features, technical feasibility, and production values. But in order to analyze the choices that they made, I also had to consider the cultural milieu they saw their work as part of: which was shaped more by experience in entertainment media than in therapy. Though Virtual Iraq is often treated in the media as a completed product, throughout my research the system was being modified. Subsequently, the form of "generic realism" that the system employs in order to be an evocative therapeutic tool for diverse patients was itself a design compromise between a dream of making fully computer generated recreations of traumatic experiences and the necessity of relying largely upon patient's own imaginations to make VRET experiences sufficiently personalized.

* * *

Historically, wartime is a major period of investment in technology—especially information and communication technologies—as well as in psychology and behavioral medicine. This project charts a moment in media development that may fundamentally change psychotherapeutic practice. It provides historical, ethnographic, and critical media studies insight into a relatively new field of media technology application that has the potential to affect how thousands of people receive mental health care, as well as the kind of care they come to expect.

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CHAPTER 1:

IF THE ANSWER IS PTSD, IS THE QUESTION "WHAT IS VR?": PUBLIC REPRESENTATIONS OF VIRTUAL IRAQ

Over the course of the U.S. military campaigns in Iraq (March 2003 - December 2011) and Afghanistan (October 2001 – present), the American media has paid considerable attention to the "signature wound" of post-traumatic stress disorder (PTSD) among combat veterans (Tanielian & Jaycox, 2008). Hollywood films like *In the Valley of Elah* (Haggis, 2007), *Stop-Loss* (Peirce, 2008), *The Hurt Locker* (Bigelow, 2008), and *Brothers* (Sheridan, 2009) tell moving, tragic stories of men transformed by military service and combat, and implicitly or explicitly suffering from PTSD.[41] The disorder has also been the subject of thousands of stories about veterans published in the news media.[42] Among the most common genres of PTSD news stories are human-interest pieces describing veterans' struggle with the "war within" that persisted long after they returned home. In a winter 2008 content analysis of recent news stories about soldiers

[41] Many of these stories deal extensively with how the soldier has changed and these changes framed through the medical/cultural trope of traumatic injury. That is, he is not different because he went to war; he is different because war "gave" him a traumatic injury.

[42] For the year 2003, only 360 articles in U.S. newspapers were returned in a search for the term "PTSD" on the Access World News database. In 2005 the same search returned 924 articles, while in 2007 it returned 2,389.

coming home from Iraq, I found that 75% directly mentioned PTSD.[43] Though less than 1% of American citizens have served in the military during the War on Terror, since 2001 combat-related PTSD has become the most public mental health issue in the United States as well as the primary framework through which our culture understands the effects of war on those who fight.

In both Hollywood and news media "coming home" stories, all manner of social problems are attributed to service members' battles with PTSD, including homelessness, unemployment, domestic abuse, reckless driving, murder, and suicide. While issues of female service members' experiences of trauma, especially due to sexual assault by a superior officer, have increasing entered the public sphere, PTSD is primarily represented as a mental health crisis among men, who still make up the vast majority of all branches of the service. [44] This is exemplified by the fact that a Google Images search in June 2012 under the term "PTSD" was dominated by images of men in uniform holding their heads in their hands, looking downward in anguish. This image of masculinity in peril has become the iconic figure of the American PTSD crisis during the War on Terror.

Stories about service members suffering from PTSD suggest that the disorder not only causes mental suffering, but also incapacitates men to fulfill their role as citizens

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[43] I conducted the search using the Access World News NewsBank database, using the search terms "soldiers returning come home Iraq" to search for articles printed anywhere in the United States during the 15 weeks between November 25, 2007 and March 8, 2008. I narrowed these down to a collection of 113 relevant and non-redundant articles and selected from these only stories that focused on at least one specific soldier. This excluded mainly stories about battalions coming home and stories about public service programs that did not discuss individual service members' experience of coming home. In my analysis, I coded 60 stories that fit these criteria.

[44] As of September 2009, of the nearly 1.5 million service members across the armed forces, only 206,000—less than 14%—were female.

when they return home. Coming home stories often incorporate public awareness projects to combat the stigma of mental illness and to encourage veterans to seek help. But by highlighting social ills, mainstream news coverage of combat PTSD has created a public image of the disorder as one that undermines veterans' ability to maintain self-control, support their families, and abide by social norms. While mental illness is generally stigmatized as emasculating, the PTSD crisis is particularly threatening to masculinity because it implies that many American men experience such extreme stress in fighting for their country that they cannot return to society.[45]

Alongside stories of veterans' ongoing "war within" as they battle PTSD, another more hopeful genre of story has become a regular feature of health and science news: those hailing innovations in PTSD treatment that may help combat veterans. Though several forms of therapy have been empirically supported as providing long-term relief for PTSD sufferers who have experienced single traumatic experiences, such as sexual assault victims and accident survivors, veterans are a notoriously treatment-resistant population. News stories on new medical and therapeutic innovations as therapy dogs, memory-altering pills, therapy assisted by the recreational drug MDMA, neck-injections of Botox, the performance-anxiety drug propranolol, meditation, and the blood-pressure

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[45] In his book *Stigma: Notes of the Management of Spoiled Identity*, sociologist Erving Goffman defined stigma as "The phenomenon whereby an individual with an attribute is deeply discredited by his/her society and is rejected as a result of the attribute. Stigma is a process by which the reaction of others spoils normal identity." For Goffman, stigma was fundamentally social; fear of stigma is based in fear of how one will be perceived by others. Mental illness, in Goffman's analysis, falls into the category of known deviations in personal traits, which refers to stigmas based on failure to live up to a social role or identity rather than physical deformity or racialized stigma (Goffman, 1963).

drug prazosin have each have each been suggested as promising new approaches for treating veterans with PTSD.

Among these new approaches to PTSD treatment, virtual reality exposure therapy (VRET) using Virtual Iraq has been among the most visible in the mainstream media. Even though VR was the poster-child for technological hype by the mid-1990s, an impressive resurgence of public interest in VR has taken place during the War on Terror. Virtual Iraq has appeared in newspapers, magazines, television dramas, radio programs, blogs, and has even featured in a play[46] and an exhibit at the New York Museum of Modern Art.[47] The technology has been garnering near continuous media attention since

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[46] News about Virtual Iraq inspired playwright Christine Evans was inspired to use digital media to create a novel theatrical performance, *You Are Dead. You Are Here*. Her goal, shared by director Joseph Megel and media-designer Jared Mezzochi, was not to comment on technology, but rather to use its ability to "play" memories as a screen-based media to facilitate the telling the story of an American soldier struggling with PTSD after a troubling encounter with an Iraqi girl who is blogging about the war as he is fighting in it. The entire play takes place in a therapist's office. By projecting pre-recorded images from Virtual Iraq spliced with other video and imagery, the play includes scenes of war and even introduces other characters. By incorporating both live and virtual performance, the narrative travels across time and place while one stage, the therapist and patient are the lone actors on stage, playing out therapy in the dramatic present. See http://here.org/resident-artists/project/you-are-dead.-you-are-here/ and http://culturalstudies.web.unc.edu/2011/04/12/you-are-dead-you-are-here-a-ghost-story-for-the-digital-war-age/

[47] German-Turkish media artist Harun Farocki has made several pieces about military simulation technologies that have included Virtual Iraq. *Images of War (at a Distance)* Farocki's first comprehensive solo exhibition in the United States appeared at the New York MoMA from June 29, 2011 through January 2, 2012. The piece *Series Games 1-1V* (2009-10), was a four-part video installation.[1] One of these pieces *III: Immersion* (2009), was filmed during a clinical training for Virtual Iraq and features imagery of a man in uniform in an HMD talking through a VRET session as though he is reliving a memory of being in Iraq. Another of the piece *IV: A Sun with No Shadow* (2010), places imagery from training simulations and evaluative reenactments in juxtaposition with imagery from Virtual Iraq. According to Farocki's web page for the piece, the title is designed to draw attention to the discrepancy in the quality of these simulations.

January 2005, only one year after its inventors conceived of it. In that month Virtual Iraq made its first media appearance in an article titled "It's Not All In Your Head," published in the premiere technology and culture magazine *WIRED* (Dotinga, 2005). Within the first three years of the project, it appeared about 180 times in diverse media outlets around the world.[48]

In this chapter I analyze public representations of Virtual Iraq in the mainstream news media and in television crime dramas in order to demonstrate the kinds of cultural work that technology does by remediating PTSD treatment in the context of the military PTSD crisis. As we will see, portrayals of Virtual Iraq in both the news media and on TV present the technology as an alternative to traditional talk therapy. In stories about Virtual Iraq, I argue, VR masculinizes therapy by portraying it as an intense, high tech multi-media experience in which men face their demons and emerge ready to reclaim their masculine roles. These portrayals fashion a novel visual cultural motif that depicts therapy not as communication with a therapist, but rather as a form of emotionally intense human-machine interaction wherein the machine has unparalleled ability to evoke

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This chapter considers the fact that the pictures with which preparations were made for war are so very similar to the pictures with which war was evaluated afterward. But there is a difference: The program for commemorating traumatic experiences is somewhat cheaper. Nothing and no-one casts a shadow here.

See http://www.moma.org/visit/calendar/exhibitions/1196 and http://www.farocki-film.de/sonneg.htm.

[48] Media outlets have included *National Defense Magazine, Discover Magazine, The San Diego Union Tribune, NPR Talk of the Nation, The New Yorker Magazine, The Washington Post, The Wall Street Journal, The New York Times, The Los Angeles Times, CNN.com, MSNBC, The BBC, The Economist,* and even *Aljazeera*. Countries have included Germany, Australia, Japan, France, Denmark, New Zealand, the United Kingdom, Greece, and Canada.

memories. Additionally, images of therapy as human-machine interactions resonate with the cultural figure of Soldier 2.0, or the digital generation service members—a young man who grew up playing video games and was trained for military service using game-like training simulations. Through these media appearances, Virtual Iraq is culturally constructed as the right tool for the job of treating the widespread problem of PTSD among veterans of the War on Terror.

The Problem: Emasculating Therapy

Traditional therapy, as it appears in many coming home stories, is not adequate to the task of remasculinizing service members with PTSD. This problem is several-fold. First, combat-related PTSD is often portrayed as incurable. "And you have to realize that it's something that won't go away, can't be cured," says veteran National Guard Specialist Christopher Dana, quoted in *Montana's Great Falls Tribune*, reflecting on his life after months of self-medicating his PTSD with alcohol which culminated with a violent incident on a plane. "All you can do is learn to live with it," he continues (Newhouse, 2008). In most stories learning to live with PTSD means, at best, a constant struggle to suppress symptoms, aided by regular therapy and daily medication. Treatment does not necessarily imply the restoration of health and masculinity.

A second problem is veterans' difficulty obtaining the best medical care available for their PTSD. One explanation stories give is that therapists do not actually want to do effective kinds of therapy. For example, in an interview with medical writer Jerome Groopman former National Institute of Mental Health director Dr. Steven Hyman expresses a common grievance about psychotherapists: that they are more interested in

emotional connection with their patients than in conducting scientifically supported medical care, such as cognitive-behavioral therapy, of which VRET is one variety:

> "When I was NIMH director, I was upset by how few people wanted to learn cognitive-behavioral therapy," Hyman told [Groopman]. "Here was a therapy proven to be effective by clinical trials. But psychologists and psychiatrists are so interested in people, and they want to cure you with their understanding and empathy and connection. The cognitive-behavioral approach is by-the-book, mechanical, pragmatic. The therapists find it boring. It's not their idea of therapy, and they don't want to do it." (quoted in Groopman, 2004).

Groopman goes on to explain that therapists' rejection of empirically supported methods reflects a prevailing cultural bias "that a single outpouring of emotion—one good cry—can heal a scarred psyche" (2004). In contrast, cognitive-behavioral therapies are often "manualized," requiring the therapist to walk the patient through a manual of activities designed to restructure thinking practices and behaviors.

Other stories suggest that conventional treatments like group counseling and anti-depressants are only cheap Band-Aids that the government provides instead of the best treatments available. Consider, for example the exalted role of in-patient treatment in Deborah Sontag's April 5, 2007 article for *The New York Times*. The piece tells the coming home story of Salvatore (Sam) Ross, Jr., a 24-year-old veteran from Dunbar, Pennsylvania, who sustained multiple serious injuries when the 15 mines he had cleared from a field south of Baghdad mysteriously detonated. Evacuated to Walter Reed Medical Center, he received medical attention for his physical wounds, but not his mental ones.

> But, although he was prescribed psychiatric medication, he never received in-patient treatment for the post-traumatic stress disorder that was diagnosed at Walter Reed. And, in retrospect he, like his relatives, said he believes he should have been put in an intensive program soon after his

> urgent physical injuries were addressed. “They should have given him treatment before they let him come back into civilization,” his grandfather said (Sontag, 2007).

Sontag’s story portrays PTSD as a force that set a young man against himself, leading him to reap destruction in his community. Ross had joined the military with strong goals for a young man—to leave home and become an engineer. But at the time of writing, he was in Dunbar, unemployed, having quit school for the blind and his fishing hobby, trying to kick several drug addictions, and looking to serve time for burning down a trailer in a fit of rage. Sontag explains that Ross was initially overjoyed to be home and even considered law school until “the black moods, the panic attacks, the irritability set in,” leading him to attempt suicide some 17 times. At night, he suffers from dreams of floating over Iraq that end with “a blinding boom.” He refuses to visit the Veterans Administration hospital in Pittsburgh because he felt disrespected there. In stories like this, the failure of the government to provide good care is its failure to protect both the veteran and his community from the destructive force of PTSD.

Another barrier to care depicted as a barrier to care in many coming home stories is that many men see seeking therapy itself as an admission of weakness. Robina Riccitiello’s story about Marine gunner Cpl. Samuel Reyes Jr. appeared in the March 17, 2006 issue of *Newsweek*. At 21, Reyes lives at a Residential Rehabilitation Program in Menlo Park, California, where he is being treated for PTSD and a traumatic brain injury (TBI). He sustained his injury during a suicide bomb attack outside of Fallujah in which 12 other Marines died. Reyes is portrayed as a promising young man who wants to attend college, get married, and recognize his loved ones—goals confounded by his PTSD and TBI, which have dramatically impaired his memory. Stigma hindered Reyes from

seeking treatment even when doctors at the brain-injury unit at the Palo Alto VA hospital encouraged him to do so. Reyes was "worried that his fellow Marines might think he was weak" (Riccitiello, 2006). Fear of being perceived as weak is a common explanation for why veterans do not seek care, which contributes to an image of therapy itself as not only an ineffective, inexact science, but also an emasculating activity. Indeed, Reyes did not feel comfortable with seeking treatment until he was reassured by the masculinity of the other men that he encountered at the center. He described them as "real tough, big guys, real smart," who possessed masculine qualities that made him feel better and also showed him that he "wasn't the only one in the whole world who would have it."

The Solution: Masculine Technology

Stories about Virtual Iraq suggest a pathway for our society to overcome the stigmatization of therapy as an emasculating and unscientific activity by showcasing new, high tech therapies that conform to cultural ideals of military masculinity. Two of the most common discourses about Virtual Iraq to appear in the media are that it will increase the efficacy of an empirically supported therapy by making therapy itself more engaging and that it will help to overcome the stigma-related barriers to seeking treatment. In the following section, I show how these claims are embedded into narratives about individual service members, are performed through the spectacularized image of therapy that is remediated from a practice of human communication to an intense battle with a powerful machinic agency, and reinforced by the cultural resonant figure of the video game-playing digital generation service member.

VRET-Mediated Remasculinization Narratives

The masculinization of therapy through VR-remediation is performed through the visual and narrative strategies that position the technology as a key agent in the veterans' recovery from PTSD. Most of the television news pieces on Virtual Iraq share a distinct structural form, which is a variant on the conventional coming home story. Unlike many coming home stories, pieces on Virtual Iraq always have a happy ending wherein the suffering veteran obtains the best care available, which restores his ability to act as a father, husband, worker, and citizen. The structure appears as follows:

1. The anchorperson introduces the piece by calling VR one of the most promising new treatments for PTSD.
2. The piece begins with the personal story of a male service member's struggle with PTSD after his deployment, narrated in part by the service member himself in an interview format and in part by the journalist, over news footage from the war.
3. The service member's participation in VRET is framed as emerging directly from his own commitment to psychological healing.
4. The piece shows a demonstration of VRET, with either the veteran himself wearing a head-mounted display or someone else, such as the journalist acting in the patient role while a therapist controls the virtual environment from an adjacent computer terminal.
5. The piece presents several scenes of digital imagery from inside the virtual environment, especially the Humvee driving scenario.

6. A clinical psychologist is interviewed and states VR increases therapeutic control for an empirically supported therapy and that it makes therapy more appealing for service members.
7. The clip ends with the veteran saying that he is not 100% cured, but he is a lot better and feels more in control over his PTSD symptoms. This assertion is often accompanied by imagery of him with his family.

The story of Marine MSgt Robert Butler, whose story was filmed for the PBS Frontline *Digital Nation* website,[49] provides an illustrative example of how stories about Virtual Iraq offer an alternative to other PTSD coming home stories. The piece opens with Butler describing the story of a firefight he experienced during a patrol on Father's Day during his deployment in Iraq. As he describes this, a photographic montage of men in uniform in the desert appear on screen. Then Butler describes how his unit had to stop a vehicle with fleeing insurgents, which resulted in them killing a 16-year-old boy and his father. This event "struck home," and, it is implied, is the origin of his PTSD. We are suddenly shown a photograph of Butler feeding his infant son (even though he says in the voiceover "I had a son that age," presumably 16 years-old).

A year later, after he came home, Butler says he did not notice that he had a problem, but his wife did and said he never smiled. We see an image of him and a woman, embracing outdoors. He describes how one day at Walmart he almost had a nervous breakdown trying to decide on which of 50 kinds of toilet paper to pick up for

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[49] http://www.pbs.org/wgbh/pages/frontline/digitalnation/virtual-worlds/health-healing/virtual-recovery.html

his wife. After going to his division psychiatrist he "did not want to hear that" he had "the classic symptoms of post-traumatic stress disorder." But he agreed to get clinical help and in 2007 started two months of exposure therapy using Virtual Iraq.

As we see footage of him entering a clinic and putting on a head-mounted display (HMD) and headphones, he describes a typical session, explaining that, "I put goggles and headphones, grab the controller and off we go on one of our patrols." The scene cuts to the first-person perspective from inside the Humvee driving down the desert road at sunset, putting the viewer in the position of what we can imagine was Butler's perspective during therapy. "You can't see the doctor. You can hear him. He would ask me to talk a bit. At intermittent intervals they introduce explosions and gunfire." We suddenly see and hear two loud IED explosions up the road, in stark contrast to the otherwise voice-only soundscape.

Butler says that he finds the value of the technology in its power to evoke memory. His reflections on his experience confirm that the virtual environment evoked memories that he did not want to face, and that facing them was challenging: "It's tough because you've spent so much time trying to avoid thinking about your deployment and they're drudging up these memories you've tried to avoid at all costs and it's difficult." For him, the power of using VR technology in therapy is precisely how it gives the clinician the ability to evoke memories without conversation: "I think it was a great idea for them to put treatment in that format. It's better than probably just sitting there and trying to have some doctor *pull* the events out of you. You're right there, boom, smack [he punches his palm] face-to-face with your worst demons." While he characterizes talk therapy as a struggle for both the clinician and the patient from whom the memory of

events must be "pulled," VR instead creates an immediate, hard-hitting experience that puts the patient "right there, boom, smack, face-to-face with [his] worst demons." The frustration of having to communicate with "some doctor" in order to heal is replaced by the immediacy of an immersive digital experience, which gets the job done, it would seem, much more efficiently.

This is not to say that Butler has been entirely cured. He clearly feels that PTSD has transformed him, but VRET has allowed him to his former roles in his family. "I mean, am I 100% better? No, I wouldn't say I'm 100% better but I do have my life back"—the scene cuts from his face to a photograph of him with two small children dressed in Halloween costumes, illustrating his return to his role as father. The clip concludes with Butler saying that,

> I'm able to do a lot of things that I did before. I don't have so many issues. I'm not running around angry all the time. This treatment saved my life, probably. It saved my marriage for sure. So it you ask me if it works, yeah, it works.

Many news pieces include interview footage with a representative of the technology such as its inventor, Skip Rizzo, or other therapists discussing the tentative nature of the research proving VR's contribution to prolonged exposure therapy. However, when embedded into the larger narrative arc of news pieces like this, that begin with a struggling veteran and end with him reinserted into civilian life as a father and husband, the value of Virtual Iraq as a technology that has the power to remasculinize men who have suffered from PTSD appears self-evident.

Spectacularization of Therapy: Machine Agency and Intense Memories

Virtual Iraq allows for the creation of a novel visual image for therapy. While the iconic image of therapy itself is a person on a couch talking at the ceiling while a therapists sits in an armchair taking notes—an image that originates in the once-dominant therapeutic practice of Freudian psychoanalysis—news stories about Virtual Iraq paint an image of therapy as a form of human-computer interaction. As we saw in the Frontline news piece on Butler, even though he described talking to a doctor, in the piece we do not see this doctor. Instead, we only see Butler preparing for therapy by putting on an HMD and headphones intercut with video capture of Virtual Iraq's on-screen imagery.

The following media appearance on the popular television quiz show *Jeopardy* provides another excellent example of how VR transforms the public image of therapy to one of human-machine interaction: On October 7, 2011, a contestant picks from the category "Brain Games." A rare video clue worth $600, it begins with a close-up of a video game controller in a man's hands positioned near his denim-clad lap. The scene cuts to the face of a middle-aged white man, his eyes obscured by an HMD and his ears by large silver earphones. His face is unsmiling, as if concentrating. Next it cuts to a shot of an LCD computer screen. On it we see the first-person perspective from a gunner position on an otherwise invisible vehicle. The sky is dark and ahead appears to be a low-resolution desert road with a car and a couple of short concrete barriers next to it: digital military imagery. The video cuts back to another close-up of the man's face, now in profile, as he brings a hand up to his mouth, as if concentrating. A computer screen is visible in the background behind him. Aside from the addition of the HMD, the man in

the clip appears to be playing a military-themed video game, though his affect is subdued. Game show host Alex Trebek reads the text accompanying the video: "Virtual Reality and psychology are used to rewire the brain of war vet Jerry who suffers from PTSD, short for this." A contestant quickly buzzes in and provides the response, "What is Post-Traumatic Stress Disorder?" He wins the $600.

In the grammar of *Jeopardy,* wherein contestants provide the "questions" for the "answer" on the board, VR was presented as part of both the textual and visual answer to the question of PTSD suffered by "war vet Jerry." Looking closely, however, reveals that VR is superfluous to the clue. Given the prevalence of PTSD in popular culture, had the question only read, "PTSD is short for this," this likely would have been a sufficient clue for a contestant to answer, "What is post traumatic stress disorder?" Neither the verbal reference to nor video imagery of VR was necessary. Instead, in this clue and in most of Virtual Iraq's public appearances, media-makers use the technology in order to create compelling visual imagery representing technology's power to intervene in the disordered mind without the presence of either a clinician or the man needing to speak.

Along similar lines, print and online news stories are often illustrated with images of people in uniform wearing HMDs with video game controllers in their hands and/or images of screen shots of the digital imagery from the system (See Figure 2).

Figure 2: The top inches of a characteristic online article about Virtual Iraq. Note the image of a young man in an HMD and the embedded video of on-screen imagery.

Stories about other new therapies rarely depict therapy itself, but as Elizabeth Losh points out, with Virtual Iraq news coverage the clinic appears to be made visible (Losh, 2006). Stories about new drugs, talk therapy techniques, or therapy dogs may show an image of a happy or stoic veteran, a researcher in lab coat, or just a handful of pills waiting to be swallowed. But in stories about Virtual Iraq, both the images of people in HMDs and screen shots suggest that we are seeing actual therapy take place. The content of these images is also important: these are not only images expressing faith in medical science, but also a cool, futuristic form of medicine that evokes comparisons with science fiction.

In addition to presenting an image of therapy as human-machine interaction, another way media portrayals of VRET using Virtual Iraq depict that interaction is as an

intense experience that forces men to face their fears. This is suggested when Butler describes how VR puts you "right there, boom, smack, face-to-face with your worst demons." As such, this portrayal suggests 1) that Virtual Iraq is such a well-designed piece of technology that it can evoke memories even when one does not want to face them and 2) that the experience is parallel to the exigencies of war-fighting, when service members must exercise bravery in the acts of duty by overcoming their natural fears of danger. The news piece on Virtual Iraq that appeared on the CNN program *Anderson Cooper 360* special "Coming Home" on November 13, 2006, provides an illustration of how the compelling nature of the technology has been performed on television (Doss & Moore, 2006). In this clip, the lines between demonstration and therapy, journalist and patient become productively blurred when the program's senior medical correspondent Dr. Sanjay Gupta enters Virtual Iraq. Unlike most journalists reporting on Virtual Iraq, Gupta had direct experience of Operation Iraqi Freedom, having been embedded with a U.S. Navy medical unit in Kuwait and southern Iraq during 2003.[50]

The first half of the piece is mostly typical of news stories about Virtual Iraq. After Anderson Cooper introduces the piece, Gupta introduces scenes from the Naval Medical Center in San Diego, one of the VRET test sites. Gupta evokes many of the common tropes about VRET as he narrates over a montage cutting from scenes of

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[50] During his time with the Navy's "Devil Docs," Gupta famously performed emergency brain surgery on a wounded Iraqi boy when no one else with neurosurgery training was available ("CNN's Gupta joins Iraq surgery," 2004).

therapists at computer terminals and young men in uniform, close ups of men in uniform wearing HMDs, and on-screen imagery:

> Therapists use video game technology to help Iraq vets overcome PTSD. They take the vets back virtually to the place where their trauma began. It's an electronic déjà vu. They feel as if it's real: the sights, sounds, vibrations, even the smells of the Iraq war, but in a safe environment.

In the second half of the piece, Gupta presents his own experience of Virtual Iraq. He tells the audience that during this experience, "I was quickly brought back to my time covering the war in Iraq," and we see a brief clip of footage of him reporting from Iraq. The scene then cuts to a clinic space at Emory University, where clinical psychologist Maryrose Gerardi sits at a computer terminal while Gupta stands on a platform, wearing an HMD. Gerardi tells him that right now he is in the Humvee and she would like him to just move ahead slowly. Cut to Gupta's perspective, and then a close-up of his face in the HMD. Gerardi narrates: "You can stand up if you would like but be careful. Now as we go along, what I can do is add stimuli along the way that would hopefully elicit some of your specific memories." She is in the mode of conducting a demo, explaining the capabilities of the technology and how they would be used in therapy. We see a split screen of Gupta's head in the HMD and on-screen imagery from the driver's seat of the Humvee. Still in demo mode, Gerardi tells Gupta that she is going to give him something a little more disturbing. On screen, vehicles emit smoke on either side of the desert road. Though Gerardi likely expects him to react as most journalists do, by saying "Oh wow!" Gupta reacts from a position of immersion, not unlike a patient. Here, the line between therapeutic experience and demo become blurred as he narrates experience and feelings of fear in the present tense:

> That's really frightening. You have no idea what's happening right now. Just two of our vehicles, it looks like they've exploded … we're trying to get out of there as quickly as possible. I can feel my heart rate just starting to pound. Looks like we just took some gunfire. More gunfire.

By speaking in the present tense and describing what he is seeing and feeling Gupta is actually following guidelines patients are supposed to adhere to during prolonged exposure therapy. However, Gerardi continues to narrate her own actions in the conditional tense, as though still conducting a demo: "Now I would be asking you if we were working on a specific memory to be recounting your memory and confronting your memory." Gupta responds, however, as though she has given him a direction: "Well, there's one time when we were driving along and all of a sudden our convoy came under fire." It would seem that as a war correspondent that had experienced trauma in Iraq, the virtual environment is so evocative of his memories that he is unable to stay in the present context of the demo despite the demonstrator's efforts.

At this point, Gerardi shifts her performative domain and begins interacting with Gupta and the Virtual Iraq system as she would in actual therapy, without the qualifications of it being a demo. She asks him, "What happened next?" Gupta replies, "It was nighttime" —in the split screen, Gerardi has changed from the usual day scene used in demos to green night vision scene—"so all this tracer fire, I guess, hitting the front of the convoy in front of us. We all just duck down into the truck, as low as we could go"—Gupta crouches on his side of the split screen, his action indicating that he feels present in the virtual environment/space of his memory rather than the clinic, and continues narrating. "And you're literally sort of covering your head" (he touches his head) "making sure your chin strap is on as tight as it can be" (he gestures at his chin). "What

were you feeling at that point?" Gerardi asks. "Helpless," he replies assertively, without skipping a beat.

> Totally helpless and really, really scared. Because I thought I was going to die, and I didn't want to die like that. I am very uncomfortable right now, especially as I'm trying to get this thing out of here as quickly as possible. Every time I hear a new noise, I can feel my heart starting to pound, a little bit of the shakes with my hands.

Gupta switches between past and present tense as he wrestles his body's response to the memory of an experience in which he thought he might die.

In the dialogue below, we see that Gerardi attempts to switch back to a demo mode of address, but Gupta, again, responds as though being directed. This prompts her to return to the therapeutic mode of address, in particular emphasizing the therapeutic necessity of confronting his fear rather than avoiding it.

> **Gerardi:** "What I would be doing also at this point, Sanjay, is asking you to rate your level of anxiety on a scale from zero to 100."
>
> **Gupta:** "Ninety. I don't feel good at all right now."
>
> **Gerardi:** "Okay, but the goal, as we had talked about, is to confront the fear memory in a safe place, you don't want to avoid it. Confront it and find out that you can habituate to that level of anxiety and be okay with it."

In this scene, Gupta acts as though Virtual Iraq has such a powerful ability to evoke memories of war that he is unable to stay with Gerardi in the journalistic demo mode of interacting with the technology. We cannot know, however, whether his performance of the machine's power over him is genuine, or a reflection of what he and his producers felt would make for compelling television. Regardless of the reality, Gupta clearly intends for his audience to take away a sense of Virtual Iraq's evocative power.

At the end of the piece, Gupta faces the camera in front of a backdrop of three computer screens, in the typical medical correspondent's personal mode of address.

> I have to tell you that I was stunned by my reaction. I know it was only a simulation, but my reaction was so powerful, what I didn't show you is that I went through that simulation two more times. And I can't say that it ever really got any easier. But I did feel more in control, and from what the psychologists tell me, that's the goal. Face your fears until you can control them, maybe even defeat them. Now this therapy is only available on a limited basis, but it does seem to be very effective at treating our warriors who are coming home.

Having played both the role of patient and journalist, Gupta's concluding thoughts on the technology rhetorically serve the role of the veteran who has gotten his life back that appears in other pieces. Even though Virtual Iraq's profound agency to evoke memories had been challenging, by repeatedly facing the system the agency eventually shifted to him. By describing his willingness to go through the simulation again after we have seen him in a state of fear, he positions VRET therapy as an act of bravery that may even lead to fear's "defeat." He leaves his audiences with a sense of anticipation for a future when all those suffering from war trauma can face and overcome their fears with this cutting edge techno-therapy.

Soldier 2.0 Does Not Want to Talk About His Mother

Virtual Iraq gains much of its cultural valence in the mass media through its visual similarity to digital media genres already commonly associated with militarized masculinity, and in particular the concomitant figure of the digital generation service member who is the ideal user of these technologies. Many authors writing on the video game industry have suggested a bias towards the development of violent, militaristic games marketed towards young men (Kline, Dyer-Witheford, & De Peuter, 2003; Pearce,

1998). Over the past decade, the U. S. military has capitalized on this existing cultural form by investing in video games and simulation technology as part of recruitment, training, and public relations (National Research Council & Committee on Modeling and Simulation, 1997).[51] Both in their content and in their marketing, such simulations reinforce ideas of masculinity as bravery and cunning in the face of warfare (Brown, 2012; Kontour, 2012). [52]

While it is true that the majority of service members are young men between the ages of 18 and 24, and therefore members of the "digital generation," what makes the claim that the technology of Virtual Iraq will attract members of this demographic to therapy surprising is that immersive VR is not among the digital technologies associated with them. This is a subtle but important point: VR was a much-hyped technology during that late 1980s and early 1990s, when many current service members were children, or not even born. As will be discussed at greater length in Chapter 3, stereoscopic HMDs that allow users to be visually immersed in a virtual environment never became a technology that was commonly found in homes or work. Instead, the digital generation is far more likely to be associated with Internet-enabled personal computers, mobile communication devices, console-based video games and computer games. However, in most media appearances, the appeal of Virtual Iraq is made self-evident by aligning it

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[51] Many authors have written about the rise of the military-entertainment complex during the War on Terror (e.g. Der Derian, 2003; Ghamari-Tabrizi, 2004; Lenoir & Lowood, 2005; Lenoir, 2003; Leopard, 2010; Payne, 2009; Power, 2009).

[52] Outside the U.S., a case study by Polish researchers about conducting VRET on a 30-year-old Polish Military Contingent private describes actually compelling the private to undergo VRET as a condition of his release from a military hospital (Tworus, Szymanska, & Ilnicki, 2010).

with military video games and eliding the cultural connotations of VR with early 1990s techno-hype.

A section of the 2010 PBS Frontline news documentary *Digital Nation* provides an exemplary case of Virtual Iraq being made rhetorically self-evident as a tool for treating military PTSD through alignment with other military digital media. In a series of segments, journalist and cultural critic Douglas Rushkoff and his team look at "Soldier 2.0," a new generation of military service member. We are shown how, as members of the digital generation, this new cohort of soldiers comes pre-armed with digital literacy skills—including multi-tasking, non-linear thinking, attention to detail, and fast reflexes at a computer interface—that the military is able to translate into tactical skills by mapping them onto training simulations. When he has free time—and he is almost always male—we are told, Soldier 2.0 further hones these skills by playing military-themed video games (illustrated by young men in uniform focused on a television screen with gamepads in their hands). In the segment that immediately follows, "A New Therapy for a new Generation," Rushkoff explains how Soldier 2.0's digital literacy skills are now being applied to mental health care and then introduces Virtual Iraq and its inventor, Rizzo. This parallel presentation positions Virtual Iraq as a familiar and compelling technology for Soldier 2.0 (Dretzin & Rushkoff, 2010).

During this segment the inventor Skip Rizzo explains the value of Virtual Iraq to Rushkoff by framing it as a cool, masculine alternative to emasculating talk therapy:

> The current generation of soldiers grew up digital and they may be more apt to seek treatment within a treatment environment that has digital technology, and so we hope to be able to draw in folks to treatment that would never go one-on-one tell-me-about-your-mother type therapy.[53]

Even though Virtual Iraq was designed specifically as a tool for augmenting a talk therapy practice called prolonged exposure, in statements like these we see that the addition of the VR system changes the meaning of the practice. In fact, it does this so radically that in interviews Rizzo has often said that even if Virtual Iraq does not actually improve therapeutic outcomes, its potential to reduce the stigma associated with therapy makes it worthy of investment. This claim contributes to the discourse that we saw in coming home stories that position the *social* problem of PTSD—as opposed to clinical problem—as deriving in part from the perceived emasculating nature of therapy.

Quotes from both veterans and clinicians interviewed for news pieces on Virtual Iraq bolster this claim. For example, in her piece for the *New Yorker* magazine, Sue Halpern quotes the director of Iraq and Afghanistan Veterans of America expressing his distaste for traditional therapy as he understands it:

> I'm not someone who responds to sitting with some guy, talking about my whole life. I'm going to go in and talk to some dude who doesn't understand my shit and talk about my mom? I'm the worst kind of that guy. So VR therapy, maybe it will work. We're a video-game generation. It's what we grew up on. So maybe we'll respond to it. (Halpern 2008)

Here, coming from a veteran is very same discourse wherein talk therapy is portrayed as an intimate, uncomfortable, and presumed ineffective practice to a "guy" who grew up as a member of the video game generation. In contrast, the familiar technology of video

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[53] Find this specific clip at http://www.pbs.org/wgbh/pages/frontline/digitalnation/waging-war/immersion-training/

games—which is presumably less intimate and more emotionally comfortable—might encourage those like him to buy into therapy.

The idea that VRET might actually open up new markets for therapy by offering it in a modality that is more attractive to the large patient population of young male service members and veterans has not been lost on those charged with promoting the technology. Case in point, Josh Spitalnik, clinical psychologist and director of research at Virtually Better Inc., the Atlanta-based company that distributes Virtual Iraq, told *American Medical News* that, "It's much easier to sell a virtual reality experience to someone who grew up playing games than it is to engage them in talk therapy session" (Dolan, 2009).

However, resemblance to video games alone cannot account for all of Virtual Iraq's power to masculinize the public image of therapy. Consider the following example: in the section on Virtual Iraq, *Digital Nation* introduces the story of reservist Gerard Della Salla, who received VRET care at the Manhattan Veterans Administration Hospital. Della Salla describes achieving great personal growth and healing through VRET—and is actually the only actual patient I have seen to re-enact VRET with their therapist for the camera. His clinical psychologist, Dr. Michael Kramer, is also interviewed and reiterates the "digital generation" techno-attraction discourse when he tells the camera that the "equipment in and of itself resonates with some of the younger veterans and I think it allows us to get more people in who might engage in the treatment." However, as a guest blogger on PBS's *Digital Nation* website, Della Salla actually contradicts this claim, writing that, "I think one of the funniest things I remember before starting VR was how, after looking into the video image for the first time, I blurted

out to Dr. Kramer: ‘What, you want me to play video games now! How the f--k is that going to help!?’" (Della Salla, 2009). Rather than being attracted to Virtual Iraq because of its resemblance to a video game, Della Salla was actually more skeptical of the therapy because it took this form.

Della Salla is not the only veteran to have gone through VRET with Virtual Iraq to express his skepticism about its resemblance to video games. A news piece produced Canadian Broadcasting Corporation includes the story of Jason Skinner, a Marine who received VRET for his PTSD at the Naval Medical Center in San Diego. Though he says that VRET saved his life and he wants to get the word out to others about the effectiveness of the therapy, like Della Salla he says that when he first encountered Virtual Iraq its resemblance to a video game made him take therapy less seriously: “Right from the beginning, you think this is a video game. Why am I doing this? This is dumb.”

In order to explain this seeming contradiction between these statements and the claim that VR will attract digital generation service members to therapy let us examine the rest of the piece in which Skinner’s story appears. The segment opens with the sound of rapid gunfire. The camera focuses on a white middle-age man. His face is stoic and serious, and his neck muscles are tense. His comfort is apparent, even though his eyes are covered by the HMD. In a voice-over a woman’s voice says, “John Frazier served in Iraq, an experience left him with trauma, called ‘post-traumatic stress disorder.’ What he’s demonstrating is the leading edge in therapy for U.S. soldiers diagnosed with PTSD.” The camera pans out to show Rizzo at the control panel, sitting next to John.

In the clip we see many close-ups of the computer screen, showing only the patient’s first-person perspective on the war-torn imagery; Rizzo, the clinician sits at the

controls, introducing an increasing number of explosions on the screen while the patient is all but silent. Rizzo leans over to tell John there's going to be an insurgent up ahead. John nods, facing forward. The voice-over explains:

> The precise details of what a soldier remembers about the incident that haunts them is programmed into the video. What the road looked like, where the sun was in the sky that day, what happened to the soldier sitting next to them.

The camera turns to the screen positioned over John's head to show a view of a racially ambiguous digital soldier in the passenger seat of the Humvee, holding his left arm around a virtual bloody wound. As John continues to sit stoic and silent, we are given a play-by-play of the other capabilities of the technology: "The base shakes with every explosion…Even smells like diesel can be added to make it more real." John silently turns to Rizzo, who informs him: "I'm going to populate the roadway up ahead with a lot of debris." In this depiction of the therapy, the patient never speaks and the clinician only speaks to tell him what he's going to do with the technology.

The piece cuts to the story of Skinner, followed by interview footage of a Canadian military doctor explaining that the Canadian military is unimpressed by the evidence for exposure therapy, and of Rizzo explaining defending its merit. The piece then cuts back to John in the HMD, the screen presenting his perspective, peering out the windshield of the virtual Humvee. We can hear gunshots and shouting while huge plumes of black smoke rise in the horizon in the screen over John's head that monitors his view.

In both her voiceover and in conversation with Rizzo, the journalist compares Virtual Iraq to a video game. For example, invoking the cultural dominant image of therapy she says that, "it seems to be working with a generation of soldiers more

comfortable with a video game than a psychiatrist's couch." Video games clearly provide a basis for this journalist to interpret Virtual Iraq. When Rizzo hands her the gamepad so that she can take a turn in the system she comments, "I'm sure my son would be better at this than I am." Likewise, in her voiceover, she notes that, "The headset seems heavy and at first it seems too cumbersome for anyone to really forget that this is a video game." When the journalist herself puts on the HMD she comes to it with the expectation of being in a game space because her son's video games provide the closest available analogy for the unfamiliar experience. When Rizzo triggers a gunshot sound and an explosion, unlike the silent veteran John the journalist exclaims, "Oh wow!" On camera, Rizzo prompts her onward, "Want to drive around it? Speed up." Only after several minutes in the demo does the journalist start to understand that the system affords a different experience than her son's video games. In her voiceover, she says, "After a couple of minutes, I can feel myself getting anxious. Suddenly it's not so hard to imagine how powerful this could be for someone in therapy."

However, if we pay attention to John's reaction to the system, we can easily infer that there was never an indication that the experience was game-like or playful for him: he moves very little and tries to express no emotional response. Like Della Salla in *Digital Nation*, he is immersed not in a game-space, but rather in an emotionally challenging confrontation with visual imagery that evokes traumatic memory.[54] While

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[54] Recent scholarship on men's video game playing suggests that part of the appeal of violent video games for men is that they allow them to experience intense emotions—such as fear and

prevalent war-themed video games provide a compelling analogy for understanding Virtual Iraq for people who have never been to Iraq or Afghanistan—and for those who understand little about the genre of video games or what makes them compelling for players[55]—for those who have been deployed what they see is instead imagery designed to evoke their memories of those places. Looking at the examples of Della Salla and Skinner, it would seem that veterans are most likely to compare the system to a video game as a way of emotionally discounting it, as if to say that this is more evidence of how out-of-touch clinical psychotherapy is with the realities of war trauma. Only after they have been in the system and faced their memories do they take it seriously and want to speak out endorsing it.[56]

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anger—in a controlled way (Jansz, 2005). This allows for these experiences to be fun and playful, even if the emotions themselves are not generally considered hegemonically positive ones.

[55] While the CBC journalist exemplifies someone for whom both military service and video games are alien domains, technology journalist Douglas Rushkoff—no stranger to video games—was able to use prior experiences with digital media as a basis of comparison in his interpretation of his demo of Virtual Iraq. As he explained to both Rizzo and the viewing audience in a video titled "A Memory Trigger" on the *Digital Nation* website,

> It's like a video game but it's not a video game. A video game—unless you're a really weird player of a video game—in a video game you are actively pursuing a goal, shooting this thing, getting to this level, doing this thing. There's this constant feeding that need to succeed, to level up. Here there's no goal. In some ways it's the opposite experience. You're in that environment of a video game but you can't actually do anything. It's more like experiencing your past than your present or your future. It's something that's happening to you so the only place you can go is into an emotional response, rather than a physical response. By doing this in partnership with a therapist it's actually an intimate experience [smiles]. In some ways more intimate than real psychotherapy. It's like this thing we go through together, he's in my head and in my heart so I then want to take off the goggles and talk with him because we've been there.

[56] *Nightline* interviewed National Guardsman Sgt. Brian Neal for their piece answering the question "What if doctors created a flashback to help soldiers heal?" Sgt. Neal says he benefitted a great deal from the VRET he received at Emory, but when the journalist asks him what he thought when the idea of using VR was proposed to him, he responds: "I thought there's no way that I want to do this."

This analysis reveals that the idea of the "digital generation soldier" is compelling to non-service members precisely because it relies on the notion of an abstract Other who is easily seduced by technology; when we are expected to identify with a specific man, however, we are instead shown a different image of masculinity in relation to therapeutic technology: one in which VR is part of an "intense"—and scientifically supported—battle against the demons of his past.

Traditional Prolonged Exposure

As we have already discussed, Virtual Iraq was designed to augment an empirically supported form of therapy called prolonged exposure (PE). Since the invention of Virtual Iraq traditional PE has been the subject of comparatively little news coverage about innovations in therapy for PTSD during the War on Terror.[57] Nevertheless, comparing the general form of news pieces on Virtual Iraq to one on traditional PE provides several insights into how news coverage for the former could be presented differently, which in turns helps to highlight what is distinctive about its construction, especially in terms of constructing a masculine image of therapy.

At the VA Hospital PTSD seminar I attended, the resident PE expert trainer introduced the practice to trainees by showing a recording of an episode of the NBC news

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[57] On March 11, 2013, I did a search for "prolonged exposure therapy PTSD" on the popular video-sharing website YouTube.com, none of the videos were news pieces or other mainstream media appearances. Five of the 20 top videos featured Virtual Iraq. Another five of the videos were excerpts from the same training video on how to conduct PE. In contrast, a search done for "virtual reality exposure therapy PTSD" included seven media appearances.

program *Dateline NBC* from 1994. The episode introduces PE as "a promising but painful therapy that could be a breakthrough for millions of women." It focuses on the case of a middle-class African American woman named Sherri Williams, who had survived a violent sexual assault. Williams, we are told, never knew what would trigger the memory and that traditional rape counseling did not help her. This news piece gives the viewer a window into the actual practices of PE. A voiceover tells us that *Dateline* was given video of Williams' sessions. The video, filmed from a high angle, is low quality, but it is easy to recognize Williams and her therapist, a middle-aged white woman sitting in a small room. In it, we see Williams narrating part of the story of her rape. A voiceover interprets the scene, explaining that Williams starts off speaking with in a flat, emotionless tone but by end of story she starts to cry. In the video, the tone of her voice changes and she begins sobbing. The therapist leans forward to pat Williams on the shoulder, comforting her, the voiceover tells us.

We are told that early in her treatment, Williams began to question the therapy. Williams tells the camera that in an effort to feel control, she held back her emotions when saying the words in her trauma narrative. She did not do her in vivo homework because she was afraid to listen to sessions. When she thought about PE she got headaches and started sweating, leading her to skip sessions. While showing more footage of Williams and her therapist, we learn from the voiceover that Williams did continue PE and in her fourth session she became able to speak about a previous rape during college. Having been raped twice, she is afraid she could not live through another. But in her interview, Williams tells the camera, "I faced it, and then I felt like I could float. It got to the point where I was sick of hearing it." She begins to smile as she says,

"It's over. I don't live with it. It could happen again and I live with that. I'm cured." Unlike the service members interviewed about VRET, she does not qualify the extent of her recovery.

Like clips on Virtual Iraq, in this clip we are given a narrative of person with PTSD who, at the end of treatment, feels that exposure therapy has returned her life to her. The clip also features interview footage with Edna Foa, the creator of PE, commenting on the technology of therapeutic mediation she developed. But in this clip we also see several things that almost never appear on in clips about Virtual Iraq. First, we see scenes of actual therapy, rather than a reenactment or demonstration. The comparatively low production values and steady camera compared to the close-ups and fast-paced editing in Virtual Iraq pieces provide evidence of this. There are several reasons why we would be unlikely to see actual therapy in clips about Virtual Iraq: one is the bureaucratic difficulty of getting access to videos of therapy from a government-run institution. It is far easier and more accessible for journalists and producers to "play" therapy by showing reenactments or demos than to access recordings of service members receiving therapy. When the victim is a raped woman of color, however, we are given access to the clinical gaze in order to show evidence that the therapy is working.

Though Williams describes holding back her emotions, in this clip we see an affective therapeutic relationship that is uncommon in clips about Virtual Iraq when Williams cries and is comforted by a therapist. Even in the most realistic re-enactments of VRET, the men remain stoic—even if their sweat and tensed muscles are visible—and their therapists are never shown touching them during the session. Whereas clips on Virtual Iraq never describe any trauma except for those incurred in war, the PE clip

explores a prior trauma and suggests this may have contributed to Williams' difficulty in healing.

Depictions of Virtual Iraq and PE share in the discourse that exposure therapy is difficult. Journalists often ask its representatives if it is cruel, but Rizzo and Foa differ in how they respond to this question. In the *Dateline* clip, the journalist asks Edna Foa, the creator of PE, if she considers it "cruel to push someone terrorized to live it over again?" Foa replies that, "We're encouraging them to experience what's in their memory what's been pushed down; we're not creating monsters, they have those monsters there." Similarly, in *Digital Nation* Douglas Rushkoff asks Rizzo whether is is really necessary to have a person relive their traumatic experiences. Rizzo responds, "It's tough medicine for a tough problem." While Foa locates the source of pain in the patient, Rizzo portrays itself as a "tough" form of treatment. VRET is portrayed as a struggle, but one that is worthwhile.

Restoring Memory & Masculinity: VRET in Crime Dramas

What do we learn by looking at how Virtual Iraq is used in a media context that is not framed as news but rather entertainment? Virtual Iraq, or technologies designed to look like it, appeared on episodes of three television crime dramas between 2010 and 2012. Each of these episodes tells the story of a crime involving veteran struggling from PTSD and explores the compromise of masculinity by PTSD and its reconstitution through facing demons of the past. In crime dramas, Virtual Iraq serves a different purpose as a visual technology than it does in the news media. TV crime dramas employ high-tech government-supporting visual imaging technologies to produce astounding

feats of crime solving. Drawing on public familiarity of VR for PTSD, these shows enroll the system as a novel device that fits their generic conventions. These representations do not accurately represent the specific practice of PE. In two of the stories, VR is used instead to evoke a veteran's traumatic memories that can be used in solving a crime. In one episode, Virtual Iraq is depicted as therapy, but the manner in which it is portrayed does not conform to the approved VRET practices.

On June 28, 2010 Virtual Iraq appeared in an episode of the former Fox crime drama, *Lie to Me* (Zinberg, 2010). In the program psychologist Dr. Cal Lightman and his team at the Lightman Group solve crimes using advanced technologies designed to uncover truths in the human psyche. "React to Contact," (season 2, episode 14) presents the case of a traumatized soldier, Sgt. Jeff Turley, who believes someone is trying to kill him. The team believes that the answer to his problem—or at least the answer to the question of why he has problem— is hidden in his own mind as a repressed memory, only available to him in the form of "nightmares and flashbacks." Playing the part of "Foster's pet project," funded by a Department of Defense grant, Lightman and his team use Virtual Iraq—with some additional digital imagery—to immerse Turley into the Iraqi city environment in order, they say, to help him recall the blocked memories of what really happened during his deployment there.

The team explains that during trauma the brain shuts down. They want to "retraumatize him in a controlled way" so that "his memories are reintegrated." The goal here is to produce a true account of what happened. As Turley gets ready for the session, two members of Lightman's team discuss the belief that VR can change the fact of the adage "truth is the first casualty of war," because it has the power to help war fighters

retrieve memories stolen from them by their traumatic experiences. “The truth is the only thing that will help him recover,” one team member tells another.

Turley and Lightman’s interaction both resembles and significant deviates from PE. First, while VRET is supposed to take place within the confines of a clinicians office, where the patient and therapist running the system are physically close to one another, Sgt. Turley wears his VR goggles in an isolated glass booth while Lightman’s technicians operate the system from a control room. As in PE, Lightman asks questions about Turley’s experience which Turley narrates. As Lightman directs Turley to use the gamepad to move about, he comments that, “it’s like a video game, really,” which discursively undermines the seriousness of the practice. As in VRET, Turley brings his own memories to his interpretation of the virtual environment, immediately identifying the person in the seat next to him as his friend, “Ronnie.” Also like VRET, while Turley describes driving in a convoy down Iraqi streets, the technicians control the scene, blowing up the Humvee ahead of Turley’s immediately after he says that it would be hit by an IED. But Turley does not stay inside the narrative, flipping up the HMD to reflect on the experience well before the narrative is complete.

When he goes back in, the technicians trigger an ambush by insurgents. The scene cuts between shots of Turley in the HMD, Lightman’s team, and images in the virtual environment. These digital images include elements that were not available in Virtual Iraq at the time, soldier knocks on the Humvee door, opens it and begin to fire. Turley becomes so immersed that he stops responding to Lightman’s question, and no longer appears to be using the gamepad. He becomes emotionally involved that he can barely

stand to remain in the environment, and when he does take off the HMD confuses present and past by calling Lightman "captain."[58]

Virtual Iraq is also centrally involved in the plot was on the CBS show *NCIS* in November 2012 (Libman, 2012). In the two-part episode titled "Shell Shock," (episodes 6 and 7 of season 10), the Naval Criminal Investigation Service agents are trying to solve the murder of Sgt. Torres, a Marine found murdered on the street.[59] They enroll his friend and teammate who was with him the night of the murder, Capt. Westcott, in the case. The agents and Westcott come to realize that he is having difficulty differentiating between the night of Torres' murder and an ambush he experienced in Arganda, Afghanistan where he lost several of his men. In the last ten minutes of the first part of the episode, the fatherly head agent and war veteran, Gibbs, suggests that Westcott needs to "face the fear" and takes him to meet a Navy doctor, where he is diagnosed with "PTS"—post-traumatic stress, but with "disorder" removed in order to reduce the stigma associated with that word. Though he agrees to therapy, Westcott nevertheless expresses concern to Gibbs about the form it will take: "I don't have to lie back on a couch and talk about the pet bunny I lost when I was three." Westcott here enacts the discursive figure of the man

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[58] When I asked members of the MedVR lab about this television appearance, their first response was regret that the writers positioned the technology as one of Lightman's inventions, instead of crediting ICT. Though they appreciated the public depiction of the system as helping to access memories and thereby ultimately improve the life of a soldier, the issue of using the Virtual Iraq system for "off-label" purposes, such as solving crimes, did not come up.

[59] The titled of the episode "Shell Shock," which refers to the World War I medical term used to describe traumatic response to the stresses of war, suggests that the producers wanted to frame PTSD as part of a much longer history, and perhaps in so doing normalize PTSD. This is also suggested by the producers' choice of referring to the diagnosis as "PTS" rather than "PTSD."

who will prefer VR to traditional talk therapy. Gibbs smiles and pats his shoulder, foreshadowing that therapy will take another form.[60]

Thus far, the episode has narrated the story of a veteran whose masculinity has been threatened by a mental illness that confused him, leading him to beat up an innocent phone company worker and become involved in his friend's death. In the last minutes of the episode, aided by sophisticated military imaging technology, the narrative takes a surprising turn. The forensic analyst who had been studying reports of the Arganda ambush reveals that the it was likely perpetrated by the Ijil rebels, a young terrorist organization. As Westcott has been compulsively writing "I J I" on things, the agents agree that we was "trying to remember" these rebels. The forensic agent pulls up photographs taken by military drones near Arganda. Zooming in hundreds of times reveals first a small band of men in Middle Eastern garb and then a Caucasian face. The computer immediately matches this face to the driver's license of none other than the very phone company worker whom Westcott had beaten up!

At no point do the NCIS agents doubt the accuracy of the computer's match. This shift in the narrative does important work: technology "objectively" confirms Westcott's original interpretation of the night in the alley: he was not "crazy" to think he was back in Afghanistan, but rather, the phone worker, Kiersey, really had been involved in the ambush. With this development, Westcott's traumatic flashbacks shift in meaning from

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[60] The idea that media can facilitate therapeutic communication is presaged at the end of the first episode when Ziva and Tony are looking at old pictures from his camera and this allows him to talk about his mom, which we learned in an earlier conversation, he had not done before.

confused and delusional to instead traces of the truth that can help the agents to find the white Islamist rebel before he carries out his next act of terrorism.

Ten minutes into the episode, Gibbs brings Westcott to a large dark room, not unlike the demo space at ICT's McConnell facility. Here, Abby, the quirky pigtailed agent will attempt to perform the next amazing feat of digital media forensics. "Based on your after action report, I was able to whip up our very own version of the Arganda incident using Ta DA! Virtual reality," Abby says as she presents Westcott with a small HMB. He jokes, "I'm more of a *Mario* guy, myself." As she sets up the system, she explains, "Well, since VR is being used to treat soldiers with PTS—" she begins, then interrupts herself as she hands him the plastic M-16-mounted gamepad. "I think this [gamepad] will be better for your memory. And it could help us find Kiersey." Her dialogue confirms the privileged status of Westcott's traumatic memories as veridical traces of facts that can help to solve the case.

Like Cal Lightman, Abby does not claim to be conducting VRET, but rather that she is drawing on the principle that VR can evoke traumatic memories in order to justify a forensic experiment. His memory stimulated by the simulation, Westcott's job is to narrate what he remembers and help Abby to fill in the details that were not available from the after-action report, the record of the event taken in-country, shortly after the event. Westcott begins the simulation by "riding along," experiencing an immersive first person narrative in which he and his team of virtual Marines storm the Ijil rebel headquarters. Remembering, he tells her that there was a computer on a table, a modem, maps and pictures on the wall, and even Kiersey's passport. Like Lightman's technicians, Abby places these digital elements in the scene almost instantly. And as in *Lie to Me*,

there are no buttons to add such small details in the clinician controller for Virtual Iraq, and even if there it would take true virtuosity to do it instantaneously. VR is no less subject to exaggeration than the popular "zoom and enhance" feature that allowed the agents to identify Kiersey as a rebel in the first place.

The scene quickly cuts back and forth between digital imagery, the veteran's view of the virtual environment, and live scenes of war. These live scenes represent both the veteran's memory of the event and "what really happened," which are necessarily conflated to show the "truth" made available by reconstructing PTSD memories. As for Sgt. Turley, facing VR proves overwhelming to Westcott. He declares he is done and forcefully puts the headset and controller in Abby's hands as he storms out.

Though VR is no more effective in solving the crime here than in *Lie to Me,* the episode goes on to espouse the trauma-centered therapeutic model as the only effective form of treatment for PTSD. Gibbs seeks help from Westcott's doctor, but the doctor says that he only signed off on "exploring the ambush … because the only way to stop a traumatic event from taking over your life is to face it." Gibbs defends Westcott's effort, but the doctor says that Westcott is trying and failing because "even with good therapy at home the healing process is going to be rocky." The message here is that therapy is difficult work.

After describing Westcott's symptoms again, the men's conversation briefly turns to the moral issue raised by combat PTSD.

> **Doctor:** Hypervigilance, re-experiencing, they're both symptoms. He sees Keirsey and he's overwhelmed.
>
> **Gibbs:** He sees everything around him as a threat. Would it help to get him back in the story?

Doctor: Retracing his steps could help him isolate what's important.

Gibbs: I'm not asking about the case, I'm asking about what would help Westcott.

Doctor *(confused)*: I'm sorry, is there a problem?

Gibbs: Well, yeah doc there's a problem. You served, right?

Doctor: Iraq.

Gibbs: Okay then you know. Kids are going over and we're expecting them to come back the same.

Doctor: Experience changes everyone.

Gibbs: What are we doing?

While Gibbs and the doctor agree that they would all raise their hands to join the service all over again, Gibbs is concerned that "Westcott is blaming himself for not doing more. How do I help him?" In this scene we see a confirmation of the value of military service, but it is potentially undermined by the inability of the military itself to help deal with the mental wounds of war. Fortunately, the doctor's medical knowledge of PTSD provides a basis for a form of care that Gibbs can provide through non-medical circuits.

In order to jog Westcott's memory of the night of Torres' murder, Gibbs and Westcott go to the convenience store where he had first seen Kiersey that night. As he narrates his memory, images of the empty store cut to scenes from his memory, similar to the effect of Abby digitally adding the elements he described. The implication here is that the virtual is only a stand-in when the real is unavailable. Similarly, in *Lie to Me,* it is only when Lightman and colleagues stage a live reenactment of the event at the heart of Turley's traumatic memory that he can finally remember the incriminating detail that helps them to solve the case. Ultimately, we learn that Turley was traumatized by being

ordered to kill a child, and that his captain subsequently attempted to hide the snafu by calling in an airstrike. The veteran character is revealed to be an innocent victim of corrupt military power, torn between his own morals and those of war.

Westcott is also absolved by remembering the truth. The more he remembers the truth, the more Westcott's socially acknowledged masculinity is restored. When Westcott remembers a hand-off between Kiersey and a girl—unquestioned as the truth—he is given the reward of Gibbs, older male veteran role model figure that he has called "badass," calling *him* a "badass." Driving this point home, when Westcott reaches out to another teammate who was there during the ambush, that Westcott did not run away, as he had previously believed, but rather that he was in fact a hero who had attempted to rescue a downed teammate. We cut to a scene of a final truth, shot in the style of the traumatic memories but representing a view Westcott could not have seen: himself dragging his teammate towards safety while being fired upon. The ultimate act of self-sacrifice and bravery towards his brothers in arms.

There are many similarities between how *NCIS* and *Lie to Me* position VR in their story of a veteran with PTSD. Each features a veteran struggling to remember the truth of an event. VR is used to evoke memories that are thereby believed to have a significant truth-value. While neither depiction claims specifically to be conducting therapy, both suggest that VR can be used to face one's fears and that this is how the battle against PTSD can be one. Though intending to do homage to VRET, taken together, these depictions misrepresent both the practice and the theory underlying PE. While PE advocates do believe that avoidance is central to PTSD, and therefore facing traumatic memories is key to healing, it is against best practices to immerse someone with severe

PTSD in a very traumatic scenario as soon as they enter VR. Instead, therapists are supposed to gradually ramp up the exposure over the course of the first few sessions, so that the patient can experience the success of making it through a session without getting overwhelmed. Also, while activists have long argued for the increase truth-value of traumatic memories, PE therapists avoid making claims about the veracity of traumatic memories.

VRET made a brief cameo on the TNT show *Rizzoli and Isles*, in a episode titled, "This is How a Heart Breaks," season 3, episode 3, which first aired on June 19, 2012 (Robin, 2012). In this episode, the system is not a part of the detectives' crime solving tools, but instead serves as a representation of both the stress of warfare and the advanced tools available for therapy. When detectives Rizzoli and Korsak go to a vet center where a recently murdered vet had received care, they walk into the main room where a doctor in blue shirt is sitting with two men in uniform. One is in VR goggles. What he's seeing is presented on a screen in front of them. Another man in uniform with burn scars on his face says he can't do it. The first vet takes off the goggles and says something like "It's hard, but it gets easier." It appears that the role of the technology is to allow the show to present an image of therapy without just showing a group of people talking.

Showing this clip during a presentation for trauma therapists, Rizzo mentioned that the production team had asked him what key message to include and this was it, but he was not sure if the final product was useful or detrimental for the public image of the technology. My own reading is that in the context of a narrative in which a veteran with PTSD was murdered while living on the streets, the brief scene of VR therapy, by

suggesting that good treatment tools are available, highlights the unnecessary tragedy of his death as ultimately avoidable.

In each of these programs, the veteran's PTSD always originates from feeling responsible for members of their unit being killed – a failure of brotherhood. In each story, the man failed in his highest responsibility, to protect his teammates, and cannot live with the consequences. Importantly, VR does not actually solve any of these cases, but only serves as a catalyst. In each of the stories, there is no question that VR can help to evoke painful memories of combat, but each also presents an image of a veteran who in some way rejects the virtual imagery as overwhelming. While this might be seen as undermining the public image of VR as an effective tool for treating PTSD, it nevertheless confirms the vision of treatment as a struggle against ones demons: indeed, one must be very tough to face their fears by placing their head in the HMD. But these stories also suggest that facing fears in the virtual environment is not, in itself, enough to reestablish masculine identity. In order to achieve this, the men in these stories must move beyond the psychological space of the clinic and use their restored memories to bring wrong-doers to justice in the physical world.

Conclusion

In these representations Virtual Iraq is not only used to highlight the power of technology to intervene in the mind, but to demonstrate that in so doing Virtual Iraq creates a public image of a new "cool" therapy that is up to the task of healing young, male military service members. In so doing, I argue, this cultural work has generated several myths: the technology necessarily speaks to young men; the environments it

creates are infinitely customizable; it can be used as an alternative to talk therapy rather than a communication tool; and it is used as a general tool for facing one's traumatic past.

Virtual Iraq's ability to create a masculinized image of therapy that conforms to Soldier 2.0 discourse has made it attractive to diverse media-makers looking to tell stories about contemporary warfare and those who fight in it. While the jury is still out on whether and how VR may attract patients to therapy, what is unquestionable is that therapy attracts people VR. Therapy seems to have restored the cultural cache of VR: the copious public attention paid to VRET systems have once again framed VR as "advanced" and "futuristic", at least within the prescribed context of therapy. Though testimony of the veterans themselves contradicts clinical psychologists' testimony that it will attract digital generation service members to therapy, the combination of Virtual Iraq's playability with a story of healing nevertheless allows for the creation of a therapeutic spectacle that, if nothing else, is attractive for media producers.

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CHAPTER 2:

THERAPY FOR COOL DUDES: MASCULINE PERFORMANCE AND VIRTUAL IRAQ

Before Virtual Iraq could be built, and before it could enter clinics, it had to become an object of desire, one that could be imagined as the right tool for the job of helping to overcome the various barriers which made treating PTSD such an intractable problem for the military. The inventor of Virtual Iraq, Dr. Albert "Skip" Rizzo is generally credited as a visionary who saw the potential of VR to both make therapy for PTSD more engaging and more attractive to young service members. However, even though Rizzo had been trained as a clinical psychologist, he had not worked with patients for years, and had never worked in the area of PTSD treatment. Because of this, one might expect that he encountered difficulty in garnering credibility as he worked to advance the cause of Virtual Iraq; and yet, this was not the case. Instead, he has become by far the most visible public representative of the technology, as well as an esteemed public expert on the treatment of PTSD. How could this be?

One of Rizzo's most successful resources in promoting Virtual Iraq has been his skill in constructing a public image of the system as "therapy for cool dudes." This has relied strongly on a performative strategy that divorces the meaning of the technology from the feminized practice of traditional psychotherapy—which goes so far as to present the system in a way that people might walk away from the demo without a clear sense of

the practice of the therapy it is supposed to augment, prolonged exposure—and realigns its meaning with video games and military training simulation technology. In situating the technology Rizzo has also drawn on diverse performative resources that through which he situates not only the technology itself as "cool," but himself as a scientist-hero with his finger on the pulse of the younger generation's techno-culture, situated at an academic research center with some of the coolest immersive digital media technologies available.

In this chapter, I show how each of the main communication strategies through which Rizzo promotes Virtual Iraq emphasizes a different form of masculine techno-performance. I draw on personal interviews with Rizzo and his collaborators, historical analysis of materials in his personal archive, textual analysis of websites where Rizzo defended and described Virtual Iraq, and a year of ethnographic research as a participant observer in Rizzo's Medical VR lab (MedVR) at the Institute for Creative Technologies (ICT) during which I also literally followed him to diverse sites where he presented his work on Virtual Iraq and other MedVR projects.

I begin the chapter by retelling the "origin story" of Virtual Iraq and consider how Rizzo marshals this narrative in order to perform the value of the technology and position himself in the role of resourceful, altruistic innovator who sees the value of using video game technology to reach members of the digital generation. Next I turn to three performance spaces: conference presentations, live demos at ICT, and media appearances. During conference presentations, Rizzo performs the evolution of VR and

the power of scientifically minded creative engineers to use it to "drag psychology kicking and screaming into the 21st century."[61] Live demos at ICT serve as opportunities during which Rizzo cannot only the show off the exciting features of Virtual Iraq, but can also share the awesome technological "toys" housed by the institute. In addition to showing the features of the technology, media appearances are opportunities in which Rizzo can perform himself as an expert cool dude—much to the delight of journalists. Finally, I take as a case study Rizzo's effort to respond to the first major critique of Virtual Iraq to appear in the media by utilizing social media to engage in a man-to-man dialogue with the offending magazine's readership.

As a whole, I show that Rizzo's own work as the primary public representative of Virtual Iraq has been central to shaping the public meaning of the technology as an exemplar of masculine control and mastery over complex problems, and therefore a psychotherapy tool suitable for military culture. Even when Rizzo's vision of PTSD or the role that technology should play in its treatment conflicts with that of his audience, he draws on diverse resources including storytelling, testimonials, scientific data, the existence of precedents, personal dialogue, direct language, and even the technology itself to help him to promote his master narrative and vision of Virtual Iraq as a valuable tool for both conducting and attracting service members to PTSD treatment.

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[61] "Skip Rizzo, Clinical Psychologist, Part 1," on the CNN program *The Next List*. http://vimeo.com/58490504

Seeing Like an Innovator: Virtual Iraq's Origin Story

Rizzo likes to tell the story of how he came up with the idea of Virtual Iraq. Though the technology was born at ICT, it was conceived elsewhere on the University of Southern California's campus. One day in the fall of 2003, Rizzo was working on slides for a conference presentation when he stumbled upon the video game *Full Spectrum Warrior* on the ICT website.[62] At the time he was a research scientist in USC's Integrative Media Research Center and in the department of Geriatrics. In his talks, he liked to highlight interesting immersive media projects taking place at USC, and ICT was one of the places doing some of the most eye-catching work in this area. *FSW* captured his attention. On the website Rizzo learned that ICT had collaborated with a video game studio, Pandemic, to develop a military strategy game. Two versions were released: a training simulation designed to teach leadership skills for Army fire teams, as well as a commercial game version for the Microsoft Xbox console.[63] The game was ostensibly set in either the fictional country of "Zekistan" or "Kazar" depending on whether you were using the training simulation or playing the game. However, when Rizzo saw screen shots he exclaimed, "That's Iraq!" It was not only "Iraq," but a digital simulation of Iraq. For Rizzo, this meant that it was also a potential digital media resource that could be put to clinical use.

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[62] The title derives from the U.S. Army's Full Spectrum Operations program.
[63] Microsoft version released June 2004, September 2004 for Windows, March 2005 for PlayStation 2. What were the differences between the versions? Need to talk about Command, which was for PC and didn't need to be commercially released. Quicksilver Software. Company commander. Also, Full Spectrum Leader for Platoon Leader.

To see a simulation as a clinical tool requires having an eye that has been trained to see digital media in this way.[64] Rizzo was neither a PTSD therapy specialist nor a computer engineer, but rather a specialist in clinical and cognitive VR research. Rizzo was among the first generation of clinical researchers who became interested in VR in the mid-1990s. After earning his doctorate in clinical psychology at SUNY Binghamton, Rizzo moved to California to conduct cognitive rehabilitation at the Long Beach VA hospital. There he found that the same brain-damaged young men who claimed that their memory and concentration was too impaired for them to complete their cognitive rehabilitation exercises would sit in the waiting room enthusiastically playing with a GameBoy.[65] Digital media, he realized, could provide more motivation to conduct simple repetitive tasks—such as rotating shapes in the popular game Tetris—than exercises promising to improve mental function.

Not long after this epiphany, Rizzo found a community of likeminded researchers spread across academia and industry. After attending the Virtual Reality and Persons with Disabilities conference at California State University Northridge in 1993 he decided to leave his clinical practice to begin working on clinical applications of new media technologies. He joined USC as a research scientist and began working on diverse projects using VR in rehabilitation as well as to conduct psychology research, such as assessment of attention deficit disorder using a virtual classroom and studies of gender

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[64] Cognitive linguist Charles Goodwin refers to this training of the eye to see the world in the categories and intensities required by a community of practice "professional vision" (Goodwin, 1994).

[65] Nintendo's early black-and-white portable gaming system.

differences in spatial cognition when subjects train on virtual shapes. Within the field of clinical VR, Rizzo gained a reputation as someone who knows every person involved in every project. For several years he wrote a column in the journal *Cyberpsychology and Behavior* where he catalogued new VR projects and upcoming conferences and during the late 1990s and early 2000s he co-authored overviews of the field (Glantz, Rizzo, & Graap, 2003; Rizzo & Buckwalter, 1997). He became one of clinical VR's most visible technovangelists.

One of the many friends that Rizzo had made at conferences was Jarrell Pair, an immersive sound engineer and VR expert. The two met at the IEEE VR conference in Houston, Texas in March 1999. Reflecting on this experience, Pair noted that he liked Rizzo right away because he was not only passionate about VR, but he was also the kind of guy he would like to go to a bar with (interview, June 19, 2011). Pair told Rizzo about projects that he had been involved with as a graduate student in computer science at the Georgia Institute of Technology. He and his advisor, Dr. Larry F. Hodges, had worked with local therapists to create VR-based therapy applications for treating fear of heights and fear of flying, as well as a Virtual Vietnam system used for treating Vietnam Veterans with PTSD.[66] Because of his friendship with Pair, when Rizzo saw *FSW*, he did not only see a potential clinical resource, he specifically saw a potential resource for developing a next-generation Virtual Vietnam for the next-generation of American war veterans: Virtual Iraq.

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[66] Pair worked on the sound design for Virtual Vietnam during the summer of 1997, between undergrad and beginning his master's at Georgia Tech.

As an innovator, and not an engineer, Rizzo would need help to actually build the device. Fortunately, Pair was nearby, since Rizzo had helped him to land a job at ICT, and he agreed to help Rizzo with the engineering side of the project. Rizzo hoped Pair would be able to harvest the digital assets from *FSW* in order to quickly produce a VRET system. In December 2003 he approached two of the directors of ICT, Bill Swartout and Randy Hill, to see if they would authorize the project and allow Rizzo to relocate to ICT as his research base. The directors agreed. This seemed to be a low-risk venture for them since Rizzo would be coming on as a soft-money researcher, which is to say that he would be responsible for finding his own funding to pay his salary and support the project. The next month, Rizzo and Pair began prototyping Virtual Iraq.

Rizzo and Pair designed and built the prototype by putting in extra hours, seeking volunteers, and occasionally paying their artists and programmers with funds leftover from other projects. Contrary to the image of researchers applying for grants and then building the technologies, it is common for engineers to first build a prototype as an unfunded "skunkworks" project and then use it in demos for potential funders. While Pair worked on getting the prototype to work, Rizzo took on the role of drumming up interest in the project. One way to do this was by presenting at conferences where representatives of groups interested in funding clinical VR projects would be in attendance. Rizzo first mentioned Virtual Iraq in a paper titled "Data, Development Issues and Future Visions from the USC Integrated Media Systems Center Virtual Environment Laboratory," at the CyberTherapy conference meeting in San Diego in January 2004. In April of that year he presented the first full paper on the project at the Third International Workshop on Virtual Rehabilitation in Lausanne, Switzerland.

Video Game Origin Story as Promotional Resource

From the beginning, the origin story of Virtual Iraq as resourceful repurposing of *FSW* became part of Rizzo's strategy of promoting the technology. For example, in their 2004 Cybertherapy conference paper, Rizzo wrote, "The treatment environment is based on a creative approach to recycling and adding to the assets that were initially built for the combat tactical simulation and commercially available X-Box game, *Full Spectrum Warrior*" (Rizzo & Pair, 2004). Years after the system had been entirely rebuilt multiple times, leaving no significant *FSW* content, Rizzo continued to refer to these origins.[67] At a 2011 Games for Health conference panel discussion, Rizzo admitted that he had played up this link in order to attract attention to the system by "riding the video game wave," referring to growing attention to the popularity of video games as a medium and the efforts of various intellectuals to promote gamification[68] as a way to improve engagement in education, healthcare, and numerous other domains of civil society.[69]

But this story also had other benefits. It not only suggested that Virtual Iraq was game-like and therefore, intuitively, both engaging and appealing to young men, but also

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[67] For example, compare the quote above to this sentence taken from a 2010 paper published in the Annals of the New York Academy of Sciences: "The initial prototype system was constructed by recycling virtual art assets that were originally designed for the commercially successful X-Box game and U.S. Army–funded combat tactical simulation trainer, Full Spectrum Warrior" (Rizzo et al., 2010).

[68] The term "gamification" is used in video game studies to describe the application of game mechanics, such as earning points, to digital media content in order to create interactive engagement (see, e.g. Bogost, n.d.).

[69] See for example, Jane McGonigal's book *Reality Is Broken* (McGonigal, 2011), Tom Bissell's *Extra Lives: Why Video Games Matter* (Bissell, 2011) and a host of other authors' work in this area published since the early 2000s (e.g. Kapp, 2012; Michael & Chen, 2006; Reeves & Read, 2009; Werbach & Hunter, 2012).

that it was merely a low-cost "mod" of a system the military had already invested in.[70] This in turn positioned Rizzo (and to a lesser extent Pair) as the model resourceful inventor innovator who finds exciting new uses for technologies, along the lines of the late 1980s television secret agent MacGyver.

Rizzo expected that funders would leap at the opportunity of supporting an altruistic project like Virtual Iraq, but during the first year he was surprised to find funding hard to come by. The Army had stood up ICT by funding its building and development, but this did not guarantee military funding for projects housed there.[71] In

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[70] Several members of the design team were uncomfortable with the public representation of the system as a mod of *FSW* because it misrepresented their work. One artist explained why he felt that this was a misrepresentation by comparing the design process to movie-making:

It's sort of as if for one movie you build a set for a house, a colonial-era house, a that's sitting on the movie on a back lot, somewhere, and a year later another movie is made that also needs to have a colonial house in it. […] I don't think you would ever say that the second movie is a reimagining of the first one just because it happens to share the same set and a few shots. […] That's essentially what we did. They had their back lot of assets and we just when in and grabbed a few […] But we didn't use any of their software infrastructure, or anything like that. [Pause] But it makes a good story to say that some government in their wisdom made this and we were able to easily transition it to another thing. That's not really true. (ML, June 10, 2011)

Even the Wikipedia entry for *FSW* reads that, "The game has been adapted by psychologists to assist veterans from Iraq overcome the effects of post-traumatic stress disorder" (http://en.wikipedia.org/wiki/Full_Spectrum_Warrior, accessed July 8, 2012).

[71] The existence and institutional structure of ICT represents an interesting moment in academic history, a neoliberal moment wherein researchers must vie for funding for their expensive projects, not only on the merit of their science, but on their capacity to capture the imagination of their various audiences. I have been in research meetings where researchers demoed a very sophisticated technical aspect of a project, and then followed this up with a brain-storming session asking, "Okay, now how do we get the military to fund this kind of work?" These projects have to be sexy to gain attention, and sexiness often means identifying a solution to a problem for the military. Some would argue that these problems are more invented than identified, but in my work I found that most researchers put good-faith efforts into at least performing a sense that the problem they wanted to target truly existed—be it issues in training, PTSD, or the obesity epidemic. They always had some reason to believe that what they were suggesting as a use for the

the early years of the War on Terror, most branches of the military were focusing their psychological research efforts of building resiliency, such as the Comprehensive Soldier Fitness Program,[72] not on treating the mental health effects of war. To the extent that PTSD was in the news, most stories about Vietnam veterans, such as Margo Marahas' story about Vietnam veterans whose PTSD symptoms were being triggered by war coverage on the nightly news, was printed in newspapers around the United States in the spring of 2003.[73]

Ever attentive to a good story, Rizzo also incorporated his difficulty in finding funding into the hero narrative of the origin story. For example, he told journalist Douglas Rushkoff in a clip filmed for the Frontline *Digital Nation* website:

> Originally, we came up with the idea at the end of 2003 and built a prototype off a common game that was available off the XBox, applied for funding, and was basically told 'we're probably not going to need this. Mission Accomplished.' ("Getting on Board with VR")

By positioning Virtual Iraq as an unfunded labor of love, Rizzo was able to position himself as a prescient innovator who was willing to invest in a technology that would

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technology was a real problem.

[72] This is a program designed to build psychological resiliency drawing on the psychologist Martin Seligman's theories of positive psychology. For several articles describing the program and its psychological goals, see the special issue of *The American Psychologist* (Volume 66, Issue 1) from 2001 (e.g. Casey, 2011; Cornum, Matthews, & Seligman, 2011; Seligman & Fowler, 2011). For a critique of the project written by two psychologists and a peace studies professor, see "The Dark Side of 'Comprehensive Soldier Fitness'" (Eidelson, Pilisuk, & Soldz, 2011).

[73] This story appeared under headlines including: "War Brings Back Bad Memories: Post-Traumatic Stress Flares for Some Veterans" (*Sun-Sentinel*, March 20, 2003), "Iraq War Awakens Veterans' Memories: They Hope the Enlisted Men and Women Will Be Able to Get Help for Post-Traumatic Stress Disorder" (*Contra Costa Times* (Walnut Creek, CA) March 26, 2003), "Media Barrage Rekindles Trauma for Vets" (*Independent Record* (Helena, MT) April 3, 2003), and "Stay Away from War News, Vets Advised: Digesting Reports Related to American Invasion of Iraq Complicates Psychiatrist's Job" (*The Sun* (San Bernardino, CA) April 5, 2003).

help to ease the suffering of veterans even before the military itself was willing to admit that this problem existed. As we will see later on, this proved to be a useful discursive resource when members of an online veterans forum accused Rizzo of war profiteering.

Related to this effort, Rizzo made a point of emphasizing his recognition of the traumatic nature of war itself. For example, many of his papers included the following sentences: "War is perhaps one of the most challenging situations that a human being can experience. The physical, emotional, cognitive and psychological demands of a combat environment place enormous stress on even the best-prepared military personnel." These sentences helped to make the case that combat PTSD was an important issue that more people should pay attention to and that warranted significant research and investment without either criticizing the military or pathologizing PTSD.[74]

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[74] Even though Elizabeth Losh reports that "Rizzo has argued that his work on Virtual Iraq can be read as a form of political resistance, as it makes the hidden costs of warfare visible to the public. He even attributes the interest of the foreign press in his project to this subversive aspect of the program" (Losh, 2009, p. 136), in my own experience with Rizzo, I see his work promoting the technology as attempting to acknowledge the horror of war without raising a political critique. This is exemplified in his blog post on the CNN *Next List* website, wherein he writes that,

> There are those who will casually say, "Well we shouldn't have gone to war in the first place". But with hindsight being 20/20 and all, that just rings hollow to me as it doesn't really provide a solution for the current problem (in spite of the fact that I am indeed no fan of war). One thing we can all agree on is that war has always been hell, and that PTSD is not just some recent invention by the modern fields of mental health. The brutal human psychological after effects of war have always been there, with PTSD-like symptoms being first reported in written history by Herodotus around 500 BC in his description of a Spartan named Aristodemus, who was so shaken by battle that he was nicknamed "The Trembler". Since those early times, the psychological wounds of war have consistently appeared as the all too often consequences of combat. And although called by many different names (e.g., nostalgia, soldier's heart, shellshock, battle fatigue), the big difference now is that we strive to recognize and understand it, apply no shame to it, and try like hell to treat it. (Rizzo, 2013)

However, both the explicit claim that the project was unfunded and the suggestion that PTSD treatment was an issue that the military needed to be persuaded to attend to are complicated by the fact that in the spring of 2004—only a few months after conceiving of the project—Rizzo was already working with the man who would come to fund Virtual Iraq. Commander Russell Shilling, a program manager at the Office of Naval Research, had actually been interested in sponsoring the development of an Iraq war VRET system for PTSD treatment before he met Rizzo.[75] In March 2004, he contacted Virtually Better, Inc., the clinical VR development company that had been started by the creators of Virtual Vietnam. Rizzo was already working on an agreement with Virtually Better, Inc. to provide support for the project if it was taken up. The company referred Shilling to Rizzo and they began working together to create a formal proposal for ONR funding. However, this funding could not be dispersed until March 2005, as ONR required all projects to be funded after a formal call for proposals and evaluation process, which left Virtual Iraq unfunded for over a year.

Video Game Drag and Destigmatizing Therapy

The public at large began taking note of combat PTSD around the same time that Shilling and Rizzo began drafting the ONR proposal. In July 2004 the *New England Journal of Medicine* published the first major survey of mental health issues amongst Iraq

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By framing PTSD as a timeless, and normal, response to war—which is it medicine's role to cure—the politics of this particular war are explicitly bracketed from the conversation.

[75] Shilling had previously researched VRET and its possible use in helping Navy divers overcome their fear of jumping off of tall boats (interview).

and Afghanistan soldiers. Led by Dr. Charles Hoge, a psychiatrist at what was then the Army's flagship medical center, Walter Reed Army Medical Center in Washington, D.C., the report was a mental health salvo. The Hoge report not only predicted significant rates of PTSD and other mental health problems among Iraq and Afghanistan combat veterans (between 11.4 and 17%), but also listed many barriers to these veterans seeking care (Hoge et al., 2004, p. 13). The researchers found that only 23–40% of veterans sought mental health care and that those who screened positive for a mental disorder were twice as likely to express concern about stigma and other barriers to care. With an all-volunteer military, this report presented a serious human resources management issue. Perceiving that the Hoge report and its prestigious origins would be valuable resources in legitimizing the development of PTSD treatment, Rizzo began citing its findings in papers and even including an image of the report in his presentations.[76]

Rizzo also began using the Hoge report in another way: While Hoge and colleagues recommended addressing the barriers to PTSD care in the armed forces by making therapy both more mundane and discrete through mandatory screenings and providing mental health services in primary care clinics and other confidential settings, Rizzo suggested that the problem might be the highly gendered stigma associated with talk therapy. This, both Rizzo and Shilling argued, might be remedied by remediating

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[76] Meanwhile, studies estimated that the Department of Defense would end up spending more than $4 billion to provide veterans care for this disorder over the course of their lifetimes (see *The Nation* article). Others demonstrated that multiple deployments significantly increased one's risk of developing PTSD. As an all-volunteer service, more and more service members were serving on ever-higher number of deployments to Iraq and Afghanistan.

therapy into a form that would be more appealing to young men: that of video game technology. [77, 78]

Virtual Iraq's resemblance to a video game was among the most powerful of Rizzo's resources in promoting the technology, and he reinforced this interpretation by repeatedly telling the story of its origins. Indeed, when I asked him why he thought the public was attracted to Virtual Iraq, he responded that it derived from popular interest in video games. Because of this, it is tempting to say that Virtual Iraq "gamifies" therapy. But Virtual Iraq has no game mechanics—there are no arbitrary obstacles for users to overcome, no bad guys to kill, no points to earn, or puzzles to solve. Instead, the clinician controls most of the action in the virtual environment; the patient-user can only walk around and experience these actions. Therefore, referring to the trans-gender performances in which actors perform exaggerated characterization of gender called "drag," I propose the term "video game drag" to the re-gendering of therapy through

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[77] In her work on the reception of technological innovations like the male contraceptive pill and public Internet in Amsterdam, Nelly Oudshoorn argues that sociologists of technology too often ignore the importance of culture as a factor contributing to the success or failure of a novel technology (Oudshoorn, 2003; Oudshoorn, Rommes, & Stienstra, 2004). "Network approaches neglect the fact that cultural conventions are important in securing links of networks" (Oudshoorn, 2003, p. 11). Technologies, she argues, do not only configure users by enabling or constraining their agency as social actors; they also enter into the complex cultural constructs that configure users' identities. To be successful is not only a social accomplishment, but also entails processes of cultural articulation that must be congruent with existing discourses and practices. This is apparent, for example, in the field of marketing, wherein producers try to fit their products into the imagined lifestyles of their potential customers. In *The Male Pill*, Oudshoorn studies a case wherein a novel reproductive technology failed to gain public acceptance because it was associated with an image of masculinity that few men wanted to adopt: that of the "supportive partner" rather than a male autonomous agent taking charge of his own reproductive capacity.
[78] This is not to say that he did not also agree with assessment: he also suggested that the technology might also be used as an assessment tool.

technology that pretends perform like a game. Framing VR as a war game put to good purposes does cultural work suggesting that the application will heal young men who play it, while effectively concealing the fact that it does not actually have the kinds of game mechanics that players expect. That is, in a similar way to how drag performers create gender caricatures—usually female—in order to entertain, as opposed to transgendered persons who actually try to embody social norms in order to be able to live with a particular social gender identity, in video game drag, the performance makes a caricature of video games as social actors rather than attempting to enact the actual features of video games that allow them to function in that role.

Video game drag was a novel performative strategy that Rizzo introduced to the field of clinical VR in promoting Virtual Iraq. Prior to Rizzo, papers and presentations on VRET never suggested that the technology itself may attract patients familiar with video games.[79] Like gamification, the success of video game drag as a performance relies on the cultural context in which people believe young men see video games as "cool" technology. Therefore, video game drag could only be powerful when used in the context of a therapy for a disorder that primarily afflicts young men.

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[79] This is true of papers by American researchers on treating PTSD among survivors of the World Trade Center attacks (Difede & Hoffman, 2002) and motor vehicle accidents (Beck, Palyo, Winer, Schwagler, & Ang, 2007; Wiederhold & Wiederhold, 2010), as well as by Israeli researchers studying its application for victims of bus bombings or a bulldozer attack (Freedman et al., 2010; Josman, Reisberg, Weiss, García-Palacios, & Hoffman, 2008) and the Portuguese researchers studying Virtual Angola, a VRET system for treating veterans of the colonial in Africa during the 1960s and 70s (Gamito et al., 2009, 2010). A group of researchers publishing a follow-up study on Virtual Vietnam blame their difficulty in recruiting patients for the study on the target population's "lack of familiarity with the concept of a computer-generated environment" and general technophobia (Ready, Gerardi, Backscheider, Mascaro, & Rothbaum, 2010, p. 53).

Cmdr. Shilling was in a special position to agree with Rizzo's arguments about the value of digital media as both tools for enhancing engagement and for attracting young people to activities. As a Naval Experimental Psychologist, he had a great deal of experience working with technology for the military.[80] Cmdr. Shilling had worked on several military projects employing entertainment media as technologies for influencing emotion and behavior, including sound design for the video game *America's Army* and producing special episodes of the PBS program *Sesame Street* for children of deployed parents.[81] Shilling saw VRET as a natural outgrowth of the military's investment in digital media development, as evidenced by the fact that he presented the Virtual Iraq project as "Full Spectrum PTSD." While the previous "Full Spectrum" projects had employed digital media to create compelling tactical learning tools, "Full Spectrum PTSD" would instead provide "unlearning tools" that would help service members recover (Shilling, 2005).

In Rizzo's first full paper on Virtual Iraq in September 2004, it was evident that the goal in remediating exposure therapy through VR was not only to increase the efficacy of psychotherapeutic intervention, but to transform its public image. Presented at the 3rd Annual Workshop on Virtual Rehabilitation, the paper, "An Immersive Virtual

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[80] Naval Aerospace Experimental Psychologist is an elite position that specializes in the human-computer interaction, historically centered on the problem of fitting humans and cockpits to one another under the extreme condition of air travel. Less than 150 people have served in the position since its creation in 1941 (Schmorrow, 2009).

[81] He also held the position of associate professor in the departments of Operations Research and Systems Engineering at the Naval Postgraduate School and became Technical Director for Immersive Technologies in the Modeling, Virtual Environments, and Simulation (MOVES) Institute (www.darpa.mil).

Reality Therapy Application for Iraq War Veterans with PTSD: From Training to Toy to Treatment" included a quote from Shilling saying that the project's goal was "to provide therapists with innovative tools and techniques for early intervention and treatment of PTSD symptoms" but noted that, "We also hope that this type of therapy, with its video game–like qualities, will resonate well with the current generation of warfighters" (Rizzo & Pair, 2004). The subtext of this quote is that young men recognize video games as a technology associated with contemporary masculinity, while traditional talk therapy presents a challenge to this ideal.[82]

With further iterations, this claim became more explicit, though in some papers, training simulations took the place of video games. However, the way that they were referenced suggests that the potential appeal of training simulations was only a stand-in for the more persuasive strategy of video game drag. Consider, for example, the structural similarity of two quotes taken from scholarly articles co-authored by Rizzo:

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[82] "While military training methodology has better prepared soldiers for combat in recent years, such hesitancy to seek treatment for difficulties that emerge upon return from combat, especially by those who may need it most, suggests an area of military mental healthcare that is in need of attention. To address this concern, a VR system for PTSD treatment could serve as a component within a reconceptualized approach to how treatment is accessed by veterans returning from combat. Perhaps VR exposure could be embedded within the context of "post-combat reintegration training" whereby the perceived stigma of seeking treatment could be lessened as the soldier would be simply involved in this "training" in similar fashion to other designated duties upon redeployment. VR PTSD therapy may also offer an additional attraction and promote treatment seeking by certain demographic groups in need of care. The current generation of young military personnel, having grown up with digital gaming technology, may actually be more attracted to and comfortable with participation in a VR application approach as an alternative to what is viewed as traditional "talk therapy" (even though such talk therapy would obviously occur in the course of a recommended multi-component approach for this disorder)." (Rizzo et al., 2007, 2008)

> The current generation of military personnel may be familiar with *simulation technology used primarily for training purposes by the military*, and may be comfortable with participation in a virtual reality treatment approach as an alternative to traditional talk therapy.(Gerardi, Rothbaum, Ressler, Heekin, & Rizzo, 2008)
>
> VRET therapy may also offer an additional attraction and promote treatment seeking by certain demographic groups in need of care, the current generation of young military personnel, *having grown up with digital game technology*, may actually be more attracted to and comfortable with participation in VRET as an alternative to what is perceived as traditional 'talk therapy'" (Rizzo et al., 2010, p. 123; Rizzo et al., 2009, p. 14). [emphasis added]

Both excerpts suggest that young military personnel will be more attracted VR treatments than "traditional talk therapy" because of their familiarity with another technological genre. Training simulations and video games are interchangeable as paradigms in these discourses.

In order for PTSD treatment to lose its stigma, Virtual Iraq's advocates reasoned, it would need a new public image that fit with existing ideals of military masculinity, a feat that Virtual Iraq was in a unique position to accomplish. It would be able to provide more therapy both more interactively visual *in* practice but also spectacularly visible *as* a practice. VR could serve not only as a medical tool, but also as a cultural one that could be used to change the public image of PTSD and its care through the performance of video game drag.

In the sections that follow, we will turn to three forums in which Rizzo performs the masculinity of Virtual Iraq as a "cool" alternative to "traditional talk therapy": conference presentations, live demos, and media appearances.

Public Talks as Therapeutic Technovangelism

Between January 2004 and January 2009, Rizzo presented work on Virtual Iraq at 52 academic conferences and workshops. He has been invited to speak about clinical VR at psychology research conferences, as well as military workshops, universities, medical VR conferences, clinical trainings for VRET, and even the United Nations.[83] In 2012, he received a particularly prestigious honor from mainstream psychology when he was invited to be one of three plenary speakers at the American Psychological Association's annual convention in Orlando, Florida. When I caught up with him at a conference in spring 2012 he told me that he had recently accumulated over a million frequent flyer miles traveling the world to promote Virtual Iraq, mostly through conference presentations.

Part of the power of Rizzo's claims about the appeal of digital media to younger generations derives from his own use of digital media as a way to create engagement. Sitting next to him at conferences, he has more than once whispered "Death by PowerPoint" when presenters monotonously presented slide after slide of bulleted lists. In contrast, Rizzo's talks are lively multimedia performances that stand out among conventional scientific presentations, effectively performing the seductive power of

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[83] Presentation venues have included the Annual Army Science Conference, the Veterans Administration Annual Centers of Excellence Retreat, the Annual Virtual Reality and Rehabilitation conference, the U.S. Department of Veterans Affairs Wounds of War: Rehabilitation Strategies for Recovery Meeting, the International Conference on Human Computer Interaction, the Laval Virtual Reality International Conference, Medicine Meets Virtual Reality, the Game Developers Conference, IEEE VR, the International Society for Traumatic Stress Studies, the University of Haifa, and Walter Reed Army Medical Center.

visually stimulating digital media. Visuals are important to his strategy. Most of his slides for his talks on Virtual Iraq have either black backgrounds with red, white, and yellow text, or use screenshots of Virtual Iraq as a background, creating a dramatic effect that is also highly masculine. In general, each of his slides has one or more images and he likes to take advantage of PowerPoint's ability to embed videos. Videos often depict either on-screen imagery from virtual environments made in the lab or of people interacting with these technologies, though in Virtual Iraq presentations he also usually includes news clips of veterans speaking about their experiences with VRET. One particularly dynamic slide shows video from the four divisions of the MedVR lab at the same time.

Rizzo's presentations are powerful advocacy for clinical VR as an eminently cool field that has finally made good on the unfulfilled promise of early-1990s VR hype. He likes to say that his lab's work is to "drag psychology kicking and screaming into the 21st century." Presentations often showcase work of others in his field that he thinks is particularly cool and will drive the field forward. As part of this, he also illustrates the technological progress of VR through comparative pairings of images of contemporary and older screen shots. The visible difference in graphical resolution make self-evident how much VR has progressed, and by extension, what cool technologies clinical researchers who do not pay attention to VR as missing out on. In explaining his projects, Rizzo avoids technical jargon, which gives the sense of someone straight-talking about the matter-of-fact future of therapy. In order to convey this point, he employs visual humor, such as a Photoshopped picture of Sigmund Freud wearing an HMD and a computer with the words "Tell me about your mother" on its screen in a DOS font.

Even in titling talks, he uses language that is both down-to-earth and evocative of how potent a tool VR is for solving the world's clinical problems. Some of his talk titles have included, "User-Centered Design Driven Development of a VR Therapy Application for Iraq War Combat-Reality Post Traumatic Stress Disorder: The Word from Boots on the Ground" (MMVR, January 2006); "Virtual Iraq: Clinical and Practical Uses for Creating Virtual Reality Treatment Applications" (IITSEC, November 2007); and "Virtual Reality Goes to War: A Review of VR Applications to Prevent, Assess, and Treat the Wounds of War" (COSC, May 24, 2012). After talks, attendees often queue up for the chance to speak with Rizzo and ask him questions about the technology. People are attracted to him and the vision of clinical VR's future that he presents.

Live Demos and Treatment Technologies as Toys

Live demos provided a significant site through which the masculinity of Virtual Iraq was performed. In creating a public life for Virtual Iraq, one of Rizzo and Pair's first tasks had been to create a prototype that they could use in demos for the various communities of practice they needed to take interest in the project, including potential funders, clinicians, and technical collaborators. In the course of developing the demo performance, Rizzo chose to demo the system in a way that did not represent the practice of therapy. Rather than provide visitors of the lab with a demo of what it would be like to go through PE—a practice he was not familiar with conducting—Rizzo's demo style drew on the techniques of high-technology demo culture, wherein demonstrators make often make spectacles of a product's "cool" features without necessarily providing a performance of what an actual user would experience. Essentially, the demo provides an

opportunity to show off the features of cool multi-media gadgets in a way that keeps the feminized practices of caregiving to stay outside of the demo space.

Rizzo has conducted countless demos of Virtual Iraq. When traveling, he often brings a laptop loaded with Virtual Iraq and a small HMD so that he can give impromptu demos.[84] At conferences, the lab often sets up a demo table. But most of the demos of Virtual Iraq take place at ICT. A wide variety of visitors including journalists, military leaders, politicians, academics, therapists, media designers, playwrights, and members of veterans' organizations have traveled to ICT to demo Virtual Iraq. Many demos take place at ICT-wide events, such as open houses[85] or special events coordinated for visiting military personnel, such as generals or DARPA program managers.[86]

Demos provide technovangelists with a performance space to construct and shape the public meaning of their technology. Claude Rosental, a sociologist who has studied the practices of high-tech demos in France, explains that during demos, the demonstrator acts as a representative of the system—often, he adds, a "sales representative" (Rosental,

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[84] During my fieldwork members of the lab figured out that they could run the system on one laptop and use a small USB-mounted second screen for the clinician's interface. This made doing demos a lot easier because it gave Rizzo less to carry and less to sync when setting up demonstrations. He would now be able to do a demo for whomever he might end up sitting next to on an airplane.

[85] Like MIT's Media Lab, ICT has a "demo or die" culture (Smith, 2009). Several times a year, ICT coordinated events wherein several labs ran a series of demos over the course of several hours or days. Because ICT is a university-affiliated research center, program managers and other military leaders who attend demo days are not being showcased products, but rather are learning about cutting edge human-computer interaction research in order to get ideas about what the future of technology and its application might be.

[86] I have learned that one should always initiate interaction with members of the VR community by asking for a demo, because this is familiar and comfortable territory for them.

2005 p. 346).[87] Through the coordination of his performance with the technology, an effective demonstrator is able construct the master narrative for the technology. Through these performances, Rizzo has been able to disseminate the master narrative of Virtual Iraq to many audiences: that it is a high-tech VR system that enhances an empirically supported form of therapy by giving clinician control over patients' experience, and that it will also attract young service members to therapy.

During both events and lab visits, Rizzo rarely only demos Virtual Iraq, but rather will take the visitors on a tour of the demo spaces at McConnell[88]—as he did on my first visit—showing the various rehabilitation gadgets, Virtual Human demo set-ups, and motion-capture facilities. The overall effect is to position Virtual Iraq as one of many exciting military-sponsored digital media projects created by the innovative minds and skilled technologists at ICT. (Sometimes, however, the coolness of the lab seems to make Rizzo anxious about the boundary between geek-masculinity and scientific-masculinity. During many demos, I have heard him tell visitors that, "We're doing good scientific work; We're not just playing with toys here.")

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[87] Rosental defines "demo" as "an abbreviation of 'demonstration,' referring to *one specific form* of demonstration, whereas "demonstration remains a generic term. A demo consists of exhibiting a technological device in action, such as a running robot or some computer software. The exhibition generally occurs in front of an invited audience, following a carefully scripted scenario. Often but not always, a demonstrator comments on the running of the technical device, linking its operation to general properties of a specific formalism or methodology. Demos are used to show the feasibility of a technological approach, the value or even correctness of a specific logic, or the proper running of a prototype or product." (Rosental, 2005, p. 346)

[88] Towards the end of my fieldwork, ICT acquired space in the building next door to the main building that they had set up as a second demo space. The plan was to transition most demo visits to this space since it would allow visits to be more efficient and easier to coordinate than ones in which visitors would have to drive or be driven over a mile away to the McConnell facility.

Most forms of psychotherapeutic technology cannot be demonstrated without actually reenacting the therapy or showing video of someone undergoing it. While it is possible to demonstrate the effects of a therapy or a drug by showing video or pictures of a subject before and after treatment, or by telling the story of a case study, these modes of presentation require the audience to be passive witnesses of the therapy's effects. With Virtual Iraq Rizzo could allow audiences to experience the therapeutic technology from the same perspective as a prospective patient, but without the necessity of following a PE therapy protocol. Observers would likewise be able to watch how the volunteer interacted with and responded to the environment without invading the privacy of an actual patient. Only under such conditions could one imagine a TED talk with a live demo of a technology for treating mental illness, such as the one Rizzo gave at TEDxUSC on April 13th, 2010.

Demos enable visitors to the lab to play with the technology. Depending on the amount of the time available, a visitor may volunteer or a member of the lab will already be set up in the system.[89] With a subject in the HMD, the demonstrator will then showcase the capabilities of the system, sometimes describing how they *would* be used by explain how a therapist could match the scene to the patient's trauma, change time of day, increase the level of violent imagery, and make things explode and set them right again by using various items on the Wizard of Oz display. Doing this saves time—the lab may only have 20 minutes with a group on a demo day—but also frees the lab members

[89] Setting up VR goggles to the correct focal distance and centering the virtual environment on the perspective of a specific person takes a few minutes.

from the responsibility of playing the unfamiliar role of therapist. Instead, like Steve Jobs demonstrating the features that can be played with on an Apple product, they can demonstrate the features that can be played with on Virtual Iraq.

Ethnographer Elena Simakova has described how the use "virtual demos," digitally rendered simulations representing a vision of how not-yet-made technologies might be used, are becoming more common practice in the tech industry (Simakova, 2010). In the case of VRET, the simulacrum of the demo does not point toward the technology of therapy but rather to the system's capacity to produce virtual experiences. What demo participants virtually access are the traumatic spaces of Middle-Eastern war zones and, by extension, the traumatic experiences of service members.

However, in the demo space, most visitors do not feel the affective weight of therapy or trauma. Instead, the dominant mood is playful: visitors without military experience often say, "Wow," comment on how "cool" it is, and laugh when the platform rumbles during explosions. Of course, even though the graphics are unsophisticated, interacting with a virtual environment through a VR interface is uncommon enough to be novel for most visitors. It is a cool toy. When the screen depicts horrors, demonstrators occasionally feel the need to remind visitors that this is a healing tool and not a video game.

Presentations for the Media: Making "Virtual" Demos

As shown in the previous chapter, there is no question that journalists have been attracted to Virtual Iraq. As a technology, it provides a powerful image that they can use as a visual representation of therapy without actually doing the hard work of dealing with

the red tape of obtaining images of actual service members in therapy. But as much as journalists enjoy this about the technology, they also love interviewing Rizzo. Though many people have been involved in the development and promotion of VR systems for PTSD, Rizzo has become the public face of the technology in the mass media. Many of the news stories on Virtual Iraq include interviews with Rizzo and footage filmed at ICT.

Rizzo himself is a valuable "prop" in the performance of Virtual Iraq as a technology for masculinizing therapy. He is among clinical VR's most charismatic advocates: He is a tall, broad-shouldered man with a black ponytail who tends to wear an all-black suit when appearing in public. In more casual moods, he wears boots, jeans, and accessories featuring skulls, and is sometimes compared to the 1990s action movie actor Steven Segal. In one television interview there is a large scar above his eye, which was incurred while playing rugby at a college reunion. In short, Rizzo does not embody the stereotypical image of someone representing psychotherapy: there is nothing "fluffy" or feminine about him. In short, he comes across as someone who would understand the young male psyche.[90]

But, as a trained clinical psychologist and research scientist, he also holds the authority of scientific expertise. He is not a "cool dude," but a man with an advanced degree doing cutting edge research at a premiere academic institution. Case in point, in

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[90] His charisma has served the project in other ways as well. Many of the project's collaborators say they got involved after meeting Rizzo or encountering his media appearances. For example, an art therapist trained in the use of sand tray therapy heard Rizzo on NPR and ended up helping Rizzo present Virtual Iraq at Fort Carson. A Columbia University ethnomusicologist writing on the sounds of war contacted Rizzo after seeing him on television (See chapter 4). Rizzo helped him get clearance to travel to Iraq in exchange for high-quality audio recordings for use in Virtual Iraq. And, of course, I would not have known of the project were it not for its media attention.

January 2013, Rizzo and his work were showcased on an episode of the CNN program *The Next List.* In episode of this program, host Sanjay Gupta introduces a different influential individual whose work, he believes, is shaping the world and its future. The episode on Rizzo, which Gupta introduces as a follow-up to his reporting on Virtual Iraq on *Anderson Cooper 360* (see previous chapter), portrays the inventor as a highly masculine, even heroic scientist who is applying advanced technologies to critical social problems. Gupta introduces him as "the wizard of the virtual world" and a "combatant in the war against PTSD." Between scenes of the demos in the lab and interviews with Rizzo and his collaborators, we are shown cut scenes of Rizzo playing rugby and riding his Harley Davidson motorcycle (the camera appears to be mounted on the handlebars, facing Rizzo, similar to a shot one might see in an extreme sports feature).

I had the opportunity to attend the making of a Virtual Iraq news clip from the perspective of the lab in late February 2011, when two women and a man from a Canadian Broadcasting Corporation came to visit the lab to film footage for a couple of pieces they were producing about combat PTSD, including the piece described in the previous chapter. This experience gave me insight into the ways in which masculinity is performed for television. While Rizzo gave the journalists a tour of the McConnell demo spaces, several members of the lab waited "backstage" at the meeting table and discussed who would play patient for the camera. Journalists always want a demo they can film and for this a member of the lab often stands in as a patient. On this occasion, Rizzo's administrative assistant, a man in his late 20s, had come to play this role. The group members joked about how the Japanese journalists coming to the lab tomorrow wanted to see a guy in uniform in the demo, and speculated on who in the office could fit into the

uniform they had. John, a project manager and a 22-year Navy veteran, said that it would not be him, since "he's already been to Iraq." [91] Indeed, John was the only member of the lab team who had never been in the system.

As we waited, the administrative assistant changed his mind and asked if I would stand in for him. I agreed, but could soon tell from the weighted hesitancy in the room that a cultural misstep had been taken: even though I was a member of the "digital generation" who grew up playing video games, as a young woman with a nose ring and visible tattoos, I was unsuitable to play Virtual Iraq's patient on television. Eventually, John agreed to go on camera.

Performing the system with John, however, creates its own anxieties. Rizzo was not currently licensed and did not usually put people with PTSD in the system. With John, he was clearly more careful to assess his emotional state than he usually was with people in demos. Before John put on the HMD, Rizzo took pains to make sure that John was sure he wanted to go into the system, and once the demo began, he likewise checked in repeatedly to make sure he was comfortable with each step along the way. Rizzo's attentiveness to the person in the HMD was uncharacteristic, giving the demo much more of an appearance of therapy than others I had seen—even though at one point Rizzo turned on a "demo" mode, a loop mode that activates all of the possible traumatic stimuli along the five sectors of the Humvee environment, creating an on-screen image of constant explosions, smoke, and chaos. Indeed, in the segment that CBC aired in August

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[91] I joked, perhaps inappropriately, that maybe he should spend more time in it.

of 2011, Rizzo and John are referred as vet and therapist, obscuring the nature of the performance as such and suggesting that the demo space was itself a clinic.[92]

When the journalist herself enters Virtual Iraq to demo the system, Rizzo makes clear that he understands the distinction between therapy and a demo. As he prompts her to play with the system—"Want to drive around it? Speed up"—he makes explosions and black smoke billows on the virtual horizon on the screen showing her perspective. However, when she asks Rizzo how therapists can tell when someone has had enough, he makes clear that what she has just experienced was not actually like VRET: "Nothing gets sprung on people. You know, like what I just did to you. I just made a bunch of stuff happen, that would never happen in a therapy session." Here, Rizzo not only acts as an expert on the practices of therapy, but also as an expert in the art of the demo, acknowledging the significant differences between how the technology is used in the two domains.

After filming this demo, the journalists sat Rizzo on a stool for about 30 minutes of interviewing, asking his opinion of the scientific evidence for exposure therapy, people's concerns about the potential for retraumatization, and whether violent video games make their players violent as well. In response to a question regarding whether exposure therapy is cruel, Rizzo tells the camera that,

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[92] At the end of the demo, Rizzo stands and takes the HMD off of John. In the original take, John had removed the HMD himself, but the journalists asked them to do it over. Though they did not explain why, and no one asked, I read this as the journalists wanting to provide a symbol of care in transitioning the patient from the harrowing virtual environment back to the "real" world in a way that would support for Rizzo's arguments against the "cruelty" of PE.

> When people first hear about exposure therapy, they kinda get a little anxious. They say why would you wanna make somebody go back and revisit the events in which they were traumatized? But the research shows pretty consistently over the years that by having the person gradually imagine or be exposed via VR to events in their traumatic memories that they're able to process those emotional memories in a way they might not ordinarily do in everyday life.[93]

Again, even though Rizzo is not a licensed therapist, and has never actually conducted VRET with a patient, he is positioned on television as an expert in this area. And he rises to the challenge, offering both easily understood explanations of the therapy and appeals to scientific research that provide reassurance that not only is Virtual Iraq legitimate, but so too is its inventor the kind of person who should be entrusted to make decisions about the future of therapy for young, male service members.

A Crisis of Representation: *Veterans Today*

Doing presentations, demos, and media interviews is work Rizzo treats as necessary for maintaining support for the project, especially from military funders. These live performances wherein Rizzo can be physically present are the primary venues through which the masculine identity of Virtual Iraq is performed and its meaning policed. The work of effectively using video game drag in making the project public entails managing public understanding in a way that both intuitively confirms VR's appeal to service members, while establishing that it is also a serious, effective medical tool. In live performances, Rizzo readily polices this boundary through dialogue with his

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[93] Even while playing video games, ostensibly.

interlocutors.[94] However, as we will see, social media affordances on the Internet have allowed Rizzo to extend his presence as a representative of Virtual Iraq into previously closed domains, such as news magazine readership, thereby allowing him to confront his critics man-to-man, even across time and space.

Video game drag is a powerful performative tool for Rizzo in establishing the youthful masculinization of therapy through Virtual Iraq, yet it must be used with great caution because video games already carry so many strong cultural meanings ranging from non-serious diversions and technologies capable of provoking violent behavior in young men. [95] The power of traditional drag performances derives from conscious

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[94] As one might imagine, many of the questions Rizzo fields about Virtual Iraq regard its relationship to video games. For example, at an Army-coordinated Bloggers Roundtable in January 2010, a blogger asked Rizzo how his research team was going to incorporate Virtual Iraq into the Xbox, Microsoft's game console. Rizzo replied that,

This is a clinical tool, not anything we would promote as self help tool or something you could buy in the store. It's not a doc-in-a-box.[94] We're very strict that the only people that have access to Virtual Iraq are those who can document that they have actually training certification in exposure therapy so they can use as clinical tool. […] Every person who comes near it has to go through ET training plus a two-day training in how to use VI application as an exposure tool.

[95] After demo-ing Virtual Iraq during the shooting of *Digital Nation*, Daniel Rushkoff asked Rizzo whether video games can cause violent behavior. He responded:

There's always a lot of this talk. You hear about whether kids are going to be killers if they play a lot of combat games, or any games, Halo or whatever. That isn't really found to be case in longer-term studies. You may find an immediate reaction after playing a video game of a child being less pro-social or being more prone to snap. But there hasn't been the kind of research needed to say that kids that play a lot video games, violent video games, are going to grow up to be sociopaths later in life. I do think people have the frontal lobe function to know the difference between what they do in a simulation and what they do in the outside world and the consequences that are different in both of those situations. People have always questioned the introduction of new media for good or bad. … I think that humans adapt to media and media in and of itself as with any technology, is neither good or bad. It's the use that it's put to. So in this case, the use here, and with many types of applications, I think support communication, support a bonding that never would've taken place without that technology. We will see from this war some good in that there's a lot of funding out to study traumatic brain injury, to study how we rehabilitate it,

awareness that it is a performance of a gender identity that may be distinct from that of the person performing. However, in some public representations, the technology is referred to not only as *like* a game but *as* a game, as in the example of a headline that appeared in the *American Medical News*—"Video Games Used to Treat Post-Traumatic Stress" (Dolan, 2009).[96] For Rizzo, sticking up for his invention entails clarifying what he sees to be the boundary between medical tool and video games, and making sure that no one walks away from a conversation with him confused about the difference.

The first major crisis of representation for Virtual Iraq came in May of 2010 when the online magazine *Veterans Today* published a diatribe against Virtual Iraq. Before this article, video game drag had been an unequivocally valuable strategy for publicizing Virtual Iraq. Up until this point, almost all media coverage had repeated Rizzo's master narrative of how VR could help masculinize PTSD therapy. The author of the piece, *Veterans Today* editor and Vietnam veteran Robert L. Hanafin, however, rejects this narrative and instead uses Virtual Iraq's relationship to video games as the basis for an extended critique of the American military's investment in digital media technology.

In his article, Hanafin states that he learned about VRET during a talk by Dr. Sally Satel.[97] Though the article was originally published as "Dr. Sally Satel Promotes

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advances in prosthetic devices, advances in how we treat PTSD that results in trauma. I wish that funding was available when we didn't have a war.

[96] Other examples include "'Virtual Iraq' Game Aims to Help Vets with PTSD," *NPR* (Halpern, 2008) and "Virtual Combat Game Helps Treat Stress Disorder" *Yahoo!News* (Zeitvogal, 2011).

[97] Dr. Satel is Washington D.C.–based psychiatrist, Yale University lecturer, and public critic of what she calls "politically correct" medicine, social justice-based approaches to healthcare resource allocation. Her position on healthcare policy has led her to become notorious among

Virtual Reality War Game from Treatment of PTSD," Hanafin tells his readers that it was not Satel that caught his attention so much as "the link to the Video Game and virtual reality developers and scientists getting the defense contract, their motivations, their logic, and the role played by military medical and mental health personnel" (Hanafin, 2010). While bureaucrats like Satel are working to cut costs, he suggests, these developers and scientists are war profiteers earning a great deal of money through government contracts to develop VR systems when countless military video games already exist. Referring to Virtual Iraq's origin story, Hanafin contends that,

> Virtual reality is based on a commercial war game that is sold in Wal-Mart, K-Mart, even on Base and Post Exchanges, so why spend tax payer bucks on a defense contract when military psychologist can just pay a few bucks to pick up a similar war simulation […] and tailor it to the patient's PTSD symptoms? (Hanafin, 2010).

Hanafin's critique suggests a significant issue with video game drag: Virtual Iraq's origins in *FSW* can take precedent over descriptions of how it was adapted to a clinical tool. Therefore, video game drag facilitates a public understanding of Virtual Iraq that suggests that *FSW* itself could be used in therapy instead—an interpretation which undermines the value of Rizzo and Pair's work.

Hanafin is also critical of both the military's use of video games and the mainstream video game industry's proclivity for war-themed games. "Beaucoupe bucks to be made in video games that promote and glorify war. […] The militarization of the video game entertainment industry is [a] well known, and successful, retail sales fact—

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veterans groups because her suggested reforms entail cutting preferential government spending on healthcare for veterans.

WAR SELLS!" (Hanafin, 2010). Hanafin positions himself as an authority in this area, describing himself as a fan of strategic war games, even providing a long list of his favorite titles. While he commends the VRET approach for its effort to "break down the stigma associated with going to the Mental Health clinics on Army and Marine bases," he is skeptical of the military's use of video games as recruitment tools, and expresses unease that medicine is using a similar strategy. "Should the same attraction youngsters have for violent video games that even the military uses to recruit for combat be seriously considered as a treatment or cure for PTSD? Maybe, maybe not" (Hanafin, 2010).

Veterans Today has an active readership among veterans and their families. In response to Hanafin's article, several began a lively conversation in its comments section. The majority of the commenters reject the entire idea that this or any technology be used to cure PTSD, because such a cure would only serve military interests, rather than those of service members and veterans.

> What we at Veterans Today see is an academic attempt to brainwash a future generation of Warriors to be killing machines without conscious, simply put ROBOTS. Why not simply use robots or better yet mercenaries to serve the other 99% of us?

The real issue, they say, is fighting unwinnable wars and hoping for "miracle cures" that will make the military's problems, such as PTSD, go away. For Hanafin and his readership, masculinity entails a vigilant skepticism towards the government and its

excesses paired with a fierce commitment to fraternal support within the community of war veterans.[98]

Only a couple days after the story was posted, Rizzo was alerted to its existence through his ongoing monitoring of news on Virtual Iraq. In the days before social media, Rizzo might have only written a letter to the editor or shrugged off the bad press as an inevitable case of "the media getting science wrong." Instead, on the afternoon of May 18, 2010 he began addressing Hanafin and his readership directly by posting in the article's comments section. After thanking the magazine for reporting on "this important topic" Rizzo asks why Hanafin "did not contact me directly to get the story straight," effectively suggesting that it was inappropriate for him to publically criticize another man's work without paying that man the respect of allowing him to defend himself, and suggesting that doing so has resulted in Hanafin making a fool of himself by espousing mistakes. Rizzo draws attention to several facts Hanafin got wrong, including the project's funding source and "the difference between the use of an off the shelf video game and a tool designed for clinical practice." He admonishes the magazine for

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[98] One commenter who believes that playing video games protected his son from PTSD is the lone voice of support for VRET in the conversation. He writes that,

> My son has had two tours of Iraq, he plans on making the Army a career. Before he joined up, fresh out of High School in 2005. He was playing Virtual Reality War Games on his xbox 360 before entering into military service. He feels it prepared him for the real thing. He shows no signs of PTSD. He dosen't smoke or do illicit drugs. He might have a few cocktails, but that's all. On the other hand I am a Vietnam Vet, who has nightmares of combat in nam. But the WA say that since I don't use Alcohol are drugs, I don't qualifie for a PTSD claim. (May 18, 2010 at 2:23 am)

While supporting the VRET approach, his argument, however, implicitly supports Hanafin's argument that already-existing video games themselves have therapeutic value.

characterizing VRET "in a fashion that trivializes the research, the success of the treatment, and the actual way that the treatment is conducted. Telling a person to go to the PX and buy a War game to treat their PTSD would be misinformed and unethical."

Rizzo diagnoses Hanafin's misunderstanding of the technology as deriving from his "exclusive and inaccurate, context-devoid reliance" on a talk Rizzo gave at the Games for Health conference. He offers to make himself available for man-to-man dialogue, suggesting that, "perhaps we can work together to set the record straight and put this form of therapy in a context where someone can make an honest judgement about its value" (May 18, 2010). As a first step, he attempts to literally redirect the conversation by directing the readership to a link to the PBS website for *Digital Nation*, where Hanafin and others can "watch actual video of how the therapy is done, the reports of people who have gone through it, and some of my explanation of the process." Though Hanafin had derived his understanding of Virtual Iraq from video of one of Rizzo's own talks, Rizzo clearly wanted to be able to be a steward of which representations were seen as authoritative bases for creating public understanding of the technology.

Neither Rizzo nor the website seem to convince the commenters, one of whom retorts that, "PBS is a taxpayer funded entity that spouts bullshit and helps your Congress Thief appropriate money for you." In turn, Rizzo amplifies his affect in response. Calling the characterization of the system as a commercial war game "a gross oversimplification and inaccurate depiction of what we have created" he goes on to tell the origin story of how, with no funding, he used *FSW* to create a prototype VRET system.

> This prototype was NOT a game, but a setting in which exposure therapy could theoretically be conduct in NOT A WAR GAME!! We finally were able to get funding to build a treatment tool for PTSD that leveraged the

> best empirically supported treatment of PTSD (exposure therapy), from this free effort. And since that time when we got a small grant from ONR, we started over from scratch to build the tool creating our own VR assets and building it as a therapy tool rather than as a friggin' "War Game." (May 18, 2010 at 9:59 pm)

In contrast to the figure of the war profiteer, here Rizzo uses the origin story to adopt the role of an altruist scientist who volunteered time and money to develop an invention intended for the public good. Conscious of his position as an outsider in a veteran forum, he goes on to defend his position by further characterizing the project as the product of a man fighting against the odds to benefit mankind:

> I am not here to pick fights with anyone, but when you put your heart and soul into a project and have to fight tooth and nail for every resource to create and apply it for a good rightful human purpose, you tend to not sit back on your hands, when someone misrepresents it as evil.

As Rizzo continued to engage with Hanaflin and the commenters, it became apparent that they understood PTSD, treatment, and VR quite differently. Hanafin and most of the commenters were Vietnam veterans who came from an older culture of war therapy, one based on sharing personal stories. These are not only stories of combat trauma, but of recovery, physical rehabilitation, and reintegration into civil society, and their difficulties with Compensation and Pension boards; in other words, the experience of PTSD as a whole. Envisioning VRET as a standardized process, they write that they and their loved ones' unique traumas could not be effectively modeled in a virtual environment, nor how this re-experiencing would help to alleviate their on-going struggles. For example, one veteran commenter addresses Rizzo directly, writing that,

> I can see a virtual reality game really helping a young GI by simulating his post-battle existence. Let's see, ah yes. Here's one to simulate. How about lying in a military hospital bed for 4+ months, mostly comatose. We want the full effect of the event, right Rizzoz? How, Rizzo, are you going to

> simulate the total embarrassment of finally waking to bedpans? And then simulate the euphoria of finally getting up—the first trip to the shitter and finally being able to take a healthy crap on one's own. Oh yes, don't forget in your VR simulation Rizzo, the two orderlies standing by, holding their noses and trying to keep the damaged soldier from falling sidewise off the pot. It's all part of PTSD Rizzo. One tiny sliver of my experience. (May 18, 2010, 12:20 pm)

Responding to another commenter, "Tom" specifically addresses the issue the same event in war will be experienced from a wide variety of perspectives, and suggests that this diversity will make it impossible to create a widely useful simulation of traumatic experiences.

> The problem is … that Rizzo is trying to simulate PTSD causing EVENTS using Virtual Reality. You, I and all the other respondees on this post KNOW the very same battle is DIFFERENT for each contestant (if you will let me use a game term). I'm not sure of the exact mathematical algorithm unless I really think deep about it, but if 500 people are fighting, some percent with get PTSD at some point later in their lives, Let's assume 20% for convenience. That says 100, soldiers will suffer PTSD at some level. Then we have to have to add the chopper crew, the medics, the nurses, the doctors at the field hospitals, etc. Etc. Each will have a completely different view of that one battle, depending on their task and emotional makeups. Which view are you going to simulate? How many views are close enough to be able to be grouped in one approximate simulation to do any good? (May 24, 2:08 am)

A commenter who identified herself as the wife of a Vietnam veteran who had been denied a PTSD diagnosis by the VA told Rizzo that even if he was sincere in his desire to help veterans, she believed that the VA would use his work to "relieve itself of any responsibility of any PTSD cases from combat," thereby trivializing war and its effects, saying people are cured and then redeploying them (May 18 at 11:27 pm). Rizzo responded: "This all sounds horrible, but do you advocate that no one attempt to create a PTS treatment because it would only be used as a corrupt tool by the VA to deny rightful

claims?" (May 19 at 1:07 am). In response, she, too, questioned the ability of VR to represent war trauma as she understood it:

> HOW does a video simulation reached into the very fibers of one's being and takes from each cell of a person which is saturated with the trauma and purges and cleanses the mind, body and spirit of entrenched horror, shock, numbness and helplessness?
>
> How does a video simulate a little known battle where tens of thousands died and the corpses and pieces of corpses lay endlessly with the unavoidable smell of death on the hot, humid air as your helicopter flies over and in your dreams you find yourself floating over too many bodies? … So Skip Rizzo … do you have THAT program? (May 19 at 2:32 am)

At this point, Rizzo began to adjust his approach by explaining the rationale for using VR in therapy in a way that spoke directly the critiques being made. In his response to this post, he not only highlighted the limitations of Virtual Iraq—writing that "There is no 'one size fits all' 'cure' for all ills"—but also recognized that the commenters have deeply suffered as a result of war and powerful negative feelings towards all those who would collude in its conduct from any place other than the frontlines.

> Of course the primary problem here is war and the way that the folks that serve in these wars are treated when they return home with a life that has been ravaged by the experiences. While all experiences cannot be replicated in a simulation, the use of VR to begin help a person process their experiences in a way that will lead to more healthy life after war is the ultimate aim. Early work with a VR simulation of Vietnam, while certainly not replicating the visible detail that you describe, served to provide enough context that Vets were able, when in the simulation, to be able to talk about their experiences in a way that they hadnt in the past, and most found this beneficial. The key here is that the VR simulation is not the cure, it is simply a tool in the hands of a well trained and thoughtful clinician who can work with the person in how they process and later think about their own real experiences. Many wartime events are so horrific, that it would be naive to believe we can make the pain just go

> away. But we can make a start on the process of moving ahead to the future, by addressing this pain the past. (May 19 at 2:07pm)[99]

Rizzo's arguments were effective in convincing Hanafin and his reader to allow him a space to defend his project and respond their criticisms. On May 19, Hanafin posted a comment inviting Rizzo to write a piece on Virtual Iraq for *Veterans Today*. The commenters agreed, writing that they deserved the facts. While video game drag sound bites like "virtual reality war game helps veterans with PTSD" had helped produce a simplified and comprehensible public vision of VRET, it also carries cultural baggage. In order to maintain legitimacy for his project, Rizzo marshaled all of the resources that he could make digitally available.

Rizzo gave his piece for *Veterans Today* the lengthy title, "A Manifesto on Virtual Reality Exposure Therapy for Combat Related Post Traumatic Stress: The Story of Virtual Iraq/Afghanistan and How It Is Helping Some Service Members and Veterans to Heal the Invisible Wounds of War." The manifesto spans some 30 printed pages and contains numerous screen shots, references to scholarly journals, and links to video clips from both the system itself and from television news segments on which it was featured. It is an epic example of mansplaining.

Veterans Today agreed to publish the manifesto with a preface by Hanafin. It appeared on the website on July 29, 2010, under the title "Virtual Iraq/Afghanistan and How It Is Helping Some Troops and Vets with PTSD." As a goodwill gesture, Hanafin

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[99] He goes one to say that it is his goal to not only provide a tool that can help all veterans, but to prevent Virtual Iraq from being used "to deny the valid claims of those who have served their country and gave all." It is not clear, though, how the inventor can prevent his creation from becoming the Frankenstein's monster the readers fear.

also agreed to re-title the original article "Virtual Reality Combat Simulations as a Treatment for PTSD."

Writing the manifesto affected the way that Rizzo managed his digital resources on Virtual Iraq. Though he had also always used news video footage and video capture in talks and demos, prior to the *Veterans Today* incident he had either stored the videos on his computer or kept bookmarked links in his browser. The incident motivated him to consolidate all of his video resources on a single YouTube channel, AlbertSkipRizzo.

Rizzo's YouTube channel created a new way to author virtual demos that extend beyond the lab in a manner he can control more easily than traditional media distribution channels. YouTube allows him to curate an archive of easily accessible and shareable news clips, screen capture videos, and other promotional videos of Virtual Iraq, as well as other projects at his lab and by friends and colleagues. In this way, his approach to curating the YouTube channel mimics the way that he organizes demos at ICT and his talks: He does not only show the one technology, but uses its attractiveness as an opportunity to get the word out about other projects in the field. And by monitoring the comments that people post in response to the videos he posts, Rizzo is also able to engage in man-to-man dialogue with a diverse audience of individuals who would be unlikely to come to his lab. For example, when a commenter responded to a news clip on the channel, questioning exposure therapy—"Why would you want to relive this shit again? This is absolutely STUPID!"—Rizzo responded directly, referring the commenter to his manifesto:

> You obviously do not understand the process whereby this works. Active Duty and Veterans have significantly benefited from this approach. If you

> care to learn more about how this works, go to the Veterans Today site and read the article […] The link is in the description panel.

Similarly when another commenter posted on a similar clip on Rizzo's channel challenging the legitimacy of PTSD itself, writing, "btw with all do respect u need to pt … comen from a grunt … u dont have ptsd u have weakness," Rizzo responded with a quick comment shutting down the commenter's authority to speak on the subject: "Sorry Daniel, sounds like yer shaming to explain. Cannot buy that without better evidence than just your opinion." By posting the evidence and research he finds most compelling and addressing critics head-on, Rizzo has been able to use YouTube as a tool to help him build a world he has long dreamed of: one in which VR is seen as a serious tool for addressing serious clinical problems.

Conclusion

Through a wide variety of communication strategies, Rizzo has worked to create a master narrative of Virtual Iraq as an engaging, scientifically sound, and attractive clinical tool. Rizzo's masculine performances of Virtual Iraq help to insert the system into a cultural context in which it can be understood as the "right tool for the job" of treating combat PTSD. We have also seen that one of these strategies, video game drag, is both a useful performative strategy and an easily misunderstood metaphor. While it helps to create a public image of effective care that also fits the imagined gender identity for the treatment population, video games carry cultural baggage that Rizzo must negotiate in his work of promoting and making a cultural place for Virtual Iraq as a triumph of medical technoscience.

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CHAPTER 3:

FROM THE 'ULTIMATE DISPLAY' TO THE 'ULTIMATE SKINNER BOX': THE HISTORY OF VIRTUAL REALITY EXPOSURE THERAPY

Despite Virtual Iraq's institutional emergence from the Army-funded Institute from Creative Technologies, historical analysis reveals that the development of virtual reality for use in exposure therapy for combat-related post-traumatic stress disorder should not be understood as an imposition of the military-entertainment complex upon the clinical field. Even though he was inspired to invent Virtual Iraq when he saw the available digital assets from the ICT video game/Army-training project *Full Spectrum Warrior*, Dr. Skip Rizzo, he only knew about the existence of virtual reality exposure therapy for PTSD because of the precedent set by the Virtual Vietnam project that his engineering partner, Jarrell Pair, had worked on as a graduate student at the Georgia Institute of Technology. The success of Virtual Vietnam established a scientific precedent for Virtual Iraq, and suggested that even low-resolution VR could be a powerful tool in the fight against PTSD.

Tracing the historical context of Virtual Vietnam's development reveals that the idea of using VR help veterans with PTSD relive traumatic experiences during therapy was not a top-down idea from any branch of either the military or the Veterans Administration. Rather, the idea emerged through the mutually beneficial interdisciplinary partnership of members of two fields each concerned with creating

techniques to produce subjective experiences: immersive computer graphics research and clinical psychology.

Because of the public attention drawn to his work on Virtual Iraq, Rizzo is often referred to in the popular media as "The Father of Virtual Reality Therapy." In his own work, though, he credits several other innovators for the foundational work that led to Virtual Iraq. In some PowerPoint presentations, Rizzo pairs images of Edna Foa, inventor of PE therapy, and Jaron Lanier, popularizer of VR, taken from the 2010 *Time* magazine list of the 100 most influential people of the past 100 years. He labels them as, "The Mother of Exposure Therapy" and "The Father of Virtual Reality." But Foa and Lanier were not the only mother/father, therapist/technologist pairing to inspire VRET. In 1995, clinical psychologist and Foa-protégé Barbara Olasov Rothbaum and computer scientist Larry F. Hodges became the primary co-authors of the first controlled clinical trial of the use of VR in the treatment of the psychological disorder published in a mainstream clinical journal. [100]

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[100] Rizzo referenced Virtual Vietnam in many papers to help suggest that early adoption of VRET could help to prevent another PTSD epidemic. For example, the following sentences begin a 2004 paper:

In 1997, researchers at Georgia Tech released the first version of the Virtual Vietnam VR scenario for use as a graduated exposure therapy treatment for PTSD with Vietnam veterans. This occurred over 20 years following the end of the Vietnam War. During that interval, in spite of valiant efforts to develop and apply traditional psychotherapeutic approaches to PTSD, the progression of the disorder in some veterans severely impaired their functional abilities and quality of life, as well as that of their family members and friends. The tragic nature of this disorder also had significant ramifications for the Veteran's Administration healthcare delivery system often leading to designations of lifelong service connected disability status" (Rizzo & Pair, 2004). Later papers added the following sentence: "The Virtual Vietnam scenario

Because both therapy and VR are concerned with subjective experience, which is inherently difficult to measure, they have historically been "weak" scientific fields. The success of VRET must be considered within two important historical contexts: the rise of cognitive behaviorism in clinical psychology research and the VR craze of the late 1980s and early 1990s. Due the hype of the 1990s, VR is still culturally associated with psychedelic digital landscapes producing mind-altering computer-mediated experiences. Cultural critics writing during the height of virtual reality hype had expressed concern that the seductions of computer-generated virtual worlds would make people want to escape their mortal bodies and environment (e.g. Hayles, 1999; Hillis, 1999). However, clinical VR pioneers saw the potential of VR very differently: as a tool that could support applications that would help *rehabilitate* bodies and reorient them *to* their environment. Rather than offering a world of unlimited virtual exploration, clinical researchers appreciated that VR offered the possibility of controlled experience: nothing could happen in a virtual environment that had not been programmed in. Compared to the actual world of the patient's imagination, VR affords the clinician a larger degree of control over the patient's experiences via the control of computer-generated stimuli.[101] The question for early researchers was what kind of digital media they should control,

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landmarked the first time that VR was applied to the treatment of PTSD and this initial effort produced encouraging results. (Rizzo et al., 2006)

[101] In the medical field, VR enacts the Cold War era dream of creating a "closed world" through simulations that reduce the world to a few controllable variables in order to create measurable, adjustable effects. In *The Closed World*, Paul Edwards argues that cybernetic research during the Cold War characterized the world itself as a hostile, yet enclosed environment in which only technocratic control can ensure safety and employed this discourse in justifying the design of many computer-based defense systems (Edwards, 1997).

what kinds of practices they should modify, and how to measure the efficacy of the results.

The work of Hodges and Rothbaum is notable in the history of clinical VR because of their mutual commitment to adopting the conservative scientific and technical standards of both fields involved in their interdisciplinary collaboration. The early history of clinical VR contains many stories of technologists looking for a useful application of VR and of clinicians looking to use VR to make their work more sophisticated and "high tech" like other areas of medicine. In contrast, Rothbaum and Hodges' work on VRET used the existing capabilities of VR in order to remediate a well-established therapeutic technique: exposure therapy for anxiety disorders. They began the work that would eventually lead to Virtual Vietnam by first establishing the efficacy of VRET systems as an alternative modality for the behavioral treatment of phobias, a therapeutic technique that was already considered efficacious in both imaginal and *in vivo* modalities. By employing the clinical science procedures and techniques established by cognitive-behavioral psychology, their research and publication practices helped to position VR as a clinically legitimate treatment modality in the United States, inspiring many other researchers to follow suit.

Rothbaum and Hodges' work helped to create a dominant paradigm for collaboration that served to stabilize alliances between the different professional and epistemic regimes of clinical psychology and VR research. Around the world there are a variety of models for how to use VR to treat PTSD based on a variety of therapeutic approaches. In scientific journals and medical VR conferences, cybertherapists from around the world espouse many models and theories of how and why VR could help with

mental illness.[102] But in the United States the VRET paradigm is so dominant that few therapists or designers working in the field are even aware that other models of using VR in PTSD treatment exist.[103]

In order to explain the historical conditions that have allowed for VRET to become the dominant paradigm for the use of VR in PTSD care in the United States, this chapter examines the emergence of clinical VR in the mid-1990s. For my data, I have drawn on historical scientific publications including books, articles, and conference proceedings, popular culture representations of VR, as well as oral history interviews with Rothaum, Hodges, and Pair. The chapter begins with a brief history of VR, showing how the industry rose as VR was imagined as a solution for a wide array of problems, fell when the industry failed to deliver on a killer application, and was eventually picked up by clinical psychology researchers as a tool for producing controllable—and therefore measurable—subjective experiences. In addition to telling the story of Rothbaum and Hodges' collaboration that led to the development of VRET, I also tell the stories of several other early VR-enhanced therapy projects that took place in the early 1990s. I

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[102] For example, in the Netherlands, a group developed a system called Multi-Modal Memory Reconstruction (3MR) designed to help a group of veterans work together to reconstruct a story of traumatic experience in combat using 3D modeling software (Van den Steen, Brinkman, Vermetten, & Neerincx, 2010). In Spain, researchers have developed a special combat PTSD version of the EMMA project, which stands for Engaging Media for Mental Health Applications. EMMA allows individual patients to select a scene like a beach, autumn forest, or desert that symbolizes their affect and then populate it with images uploaded by the patient or available through a digital archive (Baños et al., 2011; Botella et al., 2010). In Australia, the several therapists use VR to immerse PTSD patients with idyllic scenes that promote relaxation.

[103] Indeed this is so taken for granted, that some HCI researchers are suggesting that their software could be used to help patients in therapy for PTSD without any real questioning of or attention to the therapeutic model.

show how these projects, while also concerned with empiricism, ultimately failed to provide a widely accepted clinical framework for using VR in psychotherapy because they did not follow mainstream scientific practice, especially in promoting their work.

A Brief History of VR: Hammers and Nails

VR therapy advocates have noted that VR has a historical reputation as being a "hammer without a nail," (Rizzo et al., 2010, p. 115) or a "solution in search of a problem," (Riva, 1997, p. v). In an interview, Larry Hodges reflected on the beginning of his career in computer science in the 1980s and early 1990s. When newspaper reporters and researchers began coming to his lab to see the stereoscope displays that were being promoted as "virtual reality" interfaces, he realized he was caught in the middle of a technology-hype bubble: "I looked around and I realized I was doing VR, but the problem was no one knew what to do with it!" (quoted in Wiederhold, 2007, p. 84). But the problem was actually not that no one knew what to do with it; in fact VR was proposed as a solution for *lots* of problems: first as an advanced form of visualization of data, but later appreciated for its ability to make novel experiences in their own right. The bigger problem was that it did not actually do any of those things very well during the time when it was receiving the most cultural attention.

The public—and business—started paying serious attention to immersive graphical computer interfaces around 1986, the year that then 26-year-old inventor and entrepreneur Jaron Lanier introduced the phrase "virtual reality" to the lexicon in an interview for *Scientific American* magazine. Only two years earlier, *Time* magazine had heightened public awareness of the burgeoning digital age by declaring the personal

computer the Machine of the Year. A flood of VR hype swept over American culture as technologists and journalists promised a future in which new interface technologies would allow the exploration of new virtual worlds, promote the expansion of human intelligence, and revolutionize education, scientific research, and the arts (for a variety of predictions on the future and influence of VR technology see, e.g. Aukstakalnis, Blatner, & Roth, 1992; Bolter & Grusin, 1996; Heim, 2000; Lauria, 2001; Rheingold, 1991).[104]

But the history of VR goes back at least 20 years earlier. In the early 1960s, the graphical user interface (GUI) was conceived as a technology for making computers user-friendly. By representing the seemingly incomprehensible volumes of information stored in computer databases on GUIs, users would be able to apprehend this data in a "naturalistic" way: through visual perception of shapes and charts (Lauria, 2001; Lenoir, 2000). [105]

It did not take long for human-computer interaction innovators to realize that VR need not only represent data; using interfaces that stimulated the senses, computers could

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[104] Lanier, VR's most visible and vocal technovangelist, was the origin of some of the most notorious hype. VR, he promised, would soon give us world-changing experiences such as "post-symbolic communication," and "Reality Built for Two" (Lanier & Biocca, 1992). In a 1986 interview with *Wired* magazine, Lanier painted a whimsical vision of life in a VR world: "With a saxophone you'll be able to play cities and dancing lights, and you'll be able to play the herding of buffalo's plains made of crystal, and you'll be able to play your own body and change yourself as you play the saxophone. You could become a comet in the sky one moment and then gradually unfold into a spider that's bigger than the planet that looks down at all your friends from high above."

[105] In "Visual Technologies as Cognitive Prostheses," Lev Manovich has argued, however, that the presumption that visual cognition comes more naturally to humans—which has justified much research and development in human-computer interaction—is in fact a misrecognition of the ways that life in Western culture privileges and cultivates apprehension through sight (Manovich, 2006).

simulate entirely new environments. That is, the graphics' referent would be "space" itself, not data. Most historians trace the origins of immersive VR to 1965, when then-Harvard graduate student and later ARPA research scientist Ivan Sutherland proposed "the ultimate display," "a room within which the computer can control the existence of matter" (Sutherland, 1965, p. 3). Three years later, Sutherland created the Sword of Damocles, the first binocular display with head-tracking (Sutherland, 1968). When worn, the heavy ceiling-mounted helmet offered the wearer the illusion of sharing the room with three-dimensional geometric forms that could be viewed from multiple angles (Aukstakalnis et al., 1992).

Well before therapists began using it, VR's ability to create "other" realities had provided both researchers and philosophers with an interesting tool for considering issues of human psychology, such as subjective experience and the nature of reality. One of the most-repeated quotes about VR is William Bricken's enigmatic declaration that, "Psychology is the physics of virtual reality" (Barlow et al., 1990). VR clearly provided users with "real" experiences of being telepresent in another place (Steuer, 1992). Early commentators often described watching people in VR goggles crawl around the floor or duck in response to some object only they could see (e.g. Aukstakalnis, Blatner, & Roth, 1992; Biocca, 1997; Rheingold, 1991).

Many scholars and cultural theorists, however, viewed VR as a site for cultural struggle that could undermine rather than expand human knowledge of the world (e.g. Brook and Boal, 1995; Hillis, 1999; Markley, 1996). Jean Baudrillard famously warned of the "procession of the simulacra," whereby the proliferation of artifice would lead to a condition in which culture would lose all capacity to tell the difference between the real

and simulated (Baudrillard, 1988). Films like *Lawnmower Man* (Everett & Leonard, 1992) and *eXistenZ* (Cronenberg, 1999) reflected cultural anxieties over the possibility of people getting lost in VR, high on the power of virtual existence.[106] Along similar lines, a now-infamous *Wall Street Journal* article on VR warned of mind-altering "electronic LSD" (Zachary, 1990).

As VR fever grew, several technologists and cultural fringe therapists suggested therapy as among the many possible applications for VR without serious reception from the medical community. For example, notorious counter-cultural figure and psychedelics pioneer Dr. Timothy Leary made a guest appearance at a panel of VR titled "Hip, Hype and Hope: The Three Faces of Virtual Worlds" at the Association for Computing Machinery's Special Interest Group in Computer Graphics and Interactive Technologies (SIGGRAPH) conference in 1990 alongside such notable VR advocates and innovators as Lanier, Bricken, and John Perry Barlow.[107] During the panel, an audience member asked the panel about the possibility of creating a "virtual mirror," that would "maybe help us stop smoking and driving drunk" (Barlow et al., 1990, p. 27). A panelist assured them that such a project was indeed viable, and perhaps even in the works.

Another VR pioneer who attended the SIGGRAPH panel, Myron Krueger, is credited by Brenda Wiederhold as the first author to propose the use of VR in mental health care (Wiederhold & Wiederhold, 2005). Krueger, an artist and computer scientist,

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[106] In *Lawnmower Man*, a doctor uses VR to transform a simple-minded lawnmower driver named Jobe into a power-hungry virtual god with little connection to his former humanity. In *eXistenZ*, a group of potential users tests out a new video game interface system only to lose track of what is real and what is the game.

[107] A lyricist for the Grateful Dead and co-founder of the Electronic Frontier Foundation.

developed a technique for creating what he called "artificial reality"[108] at the University of Connecticut in the early 1970s.[109] In his book *Artificial Reality II*, Krueger lists its many valuable features and possible uses, including foreign language instruction, physical rehabilitation, science education, and as a "generalized Skinner box" for studying human behavior (Krueger, 1991a, p. 198). [110] In the section titled, "Applications in Psychotherapy," he wrote that VIDEOPLACE visitors "often become more playful and flamboyant than they are in almost any other situation. This observation could have important implications for psychotherapists, because this behavior might otherwise be impossible to elicit." Krueger surmised that in addition to reinforcing positive behaviors, artificial reality might help a person to "temporarily overcome a negative self-image by acting through a graphic alter ego" or "prevent a person from withdrawing emotionally." Anticipating critiques of human-computer interaction in therapy as "dehumanizing," Krueger believed that for some people, computers could actually serve as better therapeutic companions than human therapists. For Krueger, "artificial reality" was not a form of cold technology, but rather an artistic medium with great humanistic potential.[111]

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[108] Immersive computer simulations went by many names until Lanier's term "virtual reality" caught on.

[109] He became best known for his work VIDEOPLACE, a CAVE with projections on the wall that visitors could interact with, unencumbered by control devices.

[110] "It can focus on motions so small that a person cannot avoid making them, can respond to them, can reinforce these motions, and can gradually encourage more expansive behavior" (Krueger, 1991a, p. 203).

[111] In *Artificial Reality II* Krueger wrote that,

Some people with emotional problems have difficulty trusting other people. In certain situations, therapists essentially program themselves to act in a mechanical and predictable manner, to provide a structure that patients can accept. That structure is then slowly expanded beyond the

He imagined that artificial reality could provide reality-training wheels for someone working to overcome emotional difficulties:

> If an artificial reality were successful in involving an emotionally disturbed person, elements of change could be phased in slowly. As time went by, human images and, finally, human beings might be introduced. At this point, the patient could venture from the responsive womb, returning to it as often as he needed. The possibility also exists that we might permit people to avoid other people in this way. It may be realistic to define realities that adapt to the patients, rather than requiring everybody to adapt to the real world as we define it. (Krueger, 1991, p. 204)

Krueger's vision of using digital media to adapt reality to individuals was ahead of its time. [112] In retrospect, VR had very little impact on mental health—for the better or the worse—in the early 1990s. The technology was not only expensive, but only had enough computational power to render simple architectural spaces and geometrical objects.[113] The immersive VR industry bubble burst in the wake of the hype. Commercial

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original contract. However, since relationships with people are a source of anxiety, it might be easier to encourage a patient to trust a mechanical environment and mechanized therapy. The ELIZA program, developed at MIT, was originally presented as a tongue-in-cheek offering in automated therapy, but has since been taken more seriously. Its creator, Joseph Weizenbaum, professed horror at the idea that human psyches would actually be trusted to computers; however, I think his horror was misplaced. […] It may be that the only way to accomplish certain kinds of therapy is to take advantage of the endless patience and consistency of the computer. If that approach were to work, the positive ends would certainly justify the means, which seem threatening only if we automatically assume that technology must be dehumanizing (Krueger, 1991: 2003).

[112] The view that VR could help to create new worlds better adapted to the needs of mentally ill people suggests that VR had the potential to transform the history of mental health care, a field which critics argue is in the business of adapting people to society. See for example, Thomas Szasz's diverse writings on "the Therapeutic State."

[113] This did not have to be the case. While researchers thought it would be more practical to develop tools for small, niche, professional markets—such as scientific researchers and engineers—who are used to working with esoteric tools and do not require the simulation itself to be as compelling. These audiences were not interested in novel immersive experiences, but rather to help with the original vision of computer graphics: as a representation of data. Investors,

audiences did not take an interest in head-mounted displays or data-gloves and many of the small VR firms in cities like San Jose and Seattle gave up the struggle for venture capital. While a few industries including aerospace and theme parks did maintain on-going investment in VR, the devices they developed tended to be large-scale propriety projects, rather than mass-market goods. By the late 1990s, both innovators looking to make breakthroughs in human-computer interaction and investors seeking to make their tech-millions had turned to the newest tech fad, the World Wide Web.

Origins of the Clinical VR Field

> Whereas in the mid-90's VR was generally seen as 'a hammer looking for a nail,' it soon became apparent to some scientists in both the engineering and clinical communities, that VR could bring something to clinical care that wasn't possible before its advent. […] The capacity of VR technology to create controllable, multisensory, interactive 3D stimulus environments, within which human behavior could be motivated and measured, offered clinical assessment and treatment options that were not possible using traditional methods. (Rizzo et al., 2010, p. 117)

Not until after the rapid decline in the commercial VR industry did a clinical VR community focused on mental health care begin to take shape. The first documented study of VR as a psychotherapeutic tool was conducted in Japan in 1992. At the Ojika Lab, Gifu University in Japan, computer engineers Michitaka Hirose and Ryugo Kijima

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however, wanted to focus on the potentially much larger and more lucrative commercial entertainment market. When competing with the entertainment industry, it had to compete with screen-based technologies, which were higher resolution, easier for social play, and already stocked with entertaining content. See issues of the *CyberEdge Journal*, trade magazine of the VR industry in the 1990s, for articles describing the disappointing state of VR technology for industry insiders (e.g. Delaney, 1996; Krueger, 1991). See Fred Moody, *The Visionary Position* and "Post-Virtual Reality" chapter of the 1993 edition of Brenda Laurel's *Computers as Theater* for more on the collapse of the VR industry (Laurel, 1993; Moody, 1999).

worked with researchers in developmental psychology and pediatric neurology from the National Children's Hospital in Tokyo to develop a form of virtual sand tray[114] for conducting therapy and diagnosing mental health problems in children (Hirose, Kijima, Shirakawa, & Nihei, 1997). Though early papers on using VR in therapy generally mention the Japanese sand-tray study, they also note that the research did not meet the standards of a clinical trial in legitimate Western medicine (e.g. Lamson, 1997; Max M. North, North, Coble, Pyle, & Wilson, 1996; Rothbaum & Hodges, 1999). In the West, however, clinicians interested in VR were beginning to find one another and coordinate the practices that would help to establish their field as a legitimate scientific practice. The late-1990s saw the first formal studies of the use of VR in therapy, the first conference meeting dedicated explicitly to the use of VR in mental health care, the opening of the first company dedicated to designing and providing VR therapy, and the publication of several scientific reviews of the field that both established its existence and viewed its progress with optimism (Glantz, Durlach, Barnett, & Aviles, 1997; North, North, & Coble, 1997; Riva, 1997; Rothbaum & Hodges, 1999; Wiederhold & Wiederhold, 1998).

The year 1996 was particularly momentous in the history of VR in psychotherapy. That year saw the convergence of the first medical conference on mental health and VR, dubbed Cybertherapy. The meeting was held within the Medicine Meets Virtual Reality

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[114] Sand-tray/sand-box therapy is a technique often used for therapeutic work with children. Therapy is conducted in a room with a sand box and multiple shelves of figurines. Which figurines the children choose to represent themselves, their family, and other significant people in their life, as well as how they play with the figurines provide fodder for the therapists to interpret. The technique is used both to diagnose mental illness and as a meditational technique for working through trauma. Sand trays are also used in therapy for PTSD, especially with children who have experienced sexual abuse.

conference in San Diego. MMVR was the first major conference dedicated to the use of VR in clinical practice. During the 1990s, MMVR had become an important trading zone for clinical and technological researchers interested in the field, as well as entrepreneurs, military leaders, and government officials interested in staying on the cutting edge of technological development. Showcased work included co-organizers Richard Satava's surgical simulators, which allowed surgeons to practice without expensive corpses, and Walter Greenleaf's virtual reality prosthetics for the physically disabled. VR therapy emerged as a subfield of this larger movement to apply VR to medicine and health care.

Brenda K. Wiederhold, the organizer of the Cybertherapy conference, was the wife of MMVR co-founder and physician, Mark Wiederhold. As both a therapist and medical technology entrepreneur, she saw the Cybertherapy meeting as an opportunity to share ideas and create a community of experts qualified to peer review one another's work. This would be crucial to the development of two more Wiederhold projects, the journals *CyberPsychology and Behavior* and *Cybertherapy and Rehabilitation*, both published through the non-profit wing of their enterprise, International Association of CyberPsychology, Training, and Rehabilitation (iACToR).[115]

Wiederhold invited researchers with diverse ideas about how to use VR in therapy to present at the first Cybertherapy meeting, subtitled "Future Tools for Transforming Medicine." Some of these researchers emphasized the "Future Tools" aspect of the

[115] The Wiederholds would go on to become major players in the development of VR therapy as subfield of medical VR. Around 2000, they opened The Virtual Reality Medical Center in San Diego, among the first psychotherapy clinics specializing in VR-based techniques. VRMC was one of the three original VR PTSD applications given grants by the Office of Naval Research in 2005.

meeting title. They offered visions of how VR might enhance their practices, but did not actually have working prototypes to demonstrate. Often, these visions were not feasible given the current capabilities or cost of VR systems. As cataloged in the CyberTherapy conference archives, Kalman Glantz, a Boston-based psychotherapist and his collaborators at MIT presented on possible uses of VR in therapy if the technology advanced according to the future of VR promised by technovangelists, including treatment of fear of intimacy, exploration of childhood memories, promotion of marital satisfaction and bonding (see also Glantz, Durlach, Barnett, & Aviles, 1997). Likewise, Dr. Ian Alger of the New York Hospital and Cornell Medical College imagined a version of couple's counseling in which the therapist would join the couple in a virtual representation of their home or other locale:

> the opportunity of moving into the virtual world which represents the couple's own environments, or of moving into environments that are entirely new could provide an extraordinary opportunity for the therapist to collaborate in authentic and unanticipated therapeutic scenarios not other [sic] available. (Wiederhold, 2005, p. 9)

At the time the VR field was nowhere near being able to realistically render individual homes inexpensively and quickly enough to warrant the creation of such environments for the average middle-class couple seeking counseling. Neuroscientists and engineers presented research on neuro-psychological response to virtual environments that did not yet have therapeutic applications. Reflecting upon this time period, Wiederhold notes in the introduction to *Virtual Healers* that she and other early innovators in the field were largely working conceptually and dreaming of possible uses for the technology (Wiederhold, 2007).

Only six presenters did have working systems and even initial clinical data. Giuseppe Riva from the Applied Technology for Psychology Laboratory in Intra, Italy, presented a preliminary study on using VR to create novel bodily experiences in order to treat eating disorders and distorted body image. Dr. Dorothy Strickland of North Carolina State University described two case studies using VR to create customized learning environments for children with autism.

Three of the six presentations at CyberTherapy that presented clinical data were given on the use of VR to treat phobias. Hodges presented his and Rothbaum's work on VRET for fear of flying. Max North, a computer science researcher at the Clark Atlanta University, presented, "The Use of Virtual Reality Technology in the Treatment of Psychological Disorders" in which he described the application of "Virtual Environment Desensitization" to fear of both heights and flying. Dr. Ralph Lamson, a psychologist at Kaiser Permanente Medical Group in San Rafael, California, presented "Clinical application of virtual therapy to psychiatric disorders: theory, research, practice" which described his successful treatment of acrophobia using a VR system.[116]

Phobias are defined as irrational or exaggerated fear responses to stimuli. One of the most well-established findings of behavioral psychology[117] is the ability to create or eliminate associations between stimuli and responses through repeated exposure. This is called "classical conditioning." Therefore, the capacity to control diverse stimuli

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[116] Though she did not present, shortly after the conference Brenda Wiederhold completed her Ph.D. in clinical psychology at UCSD with a dissertation testing the efficacy of VR in treatment of phobias using the system developed by Hodges and Rothbaum.

[117] Behaviorism is founded on a conception of all behavior, including psychological pathology, as fundamentally a response to the environment.

presented to a subject is an extremely valuable tool for the behavioral treatment of phobias. Indeed, many figures in the history of clinical VR have compared it to the operant conditioning chamber, a tool developed by the eminent scientist of behavioral psychology, B.F. Skinner, for presenting a limited number of controllable stimuli to a test subject.[118] For example, at the first Cybertherapy conference, Hans Sieburg of the Laboratory for Biological Informatics and Theoretical Medicine at UCSD presented on "the Skinner-Engine," which he called "a general instrument for behavior modification" (Wiederhold, 2005, p. 15). Rizzo, the inventor of Virtual Iraq affectionately refers to VR—once imagined as "the ultimate display" for its ability to present—as the "ultimate skinner box" (Rizzo et al., 2010, p. 116).

Like many influential inventions including the typewriting machine, the telescope, and color photography, VR-supported therapy for phobias was a case of simultaneous invention. Instances of simultaneous invention are informative because they point to a cultural zeitgeist. However, comparing different versions of a simultaneous invention can also help us to understand how technologies and their use reflect cultural contexts of their creation, including the ideological commitments of their inventors. In the next sections, we will see how these researchers on opposite sides of the United States came see VR as the right tool for the job of treating phobias and other anxiety disorders.

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[118] The operant conditioning chamber was a space, ranging in size from a small box to a room, wherein a researcher would be able to exercise control over a variety of stimuli, such as neutral stimuli, rewards, and punishments. These could be delivered to a subject inside the chamber in relation to his or her behavior. This made it a powerful tool with which to conduct rigorous behavioral research. For an excellent history of the operant conditioning chamber and its legacy in psychology, see Alexandra Rutherford, *Beyond the Box: B.F. Skinner's Technology of Behavior from Laboratory to Life, 1950s–1970s* (2009).

The Origins of VRET for Phobias in Atlanta

According to their book, *Virtual Reality Therapy: An Innovative Paradigm*, Max North and his colleagues at the Human-Computer Interaction Group serendipitously discovered the therapeutic potential of VR at Clark Atlanta University in November 1992 (North et al., 1996). North's team was working on a flight simulator project in collaboration with the U.S. Army Research Laboratory and Boeing (Wiederhold, 2007, p. 163). The project, called "flying carpet," allowed the user to "fly" through a virtual scene presenting an aerial view of a city as a result of stepping in the direction of flight (North et al. 1996, p. 5). A 32-year old female team member began to experience feelings of severe dizziness, sweating, shaking, and stomach pain when she activated the flying motion in the simulation. She and the team believed that this was not merely "simulator sickness," [119] but rather was explained by the team member's aviophobia.

North and his colleagues decided to experiment on their team member. They had her visit the "flying carpet" again several times a week for the next several weeks, and noted that she continued to experience real anxiety. Next, they recruited university students to participate in an experimental eight-session trial based on systematic desensitization therapy, a common behavioral phobia treatment. North called the technique "Virtual Environment Desensitization." To monitor subjects' reactions, they used Wolpe's Subjective Units of Disturbance Scale (SUDs). Though navigation in the

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[119] Cybersickness is a condition wherein one experiences nausea and headache produced by the disjuncture between the visual information and proprioceptive information they are receiving about their body's motion. It is similar to carsickness. Michael Heim has an interesting discussion of the metaphysics of cybersickness in *Virtual Realism* (Heim, 2000).

virtual environment was under the erstwhile patient's control, they directed subjects to stay in the environment until their SUDs dropped to zero, which took an average of 30 minutes.

While North traces his work with VED through a lineage of behaviorist psychology including John Locke, John Watson, B.F. Skinner, and Joseph Wolpe, he explains in his book that as he worked with VR he came to resist he idea that existing behaviorist practices could explain his success. "VED is neither a simple desensitization technique, nor an exposure therapy" (p. 4). Instead, "intuitive observation" of subjects so immersed in the virtual world that they did not communicate with their therapist led him to believe that "more than desensitization was at work." He hypothesized that they were not only experiencing the anxiety associated with heights or flying, but were actually reliving previous anxiety-provoking experiences while immersed in VR (p. 9). He therefore gave the practice a new name to better reflect the central role played by VR: "Virtual Reality Therapy" (VRT).

North surmised that cognitivist theories such as Bower and Lang's neurophysiological information processing theory (Bower 1981; Lang 1977, 1979), Francine Shapiro's accelerated integrative information processing paradigm, or Foa's and Kozak's emotional processing theory may help to explain VRT. North goes on to suggest that VRT actually confirms the cognitivist approach to understanding and intervening in the mind:

> Disturbing memory is stored by a picture, cognition, affect, and physical sensations. VRT reveals that these factors are stored by association and linked together. VRT appears to activate the visual memory, in case only visual stimuli are presented, and in turn activates other related memories and experiences such as cognition, affect, and physical sensation.

He goes on to remark, however, that "at this time there is no concrete or empirically based evidence to explain why and how VRT works" (p. 10).[120]

Though North had gained tenure in the department of Computer and Information Science in 1989, his VRT work inspired him to pursue a second Ph.D. in counseling psychology at his university.[121] He completed this degree in 1995, with a dissertation titled, "Effectiveness of Virtual Environment Desensitization in the Treatment of Agoraphobia in a College Student Population." However, the only salient mention of working with a therapist in his book occurs when North describes testing the group's hypothesis their team member's ability to face heights after VED/VRT would transfer to the real world.[122] In contrast, the group pointed to their technical sophistication through detailed description of their VREAM, Inc. software development package, which they note as the most impressive VR system currently available.

From Intuitive Observation to Clinical Trial

North was eager to explore the extent to which VRT could be applied to other phobias and anxiety disorders. In late 1992, he approached well-known VR researcher

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[120] Like Myron Krueger before him, North saw VR as providing "a link between the reality of the client and the objective world" (ibid, p. 10). And like the early innovators of VR, he believed that "Virtual reality augments learning with experience": "The most direct and compelling benefit that immersion offers to the cognitive interpretation of the world is a reduction in conceptual load because of the simplifying directness of perception of the virtual world" (ibid, pp. 33–34).

[121] Concentration: Human-Computer Interaction (Virtual Environments, and Cognitive & Behavioral Science)

[122] Accompanied by a therapist, the team member went up in a helicopter over the Gulf of Mexico for ten minutes. After that, they sent her parasailing. On both occasions she described experiencing less anxiety than in previous flying experiences, but it's not clear what role the therapist played in either instance.

Larry Hodges, director of the Graphics Visualization and Usability Center at the Georgia Institute of Technology with the idea of working together to create a VRT application for treating fear of public speaking (quoted in Wiederhold, 2007, p. 82). Hodges was skeptical of North's vision of VRT as the "new paradigm" for therapy, and in particular the idea of using it to treat fear of public speaking. At the time, Hodges' was investigating the role of stereoscopic displays in task performance, working with human factors experts and perceptual psychologists to study what it would take to make them effective for various applications (ibid, p. 84). Twenty years later, the creation of believable humanoid agents still remains at the leading edge of artificial intelligence and VR research. He told North that his computers were not powerful enough to render humanoid agents that would be believable enough to provoke anxiety in someone with fear of public speaking.

Hodges' reconsidered his position after discussing the idea with his brother-in-law, Jim Williford, an Army psychiatrist. Unlike North, Hodges held a conservative position with regards to creating VR applications: he was interested in figuring out how to make the technology work, not in foisting a "VR solution" onto the problems of another field. He would only work on a VR project for another field if a legitimate and competent practitioner convinced him that it might contribute something uniquely worthwhile. North was in luck: Williford was enthusiastic about the idea of using VR as an alternative modality for conducting exposure therapy with phobic patients. Williford explained that exposure therapy was the best treatment available for phobias. This is a technique developed in the 1960s in which the therapist directs the patients to imagine the

object of their fear or to confront it *in vivo.* The goal of is to extinguish anxiety through extended exposure to the feared stimulus in an otherwise safe context.

However, there were barriers for performing many forms of exposure therapy: First, it is difficult to get a patient to imagine scenarios that cause anxiety. In some cases, the therapist will describe these in great detail in the hope that the patient will be compelled to visualize the narration. Second, *in vivo* exposure has limitations, including the need to either leave the office to confront feared situations, which can take up time and potentially compromise patient confidentiality, or to store objects of phobia—such as live spiders and snakes—in the clinician's office.

"We just needed to focus it on the right phobia," recounts Hodges. He and Williford discussed what *could* be rendered most effectively with the available technology. Hodges' group at the Georgia Tech had been working on architectural modeling projects, a common use of 3D graphics at the time, and had created VR models of the area around Georgia Tech using polygons to represent geometric spaces. Knowing this, the two independently came up with the idea of treating fear of heights (Wiederhold 2007, p. 82).

In addition to the technical feasibility using VR to create illusions of spatial depth, another advantage of focusing on fear of heights is that it is both common and often generalized. While many forms of therapy are individualized, focusing on specific details of patient's lives, Hodges hoped that a single virtual environment could be designed to study the treatment of many acrophobics using VR without significant customization. This would allow his research team to design a clinical trial that would establish the effectiveness of the tool for the job of enhancing behavioral treatment of fear of heights.

Treating fear of heights was also interesting to Hodges because he had been studying how to design virtual environments that would generate a sense of presence. Studying VR in phobia treatment offered an opportunity to investigate the technical parameters necessary to trigger anxiety, or even if such an effect were possible to achieve at all. Williford convinced Hodges that clinical work may actually be a holy grail for VR work: a practice that could benefit from the use of a controllable, telepresence-creating media system.

Hodges decided to apply for a grant. Pursuing phobia work was a risky choice for his research career that required him to drop another project on 3D visualization. However, he took steps to minimize this risk. Knowing that he was neither qualified nor competent to design a clinical trial and that such accreditation would be necessary for promoting any positive results in the medical community, he enlisted Williford's help in finding a credentialed behavioral therapist with experience conducting phobia treatment studies. The grant Hodges had in mind required collaboration between at least two universities in Georgia, so Williford contacted the psychology department in nearby Emory University. They put him in touch with assistant professor of psychiatry and clinical psychology, Barbara Olasov Rothbaum, an expert in anxiety disorders.

Rothbaum turned out to be an especially auspicious collaborator for the VR project. Trained during the 1980s, Rothbaum was involved in the cognitive-behavioral psychotherapy movement, which sought to bridge the scientific rigor of behaviorist psychology research with the attention to mind and meaning that most practicing

psychotherapists felt was necessary for the treatment of complex psychological disorders like PTSD.[123] Not only was she an expert in the behavioral treatment of anxiety disorders, but she was also a protégé of Edna Foa, the co-author of the emotional processing theory of anxiety disorders and creator of prolonged exposure therapy for PTSD. Though still early in her career, she had already co-authored influential theoretical papers advancing cognitive-behavioral approaches to anxiety disorders and had been working to establish the validity of these theories through clinical studies. Therefore, she was someone with both the cultural knowledge and experience to have her research taken seriously by other clinicians, even when it involved a seemingly outlandish technology.

Rothbaum did not know anything about VR at the time and asked Hodges to fax his curriculum vitae to her so that she could verify that he was a legitimate researcher. As someone dedicated to re-establishing clinical psychology as a science, she was both intrigued by the prospect helping the field to join other medical fields in the use of high-tech clinical tools, but also wary about wasting her time on someone looking to foist unnecessary devices on her field.

After meeting him and Williford, she agreed to join their study as the administering clinician. Importantly, she also took on a collaborative role on the

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[123] The 1970s had also been an important time in undermining the legitimacy of psychiatry (and clinical psychology) as fields, due to a variety of scandals. The period after 1980 was one where scientific researchers were trying to re-establish the legitimacy of their field by implementing rigorous scientific practice and theory grounded in the new cognitivist principles made possible by the advent of information theory and computer modeling (Gardner, 1985). Also, using definitions from the new Neo-Krapelian DSM, which used algorithms to make diagnoses in a standard way—having standardized diagnoses was also really important for being able to do the kind of work that would establish treatments as empirically supported.

technology side of the project by helping them to design the VR system they would use in the study in a way that would make it as useful as possible for her as a clinical tool. Rather than use North's flying carpet program, the team designed three environments that would allow Rothbaum to expose subjects to increasingly distressful scenarios over the course of several sessions, gradation that she felt was necessary to successful treatment. The first of the environments was a canyon with a river flowing across the bottom of it. Across this canyon were three footbridges, rendered to appear to be seven, 50, and 80 meters above water. The second environment was a building with outdoor railed balconies; the patient could be placed on balconies on the ground floor, second floor, 10th floor, and 20th floor. The third environment was a simulation of the glass elevator at the Atlanta Marriot Marquis convention hotel, rising 49 floors up to 147 meters. These environments were low-resolution digital spaces created through the arrangement of polygons patterned with simple textures.

Though interactivity was a buzzword in human-computer interaction, Rothbaum requested that the systems be designed to emphasize clinician control. Patients would be able to navigate the environment using a head-mounted display with head-tracking and a joystick, which would allow them to walk across the bridges or look over the balconies. They could also control the rise and fall of the elevator by using buttons on the joystick, but which balcony or bridge the patient was on would be controlled by the therapist at the computer terminal.

The researchers from Georgia Tech, Emory, and Clark Atlanta came together with support from the U.S. Army Research Laboratory and Boeing Computer Services to create "the world's first known active Center for the Use of Virtual Reality Technology

to Combat Psychological Disorders" (North et al. 1996, p. 4). In 1993, the center began its first clinical trial using the new fear of heights VR system. The team enrolled 20 college students of which 12 got VR exposure and eight received no treatment. Each patient in the VR group met with clinical psychology graduate student for seven weekly sessions lasting 35–45 minutes, which they reported was needed for anxiety reduction.

Though the group reported great success overall in reducing their patient's anxiety, in the published report they noted several problems with the design of their study including the lack of a treatment comparison group, absence of follow-up data, and no formal assessment of phobic avoidance. However, the purpose of clinical trial was not to establish that VR had a unique capacity to treat acrophobia. Rather, the goal was to establish that it could offer another media *modality* for introducing fear-inducing stimuli in exposure therapy. The concept of exposure therapy did not itself need to be proven as it was already considered a common, effective, and often permanent treatment for fear of heights. According to Hodges,

> So we didn't know if you were afraid of heights in the real world, that you would also be afraid of heights in virtual reality. It could be that the first patient would stand, get in, and look around and say, 'This is not real. I'm not scared.' We didn't know if you got better, and habituated to virtual heights, if it would carry over to the real world. So, all of those were open questions when we decided to do this. It was very exciting, especially when the first patient got into the virtual environment and really was anxious. That was like a big moment because until then for all we knew we were wasting our time. (quoted in Wiederhold, 2007, p. 83)

Emphasizing that VR was being used to modify the existing practice, not to create a novel therapy, the team chose not use North's term "virtual reality therapy" in their papers, but rather "virtual reality graded exposure therapy."

Though they did not credit VR itself with alleviating the students' acrophobia, the researchers did list several benefits of using VR in exposure therapy over extant modalities. For example, patients would not have to leave the therapist's office in order to be exposed to relevant stimuli, such as real glass elevators or tall buildings, a practice that can be both time-consuming and possibly embarrassing for the patient. Overall they argued that the use of VR "potentially offer[ed] more control over exposure stimuli" (Rothbaum et al., 1995). They also reported that seven of the students in the VR group decided to confront heights on their own, between sessions, even though not instructed to do so. They surmise that the experience with the virtual may have encouraged these subjects to try the "real" thing.

In 1993, they submitted their article on this acrophobia work to the *American Journal of Psychiatry*, the official journal of the American Psychiatric Association, the largest and most prestigious association of professionals working in the psy disciplines. Unlike their predecessors, Rothbaum and Hodges were committed to using the infrastructure of mainstream scientific psychology in order to validate and legitimize their work: a lesser venue would not have served this goal. In spite of their conservative approach, mainstream psychology was not quick to accept their results. The journal held onto the article for nearly two years while the editors evaluated its merit. During this period, the editors stonewalled the Atlanta group from writing a press release about their study and prevented NBC from running a story on it until they officially agreed to publish the article. Eventually, they did, publishing it as a short report in the April 1995 issue of the journal. Reflecting on this experience, Hodges commented that, "A lot of people thought this is not real" (personal interview).

But many others did. After the study was published not only NBC but many other news organizations ran stories on it, leading Georgia Tech to assigned a public relations person to Hodges' lab to field media calls. Not only was the media interested in the work: people suffering from phobias began calling to ask where they could receive VR therapy. Therapists called asking where they could be trained in using VR with their patients. At the time, the answer to both questions was "nowhere"; or rather, only within the constrained conditions of center's laboratory. Hodges and Rothbaum decided that their paradigm was worthy of dissemination and in 1996, no longer collaborating with North, they started a company in Decatur, Georgia, which they named Virtually Better, Inc. The company would be staffed mainly by Hodges and Rothbaum and their talented students in computer engineering and clinical psychology.

Like North, once she saw the value of VR in treating fear of heights Rothbaum wanted to branch out into other anxiety disorders, such as claustrophobics and agoraphobics.[124] Once the acrophobia study established the proof of concept of replacing *in vivo* exposure with VR, Rothbaum asked Hodges if he and his team would create a virtual environment that she could use to treat aviophobia, fear of flying. Unlike fear of heights, which can be treated at any tall platform, fear of flying presents several logistic challenges to therapists using an exposure therapy model: It is expensive, requiring both the patient and therapist to take multiple airplane trips. It is time consuming, requiring

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[124] "Virtual reality also appears applicable in the treatment of other anxiety disorders in which exposure-based treatments are recommended," they wrote in the conclusion to their first paper (Rothbaum et al., 1995, 628).

travel to the airport, security check, take off, the duration of the flight, landing, and travel back home. Also, it does not allow the therapist to focus the exposure on the aspect of flying that causes the most anxiety: many people are only afraid of one aspect of flying, with most either fearing crashing during turbulence or during landing. Because of these challenges, many therapists refuse to use *in vivo* exposure therapy techniques for fear of flying. If VR-based exposure proved as effective in extinguishing fear for aviophobics as it had for acrophobics, Rothbaum would be able to greatly increase the number of people with access to exposure therapy.[125]

Hodges and his team came through, not with a mere flight simulator, but with a system that could simulate a trip on a commercial airplane, wherein the therapist could control the most-anxiety-producing elements of flying, such as turbulence, weather, and repetition of take-off and landing. Rothbaum reported that though they only took out a tiny text-only advertisement in a local newspaper, she was overwhelmed by the number of people who volunteered for the study—which is very uncommon for clinical trials.[126]

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[125] Therapy for this population was clearly in very high demand. According to Rothbaum, the study was uncommonly easy to recruit for: they were able to get all the participants they needed only by posting a tiny text-only advertisement an Atlanta newspaper (personal interview, Nov. 2012).

[126] They described the major stages in development as the "creation of a visual model of the passenger cabin of a commercial aircraft, creation of an environment for the aircraft to fly through, design of the control sequence software for the different stages of an airplane flight, and design of sound effects. To be convincing, the airplane model must be built to the proper general size and scale to match that of a real passenger cabin of a commercial aircraft. Details such as the fabric texture and color of the seats, proper location of seatbelt signs, aisle width, and window locations are important to providing an appropriate look and feel of being in a real aircraft. Therapy also requires the creation of a world for the aircraft to fly in that can be viewed through a window of the aircraft by the passenger. For the stages when the plane was parked, taxiing, taking off, or landing, a runway and airport model with various types of buildings and scenery are

The same year that they opened Virtually Better, Inc., Rothbaum conducted what was now simply called "virtual reality exposure therapy" with a 42-year-old woman with a debilitating aviophobia by simulating a trip on a commercial airplane and published the case study in the journal *Behavior Research and Therapy* (Rothbaum, Hodges, Watson, Kessler, & Opdyke, 1996). In the report, they note that fear of flying is a strategic choice for VRET, not only for the reasons stated above, but also because the airline industry loses a lot of potential revenue—not a small concern for people living in Atlanta, the hub of Delta airlines and several major commercial airline flight training schools.[127] Addressing the perceived high cost of VRET compared to convention therapy, they point out that, "After the software is written and the equipment is purchased, a computer-generated airplane, for example, will be much less expensive, more convenient, and significantly safer than using a real airplane" (Rothbaum & Hodges, 1999, p. 517).[128] They also rhetorically tame the exotic image of VR by comparing it the use of flight

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needed. As the aircraft gains in altitude and distance from the airport, the surface of the earth is represented by texture maps from aerial photographs. Clouds and other features in the sky must also be simulated. … The passenger's view from the window can vary considerably with time, altitude, and weather conditions. Additional variables are introduced by the needs of the therapist and the patient when conducting therapy. An entire therapy session may consist of only taxiing about the runway without ever actually taking off. Several flights in good weather may be required before the patient is ready to flying in a thunderstorm. The VE must simulate the sequence of events of a real flight and also allow a degree of flexibility to quickly vary conditions and duration of events in response to the needs of the therapy session" (Rothbaum & Hodges, 1999, p. 518).

[127] After 9/11 airport security was tightened, and it became difficult for therapists conducting *in vivo* exposure therapy for patients with fear of flying to accompany them to the airport.

[128] They do not, however, take into account additional costs that incurred through the additional training, maintenance, and updating of the system when the technology becomes obsolete.

simulators to train pilots (a strategy that Rizzo would later adopt in promoting his own system).

Alternative Paradigms: The Case of "Virtual Therapy"

Before we turn to how Rothbaum and Hodges moved from phobia work to PTSD, it will be instructive to examine an alternative paradigm of VR-based phobia treatment. At the same time that the Atlanta group was conducting what it believed to be "first controlled study of virtual reality in the treatment of a psychological disorder" (Rothbaum et al., 1996, p. 626), across the country in San Raphael, California, Dr. Ralph Lamson was developing his own VR therapy for phobias. Like Max North, after the Cybertherapy conference Lamson published a book claiming his discovery of the therapeutic potential of VR.[129] Indeed, Lamson actually holds the U.S. patent on the use of VR in behavioral medicine and has opened a lawsuit against the U.S. government for copyright infringement in funding PTSD VRET projects.[130] In practice, however, Lamson's work on "virtual therapy" work employs a different form of therapeutic mediation from those employed in VRET projects like Virtual Iraq.

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[129] Though they acknowledge one another's work in their books, they each see the other as lacking scientific rigor. However, neither turns down the opportunity to cite the other's work as evidence of the growing interest in the field by the therapeutic community. North remarks, for example, that, "The successes attest to the fact that the new paradigm of VRT is so solid and powerful that the lack of procedural knowledge of the therapy does not significantly effect the outcome of the therapy" (North et al. 1996, 9).

[130] United States Patent number 6425764, Virtual Reality Immersion Therapy for Treating Psychological, Psychiatric, Medical, Educational, and Self-Help Problems. Filing December 12, 1997 and issued July 30, 2002 (Lamson, 2002). The lawsuit was filed with legal aid from the Bruce E. Burdick law firm of Alton, Illinois.

Lamson, a psychologist specializing in chemical dependency treatment at Kaiser Permanente Medical Group discovered the therapeutic potential of VR at a technology exhibition in San Jose (Lamson, 1997). There, he took part in a common VR demo, a simulation of being on a tall building. Atop the virtual building, Lamson found himself anxious with acrophobia. Later, he told a journalist from the *LA Times* that by reminding himself that he was safe he was able to confront his fear, and had managed to cure his fear of heights before leaving the exhibit hall (Stevens, 2005).

After curing himself, Lamson began a study to see if he could cure others. While North had called his discovery "virtual reality therapy," Lamson preferred the term "virtual therapy." In the book of the same name, Lamson explains his rationale, "The term 'virtual therapy' is used because treatment occurs when patients are visually immersed in a virtual environment, which is a context for healing" (Lamson, 1997, p. 39). During virtual therapy he immersed acrophobic patients in 30-minute sessions in a scenario resembling a café, from which they could walk out a door that led to a patio, then to a bridge. Despite the surreal nature of the environment, Lamson writes that most of patients in his office found that the environment felt real enough to trigger phobic anxiety, as his own first VR demo had: "Some people don't want to go out the door at all," Lamson told the journalist. "When they do, they wobble, spread their arms for balance, shake, or cry" (Stevens, 1995).

Like North, Lamson took pride in describing his sophisticated VR system: while he began his work using a borrowed Provision 100 DIVISION Inc. VR system, he later switched to a Silicon Graphics' SGI Maximum Impact, which he says is the most desirable technology for virtual therapy research, because its compactness is compatible

with a clinician's limited office space (Lamson, 1997, p. 92). Lamson also used biometric monitoring devices to mediate communication between himself and his patients. Heart rate and blood pressure monitors served to visualize their physiological experiences while navigating each stage of the virtual therapy scenario, adding to the information he garnered from their subjective reports of distress. These also allowed him to evaluate the effectiveness of the self-calming techniques he taught his patients at the beginning of the virtual therapy session.

Whether due to his theoretical orientation or lack of funding, Lamson did not develop additional virtual environments for other treatment populations. Instead, he tested whether his one virtual environment could be used to create "virtual success" experiences that would be helpful to other patient populations, such as his own chemical dependency patients. There is no evidence that Lamson allied with engineers or computer scientists in either his studies or his company. His failure to enroll researchers interested in advancing the field of VR may be another reason why he only had the one environment to work with.

Though he acknowledges Hodges' and Rothbaum's work, Lamson claims that it was in fact he who conducted the first randomized clinical trials using VR for acrophobia from 1993 to 1994. Repeating the limitation the Atlanta group had themselves enumerated, such as their lack of a follow-up appointment and therapeutic control group, Lamson points of that his own study included three control groups, one receiving cognitive therapy without VR, one receiving medication to calm their fear of heights, and

a waiting list group, as well as a follow-up appointment (p. 72).[131] He also critiques their unexplained use of eight sessions. In contrast, he found great success after only one—a more economical and convenient approach for an already cash-strapped medical field.

Lamson believed not only in the empirical force of his work, but its theoretical strength. Like others, he saw VR as a valuable research tool for medicine, marking "a shift from unproved therapeutic endeavors largely supported by personal beliefs to practice founded on scientific investigation" (Lamson, 1997, p. viii). Although Lamson patented his work as "VR for *behavioral* therapy," not like North, Lamson reports seeing VR as more than a simple aid to exposure and draws on cognitive theory to explain its effectiveness, arguing that, "Virtual therapy is the first approach to formulate the use of technology with cognitive principles" (p. 64).[132] Lamson crafted his approach drawing mainly from cognitive experimental psychologist Albert Bandura's theoretical work on self-efficacy. [133] Virtual therapy, he argues, "gives the user an opportunity to experiment

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[131] Lamson notes that, "Newspaper advertisements requesting fear-of-heights volunteers did not identify treatment interventions. However, an article about the study later appeared in a local newspaper. The article may have contributed to selection bias for those seeking 'novel' treatment" (Lamson, 1997, p. 67).

[132] Unlike members of the Atlanta group, in describing his research, Lamson acknowledges that other media had previously been used as aids to exposure, such as those described in Aaron T. Beck's and Gary Emery's influential book *Anxiety Disorders and Phobias: A Cognitive Perspective* 1985 (Beck & Emery, 1985, p. 93).

[133] Bandura, the originator of social learning theory, was instrumental in the move from behaviorism to cognitivism, as well as one of the most cited psychologists of all time. Bandura was one of the first experimental psychologists to openly posit internal phenomena like mental imagery. Whereas behaviorism saw organisms as shaped by environment and psychoanalysis saw them as driven by inner impulses, Bandura saw organisms as self-regulatory in the relationship of reciprocal determinism with their environment and believed that the popular behaviorist model of reward and punishment was inadequate because humans learn so much about behavior from one another.

with thinking" by allowing them to observe, challenge and change beliefs about their own efficacy (p. 39). He suggests that VR is a unique modality for therapy because the control and simplicity of virtual environments gives users more "time to think and evaluate the situation" (p. 42).[134] The goal of therapy is not to habituate patients to distress, but rather to produce "virtual success" experiences that gave the patient generalizable feelings of self-efficacy.[135] In contrast to his own well-developed theories of virtual therapy, Lamson charges the Atlanta group with conducting research "without a theoretical formulation or research hypothesis" (p. 72).

The cognitivist orientation of his work may have undermined acceptance from the clinical research community that still largely favored approaches that were primarily behaviorist in orientation. While Lamson believed in the scientific superiority of his approach over the Atlanta group, he violated the norms of the academic research community in several ways that also undermined his legitimacy as a researcher. While Rothbaum conservatively based her VRET method on a well-established practice of therapeutic mediation, Lamson felt that VR could help establish the efficacy of a truly unique cognitivist method. However, by insisting that he had created a novel form of

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[134] A strange quote from Lamson's take on this is worth checking out, because of its reference to science fiction. "Difficulty in learning may exaggerate fears concerning limited skills. Feelings of self-worth diminish when sense of usefulness decreases. This theme is illustrated in 'Johnny Mnemonic,' a film based on a William Gibson book in which the derogated underclass is identified as 'low-techs'" (Lamson, 1997, p. 14).

[135] Lamson does not pass up the opportunity to quote the eminent researcher's then newly-minted 1997 book *Self-efficacy*, wherein Bandura mentions using VR in order to create "mastery-oriented treatment of some types of phobic dysfunctions. Rather than coping with threats, phobics manage progressively more threatening aspects in computer generated environment" (Bandura, 1997, p. 331–32, quoted in Lamson, 1997).

therapy rather than developing a tool for conducting an established therapy, Lamson may have encountered pushback from the mainstream clinical psychology community, which would have then held the device to much higher standards.[136] Referring to VR as "merely a tool" may have also helped to avoid drawing the ire of traditional therapists who could feel threatened by a technological imposition on their labor.

Lamson also first published his work in the VR trade journal, *CyberEdge*, rather than a scientific research journal. Though Hodges' and Rothbaum's early papers acknowledged Lamson's work, they discount its validity because of where it was published. While Lamson establishes his virtual therapy's therapeutic efficacy both through accounts of his patients calling him to describe their new fear-free lives as well as graphs showing the change in patients' heart rate over the course of therapy, he frequently eschewed the sobriety of scientific discourse. For example, he displayed a penchant for poetic turns of phrase, such as "With eyes concealed from the outside world, an individual begins a journey unlike any other" (p. 9). While the Atlanta group published the results of their clinical trials in the established formats of single case studies and statistics, Lamson's book includes nine detailed case studies, with each patient described as having a unique combination of factors that trigger their fear—for example, a patient who is afraid only when standing above land, never water—

[136] Note the rhetorical object agency in Lamson's description of what VR contributes to therapy: "When people perceive depth and manifest a fear of heights, both the visual system and personal experience are engaged. […] Virtual therapy interventions provide direct access to the brain through the retina. Virtual environments are contexts in which rapid learning can occur through sensory stimulation. Virtual therapy is a promising form of therapeutic intervention where direct assessment of patient responses to sensory input are evaluated. Levels of stress are observed and then diminished by effective virtual therapy interventions" (p. 35).

originating from their distinct, personal traumatic experiences and coping mechanisms. This may have turned off more researchers looking for generalizability and reliability in results.

In retrospect, Lamson's failure to create a scientific legacy seems over-determined. Despite his patent, Lamson is underrepresented in scientific accounts of the history of VR therapy. Unlike both North and Lamson, Wiederhold does not include Lamson among the 20 pioneers of VR therapy interviewed for *Virtual Healers*. And while he claims to have started a VR therapy company, Virtual Therapy, Inc., I could find no record of this business online. In contrast, Virtually Better, Inc. has a recently updated website and continues to develop projects and treat patients.

VRET for PTSD: Virtual Vietnam

Virtual Vietnam was Rothbaum's and Hodges' third major project, which they began shortly after the aviophobia work. This was an important turn for Rothbaum, who had been specializing her research and practice in developing and studying prolonged exposure therapy modalities for PTSD since 1986. In her theoretical work, she and her mentor had posited that PTSD derived from avoidance of fear provoking stimuli after a traumatic event, and therefore could be treated effectively with exposure therapy. Rothbaum had done most of her PE work with female sexual assault victims, however she and Hodges did not believe this population presented a good opportunity for VRET research. Though it would be technically possible to build virtual environments that would activate the fear structure in sexual assault victims, across patients, sexual traumas are too personal and take place in too many kinds of locations to facilitate the

development of a generalized, testable VRET system. As a non-paid employee of the Atlanta Veterans Administration Hospital, Rothbaum turned to the next-largest population of PTSD sufferers she worked with, Vietnam War veterans. Because of their shared experiences of combat in a foreign war zone, this population seemed much more adequate for VRET development.

Compared to sexual assault PTSD populations, veterans were considered much more difficult to treat with exposure therapy because their traumas involved more complex factors. Also, by the late 1990s, many Vietnam veterans had been suffering from and managing their PTSD symptoms for 20 years or more—so they may be less willing or able to actively remember their combat experience in the sustained, focused way required by exposure therapy. Rothbaum hypothesized that VR might help overcome these obstacles.

Virtual Vietnam was Larry Hodges' third VRET project, but as he began working with his team to design the system, he found that working on a PTSD VRET project was different from working on a phobia VRET project in several ways. Affectively, this project felt very different from designing virtual glass elevators and airplane cabins (personal interview). The stakes were more serious: the scenarios that they were creating were not irrationally anxiety-provoking, but rather represented scenes of real, painful experiences for their intended patient users.

Also, while both the VRET phobia projects and Virtual Vietnam were justified using an emotional processing model, there were important differences in the ways that PTSD and phobias are conceptualized within this model that had implications for the design of the systems. In an influential theoretical paper published in the journal

Behavioral Therapy in 1989, Rothbaum and co-authors Edna Foa and Gail Steketee of Boston University had proposed that while "it is tempting to view PTSD as a prototype for etiology and symptomatology of phobia" in that both are learned responses to stimuli associated with anxiety, there were several important differences that needed to be accounted for in treatment (Foa, Steketee, & Rothbaum, 1989, p. 156). Compared to phobias, PTSD involves more personal meanings that shape not only what a sufferer fears, but how they interpret and process that emotional experience. At the same time, it is more generalized than phobias in that people experiencing PTSD have more complex fear structures that cause them to respond to a greater array of stimuli.[137] While they propose that like phobias, PTSD can be treated through exposure therapy, they argued that in order to change the fear structure of someone with PTSD, it must be activated in its entirety: the more complex the trauma, the larger the fear structure, and therefore the more difficult to fully invoke. Therefore treatment for PTSD required full fear structure activation, and, subsequently, the design of the system would need to reflect this.

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[137] The authors critique the capacity of traditional behaviorist stimulus-response learning theories to explain the range of symptoms common to those suffering from PTSD. The authors raise three critiques of collapsing these categories: first, while anxiety responses to specific circumstances and stimuli are sufficient symptom profiles for phobia, they are insufficient to PTSD. Second, studies suggest that many phobics do not trace their anxiety to a specific traumatic event, while all PTSD sufferers do. Third, many PTSD symptoms like flashbacks, constricted affect, startle responses, and nightmares are uncommon among phobics (Foa, Steketee, & Rothbaum, 1989, p. 156). Instead, they propose emotional processing theory as an alternative because it includes "meaning concepts" in its formulation of the cognitive structures present in those with PTSD. The authors propose that whether or not a person will develop PTSD is predicted largely on the meaning of the traumatic event, including attitudes, values, and attributions, in particular, who the victim blames for its occurrence, themselves, others, bad luck, etc.

In order to make a clinically valuable tool, Virtual Vietnam, Hodges and his team had to figure out how to develop scenarios that would be evocative to many individuals with diverse fear structures. They began by researching what kinds of traumatic experiences had been common for Vietnam veterans. This proved surprisingly challenging: The Vietnam War had been over for more than 20 years, and many veterans had difficulty identifying specific scenes independently of the actions that took place within them. Eventually, the team identified several common scenes that led them to decide to construct three environments: the interior of a flying Huey helicopter, a jungle clearing, and a dense jungle. To design the environments, they interviewed Vietnam vets, watched Vietnam War news footage (though high quality film was hard to come by), and in some cases acquired video from veterans. Hodges and a student also went to the army base so they could measure and take video of a Huey helicopter.

The team succeeded in creating a virtual Huey helicopter ride and a jungle clearing with a few trees, rolling hills, and a swampy area. They ended up abandoning the dense jungle environment while it was still in the development phase. According to Hodges, "the technology wasn't there" to adequately render many trees as three-dimensional textured shapes close to the user (Hodges et al., 1999, p. 11). In order to make the system personalizable, they added more clinician-controlled features than had in previous versions. For example, the helicopter ride environment included options for flying over several kinds of terrain—including rice paddies, a river, mountains, thick jungle, and into clouds—as well as for take-off and landing. Additionally, the therapist could add the sounds of "out-going machine-gun radio chatter, incoming gunfire,

explosions, and yelling" (Ready, Pollack, Rothbaum, & Alarcon, 2006, p.207).[138] The therapist could also control the volume and duration of these sound effects.

However, while they had had a very easy time recruiting people for the fear of heights and fear of flying study, they found recruitment for this study very difficult. Reflecting on his experience, David Ready, one of the VA clinicians, stated that he believed both the patients and other clinicians in the hospital were skeptical about VR and so few patients were referred to the study (Ready et al., 2006). Another set-back in recruitment is that exposure therapy is not recommended for everyone with PTSD. In screening potential subjects, Rothbaum excluded those whose primary symptom profile was based on guilt, rather than the fear and avoidance issues that were central to her theorization of PTSD and its treatment (ibid).

The group began conducting clinical trials of VRET using Virtual Vietnam in 1997 (Rothbaum et al., 1999; Hodges et al., 1999). As in the phobia studies, the research question was not "Does exposure therapy treat PTSD?" but rather, "will the virtual environment be a safe, and effective exposure modality?" They especially wanted to know if Vietnam veterans found the environments to be accurate and evocative. Though the environments were relatively simple, featuring no animated characters or olfactory

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[138] The jungle clearing environment had the following clinician options: "Visual effects for the landing zone environment included muzzle flashes from the jungle, a bright flash with the sound of a land mine exploding, helicopters flying overhead, helicopters landing and taking off, helicopter blades starting and stopping to rotate, darkness, and fog. The available audio effects for this environment included jungle sounds such as crickets, distant gunfire and explosions, enemy machine-gun fire, helicopters, mortars being launched and landing, rocket explosions, land mines going off, sloshing sounds in the swampy area, screaming, and male voices yelling 'Move out! Move out!'" (Ready, Pollack, Rothbaum, & Alarcon, 2006, p. 207)

stimulation, the researchers found that even veterans without PTSD had strong emotional reactions to the virtual environments. Many reported strong feelings in response to the sounds of the helicopter were especially evocative. Several participants also reported experiencing phenomena that were not actually in the system. For example, one person claimed to have seen a water buffalo in the jungle clearing. In a well-designed VRET system for PTSD, they surmised, the environment did not have to very rich: as long as patients became immersed in their own stories, they would project elements of the story into the scene. Their stories and imagination would provide the necessary individualizing elements to make the total experience of VRET both personal and generalizable.

When I asked Hodges if he was locked in to the exposure therapy model for treating PTSD, he told me that if someone approached him with another approach with a scientific basis that it was clear VR could add to—and NIH funding for the project—he would have no difficulty building such an environment. As he put it, he has "no politics" in this regard. However, he laughed as he recounted the various ideas for benefiting humanity using VR that people have approached him with over the years. "Everybody calls the VR guy," he explained. Hodges says that Rothbaum acts as his "filter," helping him to sort through the ideas and recognize what is legitimate science in clinical psychology.

Conclusion:

Virtual Vietnam was not a top-down military solution to the problem of PTSD; rather, it emerged from the collaboration of researchers from two fields that each had a problem that the other could help with: For Hodges, it helped to establish that the sense

of presence afforded by even primitive VR had a valuable application. For Rothbaum, it offered a new tool for controlling subjective experience. In each other, Rothbaum and Hodges had each found an interdisciplinary collaborator conducting scientific research that met the professional standards of their respective fields. Rather than using the technology to create entirely novel experiences—as was the promise of VR—they used it to create versions of real life scenarios that were both already used in well-established therapeutic practices and relatively easy to render well in VR. Their work was very influential, inspiring the development and research on Virtual Iraq, but also VRET systems for spiders, driving, claustrophobia, and even PTSD caused by bus bombings and the World Trade Center disaster. Generally, these environments have not been very graphically sophisticated, but in all cases researchers have reported success with the modality.

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CHAPTER 4:

HOW TO REPRESENT WAR TRAUMA WITHOUT KILLING: THE VIRTUAL IRAQ DESIGN PROCESS

Virtual reality exposure systems for treating post-traumatic stress disorder are interesting because they are designed to represent scenes that entire populations experience as traumatic, and in so doing, appear to make rhetorical arguments about what counts as a traumatic experience. But to what extent can we argue that designs themselves represent particularly understandings of war, trauma, and service members such that we might argue that Virtual Iraq is, or is not, an agent of the militarization of therapy? For example, what should we make of the fact that Virtual Iraq does not allow shooting? On the one hand, not including shooting could be seen as the semiotics of the machine itself reflecting an ideological position about trauma: that is, that the designers did not believe that killing someone was among the traumatic experiences of war. On the other hand, given that the machine is understood as "the ultimate skinner box" and is founded on a model of PTSD based on avoidance, similar to phobias, then we might be right to be more concerned if it did include shooting, because in this case we could see it as an effort to use the machine to desensitize veterans to the violence they have committed. After all, critiques of military video games and marksmanship simulators are that they encourage users to shoot at human targets without thinking and in so doing orient them to a subjectivity that mediates the world through the barrel of a gun.

Therefore, Virtual Iraq resists easy theorization as an ideological tool of the military in remaking selves.

If Virtual Iraq is not merely an ideological tool of the military extended into therapy, what is it? In this chapter I will try to answer that question by following the decision-making that has gone into its design. It has become common to the understanding of VRET systems that they employ a special mode of design that specifically tries to harness a form of "generic realism" wherein each element becomes, by necessity, symbolic—one middle-aged male Iraqi civilian represents any such man, the sound on the radio any potential message, one improvised exploding device (IED) blast all such explosions. As digital media scholar Elizabeth Losh describes how the "Software developers in Virtual Iraq,"

> […] avoided mimetic realism and sought to create generic rather than landscapes to heal their client's wounded psyches. In other words, despite being in control of a multi-sensory barrage of hyper-real stimuli, the ideal therapist still wants there to be some neutral canvas on which the patient could recreate details from his or her memories of the seminal crippling traumatic event. (Losh, 2006, p. 130)

While I agree that it is more a system for evoking emotion or emotionally charged memories than a war game—the lack of a mechanic whereby the patient-user enacts violence makes this point vividly—I argue that generic realism is less a result of clear intent than of the messy practices of trying to build an ambitiously detailed "ultimate skinner box" with the production values of a military video game and a fraction of the available resources for doing so. Descriptions such as Losh's suggest that the design of Virtual Iraq was unproblematic—as though the designers simply created a generically evocative, customizable tool based on therapists' desires. In fact, its design as a

therapeutic tool was constantly being negotiated through the first decade of the project.[139] Different ideas about the role of the imagination versus the role of the technology itself in evoking patient emotions led to ongoing questions about how to design and use the system.

This chapter describes the process through which Virtual Iraq was conceived and reconceived over time to give the project legitimacy and make it effective while still making it excitingly new. Without a clear guideline for doing this, design became a matter of socially distributed cognition. The ideas about what Virtual Iraq should be never existed entirely within any individual mind, but rather emerged through ongoing interactions between designers, clinicians, service members, military funders, and Rizzo, and were mediated by the design tools and resource materials available during the design process. The resultant "generically real" design created through this process responds to and reproduces a portrait of traumatic war experiences as an amalgamation of scenarios and "triggers," individual controllable digital elements used to customize the experience in the scenario. In this sense, the design of the system is ignorant of the idea that PTSD has a systematic relationship to war as a disruptive experience in the lives of those who fight—as the trauma that unfolds in the mere experience of going to and returning from war. But it does so not because any individual member of the design team believed in this vision of PTSD, but rather because scenarios and triggers were what could easily be

[139] Roger Silverstone and Leslie Haddon explain that design has three interrelated dimensions: creating the artefact, constructing the user, and catching the consumer. Whereas chapters 1 and 2 focused on constructing the patient-user and catching the consumer, in this chapter I focus on the creation of the artefact and the construction of both the clinician-user and patient-user during that process (Silverstone & Haddon, 1996).

gathered, communicated, and recreated during the design process.

My data includes interviews with members of the design team, including Jarrell Pair, Rizzo's collaborator on Virtual Iraq, as well as one of Larry Hodges' graduate students who had worked on the Virtual Vietnam program. It also draws on articles co-authored by Rizzo and members of the design team describing the design process, my own attendance at design meetings during the re-design of the system in 2010–2012 while the system was being designed on new software, and interviews with clinicians who have used Virtual Iraq in clinical practice.

I will show that the design of Virtual Iraq has been guided neither entirely by the needs of the practice nor designers' understanding of the problem, but rather through a constant negotiation between the technical feasibility of engineering features, a desire for high production values, and feedback from users, especially clinicians. Their efforts to design a clinically useful tool, an attractive product, and an evolving piece of research software while working within time and budget constraints resulted in generic realism, but also created a situation wherein the design did not necessarily reflect theories of how it should be used. To illustrate what this design process produced, I take up three important cases in the design of the system: the ability of the patient to shoot a weapon, the ability of the clinician to present graphic violent imagery, and the sound design of the system. I conclude by showing that the flexibility of the system itself allows for diverse groups to use and experience it in different ways that effectively resolve the conflicts between the diverse ideas of what it should be in order to be a useful clinical tool.

Full Spectrum Warrior PTSD: Next Generation VRET

Throughout 2004 and 2005, Captain Shilling of the Office of Naval Research and Rizzo worked together to imagine how "Full Spectrum Warrior PTSD" could become an optimal VR system for delivering "customizable graduated exposure based on client needs" (Shilling, 2005). To legitimize the project, they relied on the empirical support for prolonged exposure for PTSD and the precedents established by earlier studies that established the safety and relative efficacy of VR as an exposure therapy modality, such as Virtual Vietnam and a Virtual World Trade Center disaster application (Difede & Hoffman, 2002). [140] These precedents established that the symptoms of PTSD were the result of specific traumatic events, and that the design of a VRET system needed to be specific to these events in order to dismantle the patient's unhealthy fear structure through habituation.[141]

In order to create a VRET system to address PTSD in veterans of Operation Iraqi Freedom, the first step was to characterize traumatic experience of the war in Iraq. But

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[140] The Virtual WTC system was developed through collaboration between JoAnn Difede at Weill Cornell Medical Center and Hunter Hoffman at University of Washington. The system was graded in that it allowed the clinician to expose the patient to scenarios increasingly resembling the September 11, 2001 World Trade Center disaster. Scenarios included the Twin Towers on a sunny day, the towers being hit by airplanes with and without explosions and virtual characters dying in the blasts. Other current PTSD VRET systems included Israeli Terrorist Bus Bombing (University of Haifa/University of Washington), a Motor Vehicle Accidents application (University of Buffalo), and a Virtual Angola created for veterans of Portugal's wars in Northern Africa (University of Lusofona de Humanidades e Tecnologias, Lisbon).

[141] Remember that Foa's and Kozak's emotional processing theory conceived of traumatic experiences themselves as the source of the recurring symptoms that define PTSD. Seeing traumatic experience as a temporally and spatially situated event represented as the cognitive-behavioral associations between stimuli, responses, and meanings called a fear structure, the work of creating clinically useful VRE scenarios that would promote habituation was to represent these events as completely as possible.

this was not obvious. Few veterans of the War on Terror were being diagnosed with PTSD when the Virtual Iraq project began in 2003; the premise for the project relied on the Hoge report's *prediction* of high rates of PTSD. These in turn were based on the rates at which service members had what Hoge and his colleagues called "combat experiences." Their list included 18 kinds of events such as, "Being attacked or ambushed," "Receiving incoming artillery, rocket, or mortar fire," "Being shot at or receiving small-arms fire," "Shooting or directing fire at the enemy," and "Being responsible for the death of an enemy combatant" (Hoge et al., 2004, p. 18). Rizzo and Shilling used this list of events to conceptualize the kinds of scenarios that would both be "functionally relevant" for therapy as well as "pragmatically possible" to build and make controllable through the clinician interface.

In order to make a broadly usable tool, it would not be technically feasible to model each individual's traumatic experiences as a complete narrative given existing budget and time constraints. Hodges and his team had solved the problem by developing a small number of common scenes and then allowing the clinician to customize them by adding various elements—such as bright flashes and sounds—with the belief that these would trigger the imagination, which in turn would fill in the rest of the memory. While this design solution provided a precedent for Virtual Iraq, Rizzo and Shilling also each brought assumptions about good video games into their thinking about how to create the next generation of VRET systems. Though Virtual Iraq would not have playable game mechanics for the patient-user, they would try to make it as immersively engaging as possible by creating a virtual environment with far more scenarios and diverse elements that would allow clinicians to create a wide range of virtual experiences. They recognized

that they would never be able to fully stimulate every individual's traumas, but doing so was the horizon line for the system's design. That is, they conceived of Virtual Iraq as less of a tool for evoking the imagination, and more akin to a fully immersive VR experience. In this vision, the distribution of agency involved in generating exposure stimuli would be reconfigured so that technology would play a much more central role compared to the imagination and in so doing give clinicians even greater control over their patient's subjective experiences. Conceived of in this way, the system surely would have been the "ultimate skinner box"—not unlike the Holodeck on *Star Trek*—which would have allowed clinicians to recreate their traumatic experiences in detail and measure patient responses to them.

In presentations that they made during these early stages of the project, Shilling and Rizzo outlined six requirements for what they called "Full Spectrum War PTSD" (*FSW PTSD*) that they felt were necessary to represent a diverse array of the traumatic events described in the Hoge report. The last two items on the list were components of the system that would allow the clinician user to control and monitor the patient's experience in real time, the 'Wizard of Oz' interface[142] and a mechanism for recording patients' physiological responses so that the clinician could make sure the patient was responding enough to allow habituation, but not so much as to be retraumatized.[143] The

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[142] Which, in Shilling's words, would allow the clinician to place the user in a relevant setting as well as to "further customize the therapy experience to the patient's individual needs via the systematic real-time delivery and control of 'trigger' stimuli in the environment" (Shilling, 2005).
[143] In other words, the therapist needs to be able to visualize the patient's physiological responses to the stimuli she is presenting so that she can see what the patient is reacting to. This is interesting because this is not a standard practice in exposure therapy. Though some advocates

first four items constituted the elements of the patient's experience that the clinician would be able to control:

> 1) **Multiple scenario settings**, including a city scene, a small rural village, multiple building interiors, convoys and checkpoints, a desert base, and a desert highway;[144]
>
> 2) **Selectable user perspective options**, including walking alone, walking with one person, flocking patrol, Humvee interior view, and a helicopter interior view;[145]

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argue that psychophysiometrics are useful tools for treating the patient on how to recognize and control their own bodily state, I have to wonder if it is not at least in part necessary because the technology is getting in the way of the patient-therapist interaction during exposure. After all, the patient's face is partially obscured by the VR goggles and the clinician's attention is taken away from the patient's body by the need to attend to the Wizard of Oz display.

[144] In a 2005 paper, Rizzo described the six ideal scenarios as follows: "1. City Scenes – In this setting, we are creating two variations. The first city setting (similar to what we have in our prototype) will have the appearance of a desolate set of low populated streets comprising of old buildings, ramshackle apartments, a mosque, factories and junkyard. The second city setting will have similar street characteristics and buildings, but will be more highly populated and have more traffic activity, marketplace scenes and monuments.
2. Checkpoint – This area of the City Scenario will be constructed to resemble a traffic checkpoint with a variety of moving vehicles arriving, stopping and then moving onward.
3. City Building Interiors – Some of the City Scenario buildings will have interiors modeled that will allow the user to navigate through them. These interiors will have the option of being vacant or have various levels of populated virtual characters inhabiting them.
4. Small Rural Village – This setting will consist of a more spread out rural area containing ramshackle structures, a village center and much decay in the form of garbage, junk and wrecked or battle-damaged vehicles. It will also contain more vegetation and have a view of a desert landscape in the distance that is visible as the user passes by gaps between structures near the periphery of the village.
5. Desert Base – This scenario will be designed to appear as a desert military base of operations consisting of tents, soldiers and an array of military hardware.
6. Desert Road – This will consist of both paved and dirt roadway which will connect the City scenario with the Village scenario. The view from the road will mainly consist of desert scenery and sand dunes with occasional areas of vegetation, ramshackle structures and battle wreckage."

[145] "1. User walking alone on patrol from a first person perspective.
2. User walking with one soldier companion on patrol. The accompanying soldier will be animated with a "flocking" algorithm that will place them always within a 5-meter radius of the user and will adjust position based on collision detection with objects and structures to support a perception of realistic movement.

3) A library of "trigger" stimuli;

4) Integration of scent and vibrations.

Full Spectrum Warrior clearly played an important role in their imagination of what the system would be able to do, as evidenced by the fact that in these early papers they used screen shots from the game in order to illustrate what the finished environment would look like.

Research as a Design Problem

Like most software design, building Virtual Iraq was necessarily a distributed, iterative process. A significant part of the distributed system of designing Virtual Iraq was a matter of engineering research and expertise. Building the system was partly a matter of figuring out what was actually possible to build given the available resources. As it turned out creating *FSW PTSD* in a way that would live up to Shilling and Rizzo's vision was very challenging from an engineering standpoint.

One of the challenges was that *FSW PTSD* was neither clearly a primary research project nor an applied research project. [146] In technology development, primary research

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3. User walking with a patrol consisting of a number of companion soldiers using a similar "flocking" approach as in #2 above.
4. User view from the perspective of being in a HUMVEE or other moving vehicle as it automatically travels through the various setting scenarios. The interior view can have options for other occupant passengers that will have ambient movement. The view will also be adjustable to support the perception of travel within a convoy or as a lone vehicle.
5. User view from the perspective of being in a helicopter hovering above the scenarios."

[146] Though the Institute for Creative Technologies had agreed to house the *FSW PTSD* project, it was not an entirely comfortable fit for the institute because it bridged the distinction between primary research and applied research. Though ICT has participated in making military games

is intended to explore what kinds of technologies can be built and to test proof of concept. The technology can be a kludge, buggy and fickle, because the producers are the primary user group: they only need it to be demo-ready. In contrast, in applied research, the question is whether a technology can be used to address the real problems of an existing user base, and therefore is treated more as a finished product. People expect products to work, and that when they do not, they will be able to get support such as detailed help files, phone call assistance, or even be able to take the device to a service center. Additionally, research technology is developed over long periods of time, giving researchers time to be creative and experiment, whereas products to be used in applied research need to be built quickly, following a rigid production schedule to get the product to the client.

On the one hand, *FSW PTSD* entailed applied research because clinicians were using it with patients in a clinical trial of exposure therapy. (Indeed, the existence of Virtual Vietnam suggested that concept of VRET for PTSD was already proven.) To test

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and simulations, it was not a contractor that makes products for the military, like Lockheed-Martin or SAIC, but rather a center for conducting innovative digital media research that would provide a scientific basis for future military projects. In the National Research Council report *Modeling and Simulation: Linking Entertainment and Defense*, it is clear that the authors, many of whom were involved in founding ICT (including Jacquelyn Ford Morie and Mark Zyda) believed that many decades of research were needed before entertainment technologies could be scientifically applied to the creation of viable training projects (National Research Council & Committee on Modeling and Simulation, 1997). This is not to say that Virtual Iraq was the first such project for ICT: *Full Spectrum Warrior* was also more of an applied research project than a primary one. But ICT has been taken to task by people who see such projects as the research community and commercial video game industry co-opting military money without producing real changes in military operations. Critics also argue that it was unnecessary for ICT to become involved in a project that a commercial game company could have done alone as a contractor (Adair, 2005).

the efficacy of the system, these clinicians needed it to work. On the other hand, the project was primary research because the researchers were also trying to figure out how to build a low-cost, portable VRET system that could be used with a new treatment population. They could not know in advance whether what they made would evoke the desired emotional response from a significant number of service members with PTSD that would make it a clinical tool.[147] Finding this out would entail collecting feedback from service members and clinicians as they used the system and incorporating this data into iteration of the design. As Rizzo explained in an early paper, "The specification and creation of such trigger stimuli is an evolving process" which began with "intuitive efforts" and evolved by gathering feedback from returning soldiers, combat environment experts, and clinicians using the environment in therapy (Rizzo et al., 2005). In this way, it was very different from *FSW*, which had been developed through a very involved collaboration in which the Army had clearly specified what they had wanted the game/training system to be and were willing to pay for those features.

Related to this, another challenge to living up to Rizzo and Shilling's shared vision was that the project had such limited resources during the first year. Compared to the hundreds of people and tens of millions of dollars that are invested in making major video game titles, the team working on Virtual Iraq was very small. Only a handful of digital artists or programmers worked on it at any given time, and all of these divided

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[147] As cognitive scientist and designer Don Norman has pointed out, design generally needs to be iterative because neither developers nor customers know what exactly is necessary to the task in advance of using the technology (Norman, 2002).

their time between several projects. Many people at ICT contributed to the project for short amounts of time before moving on to focus on other, better-funded projects, either at ICT or elsewhere.[148]

Another challenge was that for Pair, it was important that the design team rely as much as possible on software developed within ICT, which would both serve to highlight the engineering abilities of institute and, hopefully, avoid red tape and save money on software licensing fees after the project became public. [149] However, as Pair and several other designers pointed out to me, creating Virtual Iraq was not simply a matter of creating "mod" or "port" of *FSW.* Though it is often referred to as an *FSW* "mod" this is a misapplication of the technical term. A "mod" is a version of a video game made by swapping out the digital characters and other assets; it entails primarily cosmetic changes, not changes to the underlying architecture of the code.[150] But the code architecture of *FSW* would not provide the necessary user dynamics to create a system that allowed the clinician-user to control the experiences of the patient-user. To create the clinician interface, the design team borrowed software from another project at ICT that Pair had

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[148] Also, while most of ICT's projects at this point had involved creating a small number of virtual characters, such as virtual recruitment officers, Virtual Iraq would require a much larger environment populated by more characters than they were used to producing.

[149] Though artist Haroun Farocki has pointed out that the production values of first version of Virtual Iraq paled in comparison to similar projects in videogame and training simulation and have argued that this signifies that the military is less interested in problems of therapy than problems of training and recruitment, an alternative explanation of these aesthetics is that they resulted from Rizzo and Pair's effort to have the system built in-house at ICT where the design team faced a number of restrictions.

[150] Examples of actual video game mods used to create either military training simulations or military-themed versions of games include *DOOM/Marine DOOM, Battlezone, Half-Life/Counter-Strike, ARMA/Day Z.*

been working on, an immersive training simulator called FlatWorld. For this he had worked on a software platform called the FlatWorld Simulation Control Architecture (FSCA), which allowed an outside controller to introduce elements into an environment combining movie flats and screens with digital imagery.[151] Using FSCA also had advantages in that it allowed them to maximize their use of ICT's in-house software, which would both advance the work of the institute and potentially save money in licensing fees later on.

Nor was the team able to simply harvest the digital assets from *FSW* and import them unproblematically onto the FSCA architecture. They did attempt to borrow digital assets from *FSW* in creating the prototype—including a mosque and a few other buildings and characters—by the time the first usable system was given to clinicians, almost none of the *FSW* assets remained. Because they had to quickly build all the other assets from scratch, they did not match the *FSW* assets. Rather than leave an uneven aesthetic the artists rebuilt these assets as well.[152] While the team did succeed in making a prototype that could be controlled by clinicians, and ran on low-cost personal computer

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[151] "The FSCA enables a network-centric system of client displays driven by a single controller application. The controller application broadcasts user triggered or scripted event data to the display client. The client's real-time 3D scenes are presented using Numerical Design Limited's (NDL) Gamebryo graphics engine" (Rizzo et al., 2005). Similar to a CAVE, the virtual environment would be created through the projection of dynamic graphics onto walls made of projection screens. FlatWorld added to this mixed reality elements, so that rather than the space being made entirely of screens, it would incorporate Hollywood-style "flats," such as mock-ups of walls with the screens being situated windows or cracks. In this way, the user would feel that he or she was in a physical space with the screen providing "windows" into an outside world.

[152] Pair also attempted to port an entire virtual city that had been created for a training simulator he was working on at Ft. Sill in Oklahoma, called the Close Air Support Trainer. However, this city was designed to be seen from above, not from the ground level, and ultimately the design team decided that it did not have sufficient aesthetic appeal to keep it in the VRET system.

hardware,[153] given their limited resources, they prioritized first building an Iraqi Village prototype (first ready in February 2005), and later the Humvee (March 2006).

In order to model a traumatic event, the lead artist explained to me, the first step is to break down the event. Starting with a reference, such as a video of a car being blown up by an IED in a suburban marketplace, the artists will list the components, such as the explosion, dust, civilians, soldiers, how people respond, the effect on the car, other vehicles, market stalls, palm trees, and sky. Each of these elements contributes to the whole of the event. Nothing can be taken for granted, because the whole world and the event that takes place within it need to be created. The creation of each component then is entered as a task in JIRA, and assigned to a member of the design team. Lists of available assets and tools—such as meshes and animations that have already been made—and additional reference materials are included in the task in order to help the artist with his or her workflow. The lead artist explains that while familiar components that need to be animated are largely modeled based on intuition—such as people driving a car or milling around the street—certain violent events like explosions need additional reference materials because they are out of the purview of the designers' day-to-day lives and "they are probably not like Hollywood ones." He points out, though, that, "If it feels right, that's what counts": Could users tell the difference between an animation of someone driving a Humvee and someone driving a Honda Civic? Would they complain that

[153] "The current VR PTSD application is designed to run on two Pentium 4 notebook computers each with 1 GB RAM, and a 128 MB DirectX 9 compatible graphics cards. The two computers are linked using a null Ethernet cable. One notebook runs the therapist's control application while the second notebook drives the user's head mounted display (HMD), orientation tracker and navigation controls" (Rizzo et al., 2005).

someone blasted by an IED bounced on the ground too many times? If they did, then they would be able to change individual components without disrupting others in the scene.

As we will see in the following sections, there were a number of design issues where the different inputs to the distributed process—including feedback from clinicians, feedback from service members, available technical resources, and the design team's aspirations for creating a high-quality VR product—pulled the design in different directions. One of these was the issue of realism.

User-Testing Realism

Research with users took two forms: research with clinicians using the system and research directly with service members who had been deployed to Iraq. Research with service members took place before clinicians began using the system. The purpose of this research was not to learn how to make the system clinically useful, per se, but, guided by the principle that the goal of the system was to stimulate traumatic experiences, this research queried service members to rate its "realism." Through this work, the design team learned that evaluations of realism was user-specific; while service members generally rated the representations of Iraq as acceptably realistic, they became very critical when they noticed incongruous details related to military life.

The next step in this research was to send the system to Iraq. In February 2005, TATRC funded a study to send Virtual Iraq and the Virtual Reality Medical Center systems—packed in hard-shelled foam-padded suitcases—with Rizzo's former clinical psychology student and Army officer Greg Reger on his deployment. There, Reger gathered information from combat veterans about the realism of the environment (Rizzo

et al., 2006). After his deployment, Reger returned to Madigan Army Medical Center (MAMC) at Ft. Lewis, Washington. In April 2006, Rizzo sent him the first version of the system to have both Iraqi city and Humvee scenarios so that he could to conduct additional user testing on the realism of the system. Reger's research team surveyed 93 service members who had recently returned from deployment. As in Iraq, this study was conducted only with veterans without a PTSD diagnosis. Participants received a scripted demo that took them through the features of the system. They were then prompted to rate items such as "Sense of being in Iraq," "Realism of visual scenery" and "Realism of sounds" separately from their quality (Reger, Gahm, Rizzo, Swanson, & Duma, 2009, p. 103). We are not told how the researchers defined the separation between "realism" and "quality" for their participants, but we might assume that the distinction entailed something like an ability to recognize: for example, an outline drawing of a horse might be recognizable as what a "real" horse looks like, independent from the production value of the rendering. This is the difference between iconic (or generic) realism, as opposed to mimetic realism.

While the overall evaluation of realism was high, the researchers found that a few discrepancies in key areas of representation of both the war zone and of military culture interrupted service members' sense of presence. The designers referred to this interruption as "distraction." Several of the MAMC study participants were distracted by the overall aesthetic of Virtual Iraq, which seemed too empty, too clean, and too open. Many felt uncomfortable walking in the city without a weapon, which they would never do in real life. The marks on the passenger's uniform indicated someone of a rank too high to be riding in the passenger seat of a Humvee. Also, since the designers had studied

a *parked* Humvee as a reference, the Humvee in Virtual Iraq drove across the desert in the "engine off" position.

As the design team attempted to incorporate this feedback into the next iteration of the system, some of the changes created engineering hurdles. These opened up the possibility for new kinds of distractions that would compromise the experience of the virtual environment itself as a seamless world. For example, increasing the litter and debris required creating new meshes for many of the building and ground surfaces. In order to make the environment consistent, this had to be done on nearly every building. User-feedback also led the team to try to make more vehicles and civilian pedestrians. Because the team was concerned about the low quality of the realism created by the aesthetic of simply repeating the same cars and people over and over again, responding to this request while maintaining their production values required additional modeling. Adding more animated cars and civilians to the environment would draw more processing power, which threatened to slow down the system.

An easier modification to make based on feedback was mounting the gamepad on a weighted mock M-4 rifle in order "to allow soldiers to navigate in a more naturalistic fashion" (Reger et al., 2009, p. 103). Mounting the gamepad on a physical gun proved easier than adding a virtual gun, and essentially added a haptic element to the system without any programming.

Reger's article concluded that while the study did "provide foundational support for the validity of the VR Iraq as a realistic representation of the environments experienced by soldiers who deploy to Iraq" he also noted that realism "may be a

necessary, but not sufficient, factor in the efficacy of VRE. Clinical trials are needed to evaluate the promise of VRE as an effective treatment for PTSD" (p. 103).

While testing with service members had specifically investigated how realistically the system represented Iraq as they had experienced it, feedback from clinicians was sought in order to figure out how to make it a useful tool for treating PTSD. After incorporating Reger's feedback, the team began seeking feedback from clinicians regarding the usability and features of the system. Clinical partners working on the project at Camp Pendleton and Naval Medical Center San Diego sent feedback on the project throughout spring and summer 2005. As the number of sites grew, the design team eventually developed an online survey form for clinicians. Unfortunately, no formal studies have been published on clinician feedback and I was not able to see the surveys. I did learn, however, that clinician feedback tended to take the form of requesting bugs to be fixed and requesting specific features, such as the sounds of specific weapons.[154]

For the most part, the artists and other members of the design team had no contact with either clinicians or patients. Instead, Rizzo served as a boundary person between clinicians and the design team; he came from a clinical psychology background, but he was not a therapist, and though he worked on the design team, he did not have any training in computer graphics or design. But he could act as an intermediary between these worlds. Because he was having weekly meetings with various clinical partners,

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[154] For example, the following feedback was found in an email from a clinician to Rizzo "When attempting to switch to the 'birds eye' view for the therapist so I could orient the subject, the subject's view changed with it."

almost all of the clinical feedback the designer received was filtered through him.

"It Has to Look Good": Production Values and Realism

A few members of the design team did travel to Camp Pendleton and Naval Medical Center San Diego to meet with some of the clinicians and get a sense of where and how the system was being used. According to the lead artist, the most interesting thing he learned speaking to the clinicians "was how general everything could be."

> It wasn't as important that the buildings looks exactly like Iraq or that the type of palm trees were exactly like what was there, or that everything was detailed down to the last level, that was not important. It was very much more about just the … *sketching out the* experience versus having a detailed painting. That was not very important at all. As long as you get it close enough and have the right types of stimulus it didn't need to look exactly like the real thing.

In other words, even though the research with service members had sought to establish the realism of the system, talking with clinicians established that they did not have create the system with goal of full mimetic realism. Like someone viewing a sketch or cartoon, the patient-user would fill in the details with his or her imagination. Some of the VRE designers referred to this phenomenon as "immersive fill."

The concept of immersive fill is evident in the following excerpt from Cmdr. Robert McLay's memoir in which he describes one of his earliest experiences using Virtual Iraq with a patient.

> "How does that feel?" I asked. I had already observed that his heart rate and other physiological signs of anxiety had increased slightly. That surprised me, since the simulation was not too different from the environment he left to come to the hospital. I thought it might be the unfamiliar feel of the headset, but he gave me an answer I didn't expect.

> "I know this is going to sound strange," he said. "But in some ways it feels more real than being here in Iraq now. It's like I can feel the weight of a flak jacket as soon as I start moving around here."
>
> "And where does here look like?"
>
> "More like Al Asad, where I was during my first deployment. Now so much like the camp here."
>
> [To McLay it looks like Fallujah] "Then it dawns on me. We didn't have that many tents left in Fallujah. Hard structures had replaced those a few years back. Really, the patchy nature of the video-game-like simulation didn't match either Al Asad or Fallujah. The simulation existed nowhere except in the mind of a programmer. I had seen a small camp and projected on it my memories of the world around us now. For the major, memories of Al Asad were stronger, so those thoughts had filled the gaps. Both of our imaginations were filling in, and for Major DeSanto, memory was powerful." (McLay, 2012, p. 168)

Another way of thinking about "immersive fill" was proposed by Ari Hollander, the lead designer at Firsthand Technologies, the company that designed the IraqWorld system for UW/Tripler Army Medical Center. In a paper featured on the Serious Game Source website he noted that unlike video games, VRET systems are not designed to be "fun" but rather to maximize the patient's engagement with his own memories. In order to explain this experiential goal, Hollander evokes Japanese robotics professor Masahiro Mori's concept of the "uncanny valley."[155] (see **Figure 3** below)

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[155] In 1970, Japanese robotics professor Masahiro Mori put forward the idea that as robots were made to appear and behave in an increasingly human fashion, they would also garner increasing empathy from humans that interacted with them. However, he argued, at a certain point in realism of imitation of the human, there would be a sudden drop off in this empathy. The uncanny valley marked an experience of a mechanical other that is too life-like to be considered just a robot, but disturbing in its failure to appear fully human. As simulation technology improves, some technologists have argued that the location of the uncanny valley (and, therefore the magic mountain) also shifts to accommodate contemporary cultural expectations. Consider, for example,

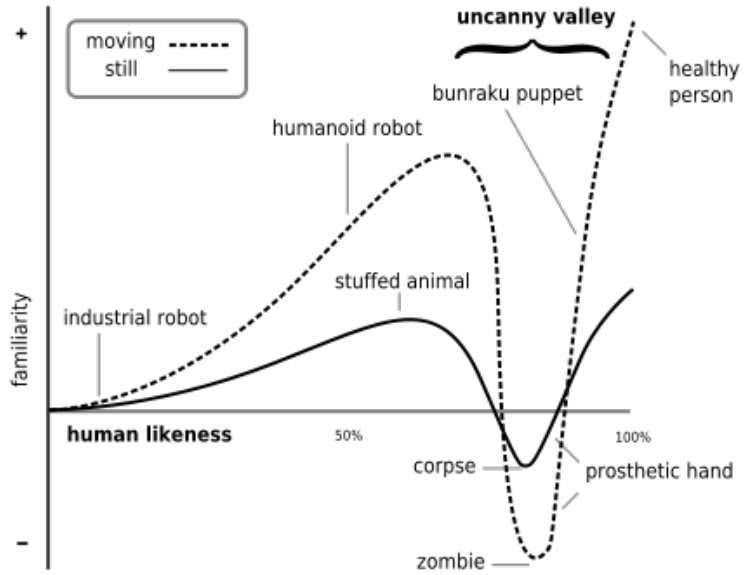

Figure 3: Masahiro Mori's graph of the uncanny valley.

Rather than apply the concept of the uncanny valley to the life-likeness of robots, Hollander applies it to the realism of virtual environments. Just to the left of the uncanny valley, Hollander notes that Mori's graph contains a "magic mountain," a point of maximal realism and empathy/engagement in the environment. In VRET environments, this corresponds to the point of "presence/reminiscence" in which the patients add their own imagined detail to the environment (Hollander, 2006).[156]

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the now obvious artifice of the shark in *Jaws* or the computer-generated velociraptors in *Jurassic Park*, each of which terrified contemporary audiences.

[156] "More than one researcher has reported that VR Exposure therapy patients, when recalling their therapy experiences, have occasionally described significant components of their experience in VR that were not actually present in the simulation! It is as if, adjacent to the Uncanny Valley

I asked the lead artist if his own realization that the environment could be very general had surprised him. He replied that, in hindsight it was not, given how much the imagination is capable of producing. But while the idea of generic realism made intuitive sense to him, the actual practice of using it as a design guideline was unfamiliar:

> It was not so much a surprise, maybe, as very different from what I was used to. Because in my previous job we did cinematics for games, the pre-rendered movies that you see at pivotal story points and those are about tons of detail and just as much cool stuff as you can cram in there. So this was kinda the exact opposite of that in some ways. And I think in hindsight, knowing that it in advance would've helped plan the whole development process better. But it's hard to say. Hindsight is always 20/20. (interview, June 10, 2011)

Therefore, even in producing generic realism, the design team strove towards high production values. From their perspective, Rizzo wanted them to include as many of the requested features as quickly as possible so that clinicians could use them: as long as they were "realistic" in the sense of being iconically compelling, the quality was less important to him. This sometimes led to conflict. As the lead artist explained,

> Skip was like I don't care what it looks like, just put stuff in there and we're like wait no, it has to look good. And I think there was a little tug of war there. Nothing bad. It's bound to happen when people want to do good work, you know, it has to be good. (interview, June 10, 2011)

While early VRET researchers like Hodges and Max North had been pleasantly surprised by the ability of generic realism to produce feelings of telepresence and immersive fill in their subjects, two important significant shifts in the media environment that had taken

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there is a peak where subjects will fill in major details from their own experiences and the simulation magically becomes more than real. PTSD patients carry around in their heads a set of special effects that we can't ever match with simulation. With VR Exposure Therapy applications the key may be to design simulations that provide maximal space for the patient and the therapist to do their work" (Hollander, 2006).

place between Virtual Vietnam and Virtual Iraq that made it difficult for the designers to accept lower expectations for production values in their work: the rise of the video game industry and greater availability of war imagery.

In building Virtual Vietnam, Hodges had been working with the best VR tools available, but based on contemporary standards these had very slow frame rates and low resolution. According Hodges, the video game industry renaissance of the mid-2000s was both a blessing and a curse for the world of VR research. While it helped bring down costs for graphics processors and development software, it also raised expectations about what the technology should be able to do and look like, creating expectations of graphical realism and interactive mechanics, even though early VRET work demonstrated that even primitive environments could produce therapeutic telepresence (see chapter 2).[157] When he had begun his VRET work in the early 1990s, 16-bit video game systems were cutting edge; by the mid-2000s, the mimetic realism of detailed graphics and life-like physics came to be considered increasingly important and a mark of pride for video game developers.[158] Many of the designers who worked at ICT were graduates of prestigious interactive media design programs, including the one at USC. Therefore, they had been acculturated to share the video game industry's production values. In imagining their

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[157] People are often curious if the commercial video game industry supported this technology. The answer is that the game industry aims to produce blockbusters, and historically has not worked to cultivate niche markets, such as health gaming. However, some express appreciation when other outsiders such as academics develop games for health, since this is good public relations fodder.

[158] Digital media scholar Alexander Galloway has argued effectively that realistic graphics in more video games should not actually be considered "realism" because they do not represent the "real" lives of players. The graphics may be highly-detailed, well-proportioned, and follow the rules of physics, but more often than not what they represent is the realm of fantasy (Galloway, 2006).

users, they also knew that they were designing for audiences who they believed expected these standards. Whereas Virtual Vietnam had been designed for an aging veteran population, the Virtual Iraq team was designing for "digital generation soldiers," as well as military supporters, journalists, and other members of the public who would see their work. To make the system look "cool," by necessity it would have to look like a video game: video game drag was not just a promotional performance of gender, it was also a byproduct of the pressures the designers felt as members of video game culture.

The designers were also able to make much more realistic environments because Virtual Iraq was created in a much richer war media environment than Virtual Vietnam. Hodges had limited reference materials including photographs, a small amount of grainy black and white video news footage, and Hollywood movies from which to design Virtual Vietnam.[159] In contrast, the designers of Virtual Iraq had abundant materials that they could use to model digital assets that they needed, including military gear and Iraqi buildings, civilians, and landscape. The Iraq and Afghanistan wars were being fought with journalists embedded into combat units and service members who had camera phones and Internet access: both authorized and unauthorized war imagery was highly accessible for the design team.[160] They claimed that they found most of the reference material they needed through searches on popular websites like Google Images and

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[159] Vietnam has been called the first "television war," because it was the first to be recorded on video and broadcast into American living rooms. However, this video was often delayed and sanitized for broadcast media. For a critique of news media coverage of Vietnam see Daniel Hallin, *The "Uncensored War": Media and Vietnam* (Hallin, 1989).

[160] For a detailed discussion of embedded journalism during the War on Terror, for example, Susan L. Carruthers, *The Media at War* (Carruthers, 2011).

YouTube. For more graphic imagery, they sometimes turned to LiveLeak, an uncensored video-sharing website known for hosting content allegedly posted by insurgents depicting violence they had committed against American service members.[161] Because none of them had ever served in the military or been to Iraq, the designers had to approach the veracity of images with skepticism. [162] However, they found this less challenging than sifting through thousands of search results to find exactly what they needed in high resolution.

Occasionally they acquired photographs from recently returned military personnel, though they found that these sources were often low-resolution and it was difficult to acquire them in time to meet their work deadlines. The contemporaneousness of the war also enabled a couple members of the design team to photograph relevant military equipment and uniforms during a field trip to Camp Pendleton, which was much

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[161] The Art Lead claimed that he did not think that it took much searching to find the necessary materials,

> …if you turn off your custom search filter, or safe search, whatever it is. And then there are various websites, various outlets. There are sides of the Internet that you wish didn't exist, some people who like to collect this stuff, or for whatever reason it's out of there. It seems like with almost anything with the Internet, [if] you're doing an image search, you always have to have somewhat of a thick skin. Oh, look at that, that's interesting. You have to just move past that and pretend I didn't see it (interview, June 10, 2011).

[162] The mediated nature of reference material is reminiscent of Baudrillard's concept of the precession of the simulacra:

> Today abstraction is no longer that of the map, the double, the mirror, or the concept. Simulation is no longer that of a territory, a referential being, or a substance. It is the generation by models of a real without origin or reality: a hyperreality. The territory no longer precedes the map, nor does it survive it. It is nevertheless the map that precedes the territory—*precession of simulacra*—that engenders the territory, and if one must return to the fable, today it is the territory whose shreds slowly rot across the extent of the map. It is the real, and not the map, whose vestiges persist here and there in the deserts that are no longer those of the Empire, but ours. *The desert of the real itself* (Baudrillard, 1988, p. 1).

more difficult for Hodges, working after 20 years of equipment evolution. After the project had more publicity, they were also able to access military pipelines to acquire high-resolution images of uniforms and other wearable equipment. The lead designer amassed a collection of documentaries about the war to use as resource materials for actions as well as imagery.

It is worth noting that if the goals of the project had only been to create a system that realistically depicted war, they could have eschewed the process of modeling altogether and used digital reference material to make an exposure system. But Rizzo was committed to the VRET paradigm and video game aesthetics, which bound the designers to create immersive digitally modeled experiences, not only realistic imagery.

BRAVEMIND: Re-Designing Virtual Iraq

As a part of the Army Medical Research and Materiel Command grant for the multi-year, multi-site clinical trial of exposure therapy and D-cyclosterine, money was set aside to rebuild Virtual Iraq on a more stable architecture. Redeveloped as research software, the Virtual Iraq project received a new name: BRAVEMIND (Battlefield Research Accelerating Virtual Environments for Military Individual Neuro Disorders). In this new iteration, the project would finally move from being primary research technology to applied research technology. [163] In rebuilding the system from scratch, the

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[163] Academic technology research does not usually try to make clean products, and grant structures generally favor giving grants to industries instead. The fact that ICT held onto this

design team was able to change the tools and processes they used to engineer the system, which also allowed them to maintain higher production values, and to include additional features based on clinical input.[164] Overall, BRAVEMIND represented an effort to recalibrate the project to make it more effective in terms relevant to all the constituent groups of the design collaboration.

Independent of production values, the original Virtual Iraq software ended up creating limitations on the design team's ability to accommodate Rizzo's requests for features. Because they had worked to make each version by quickly adding features, in the style of primary technology research, the underlying code was highly unstable. The software became a kludge of code based on quick and dirty work-arounds. Seemingly simple additions created unexpected bugs. As a designer who had been with the project from its early stages explained,

> It was kinda like trying to build a car while you're driving it. So then all the parts are incompatible. Square peg round hole at every corner. So Skip would be like 'could we do this?' and we'd say 'no, no, no' and he'd get *really* frustrated. (interview)

Therefore, one of the goals of the rebuild was to plan for the system as a whole so that all of the existing features would work well, which would also provide a more stable architecture as they continued to add features. When I asked one of the designers when he

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project and won the money to rebuild the system tells us a lot about Rizzo's tenacity with regards to holding onto the project.

[164] Because they already had a user base of clinicians using the system with patients—some of whom would be making the transition Virtual Iraq to BRAVEMIND a year into the MRMC-funded clinical trial—the designers decided that it would be wise not to remove features from the system, but rather to use the opportunity to expand the available options.

thought they would be done, he answered that he thought they would never be done: there would always be more features that could be added to create further customizations.

For BRAVEMIND, the team chose an up-and-coming game engine, Unity. Compared to Gamebryo, on which they had built Virtual Iraq, Unity was easier to prototype on quickly as well as more powerful: it made it easier to add shadows, better lighting, and would run higher resolution graphics more quickly. Though he did not care about production values to the same extent as the artists, from Rizzo's standpoint, one of the most important goals of re-making the system was to make it more visually impressive. When I asked him whether it was possible that the new build would not work as well because the extra detail might leave less room for immersive fill, he replied that, "We don't know if this new build will work better. Maybe it will turn out that the old system worked well. But we do it anyway. I just want people to look at it and think it's cool." Here, Rizzo reiterated his own commitment to video game culture, in which "cool" means graphically realistic. The designers could not merely recreate the system on more stable architecture using the previous standard for graphics; they had an obligation to make it look as realistic as technologically feasible. To do otherwise would both reflect poorly on ICT and would convey a message that neither they nor the military took PTSD seriously, which in turn would hurt Rizzo's ability to promote the system to its various audiences. The semiotics of visual realism was too profound in this context to ignore.[165]

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[165] Once, during a meeting with Rizzo, one of the program managers came in and asked which of the two models of fake M-4s he should order, the blue one or the black one. The obvious answer, given the attention to realism and seriousness, was black.

In addition to using a new game engine, the design team also used a more professional development process and management techniques borrowed from the game design industry. A dedicated Art Group had been formed at ICT, with specialists in character design and animation, and this was overseen by a Technical Lead and managed using professional tools used by the commercial technology industry, including the project management tool JIRA. One goal of the new design was to design everything in a way that it would be open to modification and refinement.

Scenarios

The designers expanded the number of environments and the elements available within them. In addition to rebuilding the Iraqi desert Humvee driving scenario, they added an Afghanistan desert-driving scenario, and an American southwestern desert-driving scenario. Whereas in the previous build the Afghan driving scenario was merely a button that added mountains on the horizon of the Iraqi driving scenario, in the new build, the designers made a point of studying and representing the differences in architecture and foliage in the two countries. This change reflected the changed emphasis of the war to efforts in Afghanistan and the subsequent increase in veterans deployed to this country seen by therapists.

The American desert environment—based on a stretch of desert along Highway 395 near the Twenty-Nine Palms Marine Base—featured a well-paved and painted road, power-lines, a sign advertising the Tranquility Diner, and green road signs in English. It was created on the request of some clinicians who had reported that some of their patients found the middle-eastern scenarios too overwhelming. The American desert, I was told,

could provide a stepping-stone to acclimate the patient to the VRET system before putting them in a virtual combat zone. However, the environment offered the same trigger features as the middle-eastern driving scenarios, such as IED explosions and snipers. The issue of traumatic events that occurred stateside or as a part of training did not come up.

Though it had been requested, in the new build they would still not be able to create an open driving experience in the Humvee, where the user would be able to off-road, as in popular driving video games like *Grand Theft Auto.* Instead, the patient would be "on rails," only able to drive in a more or less straight line. Each driving scenario was designed as one long stretch of road with several types of landmarks along the way: a checkpoint, a bridge, a few small buildings, and open road. Each of these was connected to a button on the clinician control panel so that the patient could be easily put near the most relevant landmark. However, if the patient drove for long enough, they would pass each of these points, and—because the ends of the road were linked, creating an endless loop—potentially over and over again. This would also potentially be distracting, but it was a way to create several kinds of experiences all within one scenario.[166]

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[166] One designer told me that he would have liked to have been able to create an "infinite driving experience" in which the software would dynamically change the road as the patient drove down it, as a real road does. This was another example where the production goals of the designers were in excess of what was felt to be necessary to create a clinical tool. Ultimately, the resources were not available to fulfill many visions of what would make the system cool.

Clinician Controller

No longer referred to as the Wizard of Oz interface, the overhaul of the "clinician controller" was conceived as a human-computer interaction design effort that would give the clinician control over a wider array of features more easily. In the original build the only walking scenario was a city environment around which the clinician could use buttons to "teleport" the patient. However, because clinicians rarely needed to teleport patients between these kinds of sites it did not seem necessary to take up the control panel with these buttons. In the new build clinicians would instead be able to select from at least six walking scenarios in a drop-down menu. These included a checkpoint, a palm grove, a safe zone, "residential" and "poor residential."

Additionally, whereas the previous control panel only had one IED blast button in the Humvee scenario, the new control panel would include a grid of eight buttons that would allow the clinician to deliver blasts to the front, back, sides, and corners of the vehicle as well as a slider for controlling the intensity of the explosions.

The design team wrestled with whether they should build a wider variety of controllable elements or create more realistic depth in a few experiences by animating full events. The question here was really about the kind of role the system would play in evoking emotion: would they be adding more "props" clinicians could collage together to enhance patients' stories, or would they create fully animated immersive experiences? Full animations would create more seamless experiences for users, along the lines of video games, but, with a few exceptions—including a plan for a scene where a group of insurgents ambushed the Humvee—they decided that given the diversity of ways that a

given event could play out full animations could easily become distracting in the ways that they did not match given users' memories. But neither did they want to devote resources and processing power to enabling the clinician to have full control over every detail in a scene. One designer explained how, for example, in a real market-bombing scenario, a crowd may be mixed in diverse ways, including number of men, women, children, military, and police, and requiring the clinician to control each of the characters would make the system both unusable during therapy and extremely time-consuming to engineer. In their final design, they ended up compromising by giving clinicians control over many basic elements of a scene, but programming certain events such that they necessarily triggered others. For example, to stage a market bombing a clinician could choose how many of each of six types of Iraqi civilian characters are present in a given scenario, including adult male and female, older male and female, girls, and boys.[167] When the clinician clicks the button to initiate a bombing, all characters within a range of the blast would run and some of those particularly close to the blast would be automatically hurt based on the "wound state" selected by the clinician. Not all characters would be able to be wounded because this feature made them "code-heavy"—that is, programmed with a wider potential for features such as animations of the act of being

[167] The ICT art team built these characters in-house, which took about two weeks each for researching typical Middle-Eastern faces and clothing, followed by creating meshes and textures. During one interesting design meeting I learned that there was an alternative route when Rizzo asked the two other designers present about the possibility of purchasing a "package of Arabic characters." Due to the large number of government-sponsored digital media projects that take place in virtual environments, several companies—such as the New Orleans-based company TurboSquid—have recently begun dealing in three-dimensional digital assets (such as meshes and textures) representing people and objects associated with the War on Terror, including characters and buildings stereotypical of those in Iraq and Afghanistan.

wounded and textures representing wound-states—which required more processing power than characters only programmed to mill about and run away from blasts.

Other kinds of events could also be made by coordinating button-clicks that triggered sequences of animations. For example, in the new driving scenarios, clinicians would be able to trigger an animation of a small boy running across the road. Then they could trigger an IED blast, thereby creating a scene wherein the child appeared to be hit and vanish in billowing smoke.

A brief example of the kinds of conflicts that arose out of the desire to balance high production values, limited engineering resources, and clinician desires came up during a design meeting where Rizzo and two of the designers discussed how to address clinicians' request to be able to allow the patient to get out of the Humvee after the IED blast. The problem with moving the patient-user perspective from the interior of the Humvee to the exterior would require complex rendering. In video games this issue might be dealt with by a standardized loading sequence or an animation that fills in the transition between two environments. A loading sequence would have been easiest, but while it fit with video game aesthetics, the designers were uncomfortable with creating such an aesthetically artificial experience in the system. Creating an animation would be the most realistic way to render the experience, but also time-consuming, and they would have to create at least three of them, one for each of the possible positions the patient could take in the Humvee: driver, passenger, and gun turret. The designers instead proposed giving the therapist a button that would "teleport" the patient out of the Humvee, using smoke as an animation for the transition between in-vehicle and out-of-vehicle states. This would be easier to produce than full animation, and more

aesthetically appealing than a loading screen. But recognizing that a blast to the patient's Humvee might not be the only experience that precedes getting out of the vehicle, they wondered if the smoke animation might be even more distracting than a loading screen.

Case Studies: Representing War, Trauma, or Therapy?

The following case studies provide three examples of how the distributed design process created situations in which it was not clear whether Virtual Iraq was supposed to represent war itself, traumatic experience, or an ethos regarding what should be experienced in a virtual environment as a part of therapy. These conflicts, we will see, emerged through the designers' efforts to balance high production values based on video game culture, a desire to create a rich virtual environment within the limits of what they could resourcefully engineer, and the need to create an evocative clinical tool for stimulating service members' memories.

Case 1: Is Killing a Virtual Arab Therapeutic?

I had been struck by my inability to shoot during my first demo of the system: I only had the haptic sensation of holding a weapon provided by the controller mounted on a weighted mock M-4 rifle. Though the Hoge report included service-member perpetrated violence "Shooting or directing fire at the enemy" and "Being responsible for the death of an enemy combatant" among its list of common traumatic experience, these were not affordances built into the design of Virtual Iraq. Iraqi characters can only be hurt when they enter the blast radius of a car bomb or are shot by an insurgent sniper. I was curious why this choice was made: Did the design team disagree with Hoge or were other factors

at play? During many demos, people asked why they were not able to shoot, which they expected to be able to do when they had a gamepad in their hands while in a military-themed virtual environment. Rizzo would explain that shooting was not included because they did not want the system to be a "cathartic revenge fantasy," like a video game. This was also expressed in Manifesto on VRET published in *Veterans Today* magazine:

> [Unlike] off the shelf "War Games" there is no option for firing a weapon within the VR scenarios. It is our firm belief that the principles of exposure therapy are incompatible with the cathartic acting out of a revenge fantasy that a responsive weapon might encourage. (Rizzo, 2010)

However, this was not the only explanation that I received from members of the design team at ICT. For example, a program manager explained that shooting might be distracting, especially if it produced different outcomes than it had in the real war. "You don't want distract the patient from telling their story by creating a contrast between what happened when they shot a gun in the real world and the kind of agency they have in the game." To this, he also added a second explanation for not including shooting: "You also don't want to create an unnecessary obstacle in the game, something they have to accomplish in the game space." That is, including shooting would create the burden of "advancement" in the system, wherein the patient-user feels that he *needs* to shoot characters in order to progress in the narrative—as one does in first-person shooter video games—and that might create counter-productive anxiety.

When I interviewed Pair and other designers who had been involved in creating Virtual Iraq, several told me that the decision to exclude shooting was a strategic

decision, rather than an ideological one. Shooting was just one of the many features that they chose not to prioritize given the limitations in time, resources, and manpower.[168] Indeed, in early papers describing the system, Rizzo had suggested that shooting *would* be an available feature that the therapist could control.

> In each of [the] user perspective options, the user may or may not possess a weapon, and in some cases the weapon will be usable to return fire when it is determined by the clinician that this would be a relevant component for the therapeutic process. (Rizzo, 2005)

However, as we see in this description, shooting is not described in terms of killing, or of initiating violence, but rather in the politically neutral terms of "returning fire." Indeed, in BRAVEMIND, they did create a clinician control that would allow the patient-user to shoot rounds from the position of the Humvee gunner, but these rounds would be fired into the air, without creating any effect on the virtual environment or characters.

Therefore, it might be more accurate to say that Virtual Iraq did not explicitly represent an ideological stance regarding the traumatic nature of killing, but rather that the design team implicitly recognize that any representation of the patient-user killing would be problematic and open to interpretations that could undermine their collaboration network.

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[168] Game engines provide development tools as well as software components including graphics, sound, physics, and artificial intelligence functions. If the team had wanted shooting, they could have used a first-person shooter game engine, but this would have likely entailed its own animations and physics for what happens when a gun is fired—which in games is often a splatter, followed by the enemy disappearing.

Case 2: Is Representing Violence Against Bodies Therapeutic?

Though Virtual Iraq allowed clinicians to choose one of four severities of wound states for the characters hurt by on-screen violence, many of the clinicians I had interviewed said that during therapy they only used the lowest level—which created no injury. In April 2011, I attended the seventh VRET clinical training at Ft. Bragg in Fayetteville, North Carolina, where I learned that in addition to giving tips for how to work with the system, the trainers, Barbara Rothbaum and JoAnn Difede actually instructed the attendees to use the lowest wound state setting. In her own practice, she explained, she has patients describe injuries in great detail, but will not put such imagery on the screen: "I want to hear it [from the patient] but I don't want them to see it. The point is to expose them to their memory, not to desensitize them to blood and injury." Difede added a further theoretical rationale: "Jung said that we have an archetypal response to blood. It is part of being human and we should not desensitize our patients to that." In the terms of Foa's and Kozak's emotional processing theory, they did not need to expose them to blood and gore because these were necessary parts of the fear structure: it is considered natural to respond to them with fear.

Given designers' concerns about prioritizing what they could build given limited resources, I was surprised to learn that Virtual Iraq had a feature that clinicians were explicitly being told not to use. Was it merely at artifact of the original build?[169] When I

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[169] It was clear that there were still many bugs in the program. For example, the Humvee in front of us was floating upside down. Assistants from Virtually Better and from TATRC attempted to

returned to Los Angeles I made a point of finding out if such kinds of imagery of violence against bodies was going to be included in BRAVEMIND. They were: in fact, the range of wound state was going to be expanded. Six wound states were planned: mild, moderate, and severe versions of both blast injuries and gunshot wounds.[170]

A few weeks after the training session, I was able to interview Benny, the technical artist on the design team tasked with creating meshes[171] for the "wound states" on the virtual characters that would populate BRAVEMIND. Sitting at his desk in the Art Group's cluster of cubicles on the third floor of ICT, Benny showed me some progress shots from a mesh file for damage state for the middle-aged adult male civilian character. In the final product, this mesh would be placed over this character when a blast is triggered on the appropriate damage setting. The middle aged Iraqi male character has a mustache and wears a blue plaid shirt and jeans. With the mesh placed on him, his body becomes blotched in red and chunks of his body disappear. The design team refers to this

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help, ultimately restarting the program. The clinical trainers, accustomed to glitches, were not bothered by this.

[170] The design team does not force people to work on this gruesome injury. Benny volunteered for the job. He has a background in video game art and enjoys designing aliens and monsters. So far he finds modeling mangled bodies more interesting than some of his other projects at ICT, where he models clean uniforms and tour guides. Modeling wounds had originally been tasked to a different technical artist on the team, a woman who specialized in character design, but it became Benny's job when she asked to be spared of the task because she is pregnant. She did not think it would be wise to spend her pregnancy looking at gruesome images, including those of dead children.

[171] In digital animation, a "mesh" refers to a three-dimensional shape made of polygons. To create an element, the mesh is covered in a texture, a two-dimensional "skin" or "wrapping paper" that will produce the appearance of the element structured by the mesh.

character as "Choppy," because he is the test character for the wound states. "Terrible things happen to him," they joke.[172]

When creating a character, Benny starts with a concept image, a low resolution mock up created by one of the design leads. To create a detailed, high-resolution character, Benny supplements the concept with reference material.[173] Artists like Benny may collect their reference material into a single "model sheet," a collage of images relevant for a specific modeling task. The model sheet allows the artist to survey many reference images at once. There are between 25 and 30 images in Benny's model sheet for the severe IED blast wound state. Many of these are images of the interior of cars, taken through open or missing doors. Inside the cars and splayed out on the ground are charred bodies, bodies missing limbs and limbs missing bodies. One image particularly stuck out: a man in a car, what is left of him, his head and face having been reduced to the pink bowl of an empty skull balanced on a bloody neck.[174]

Benny tells me that while he does not enjoy looking at the references and thinking about their origins, he is grateful to have these images: "Even though they are gruesome,

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[172] Giving him a cartoonish name rather a traditional Iraqi name allowed both emotional distancing and distancing from the reality of what he represents.

[173] The team has a private library of reference material with several directories, including Characters, Environments, FromSoldiers, Maps, Medevac, Props, Residential, Structures, and Vehicles. In the original build, all the image files from a given source had been stored together, but eventually one of the artists asked if the asset management would separate out the violent content. Before this was done, folders of images provided by soldiers might contain both scenes of children playing and the aftermath of IED blasts.

[174] When I ask Benny if he will find me the reference material, the voice of the lead technical artist, his supervisor, calls from over the cubicle walls "Don't do it!" in a joking tone. I have been asking about reference materials for months, and the team does not think I am mistaken in my desire to see the images (when I ask them about it, they sometimes refer to the images as things they wish they had not seen or would prefer not to see).

this is the type of reference you are looking for, especially if you are trying to represent reality … Your art is a direct reflection of the reference you have."[175] Because the original build was fairly low resolution, the artists had been able to use video and black-and-white images as reference material. The new build on Unity would use much higher resolution graphics, which required higher resolution reference material, and for Benny, much more graphic imagery.[176] I asked him if he had an idea of how viewing this kind of imagery could be therapeutic. He did not have personal experience with the war, but had heard stories about soldiers coming back with their emotions bottled up and had gained a sense of what exposure therapy was from hearing Rizzo talk about it in media reports. He said that he thought graphic imagery might be valuable in helping to trigger memories.

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[175] Benny tells me that these images are not so bad when you see them all laid out. The lead designer also conveyed this sentiment when he described the importance of "aestheticizing the experience" of looking at graphic reference material during the design process, trying to see interesting shapes and textures rather than violated bodies. There is something interesting to be said here about vicarious traumas, as well. Since the revision of the fourth version of the DSM, people can be legitimately traumatized by vicarious exposure to violent imagery. For a discussion of the social implications of "virtual trauma" incurred through mediated activities such as seeing the fall of the World Trade Center Towers on television, see Allan Young's piece, "Posttraumatic Stress Disorder of the Virtual Kind" (Young, 2007). As a part of their work, the designers of the VI/A project have to look at very gruesome imagery of wounds and death, and then recreate these. These are neither simply medical curiosities or video game fantasy, but real consequences of the war that they are designing as a tool to help ease the trouble minds of those who fight within it.
One of the most common symptoms of PTSD is the flashback: an image burned into the mind, fragmented and without context. But in modern warfare, technology has given us a different kind of flashback: the 30-sec camera-phone video as well as countless snap shots. The design team watched such videos over and over, like traumatic memories, but for a very different purpose: in order to get them "right" to recreate them in a controllable way that a therapist can control, and that the patient will learn to control. Through design, they would give technology a mediating role in mastery of traumatic memories.

[176] This also created a challenge because high-resolution imagery of wounds was more difficult to find through Google image searches and other methods that had worked before. Many graphic images were acquired directly from soldiers.

"Skip mentioned that they don't need much to get triggered, but obviously if it's closer to what they've experienced it triggers faster" (interview, June 30, 2011)

When I mention to him that some therapists have said they would not use this high level he says that maybe if a patient is resisting emotional engagement, then the clinician can show them this imagery. He suggests, for example, that soldiers who play contemporary video games are used to seeing hyperrealistic "blood, guts, and gore" imagery, and therefore BRAVEMIND has to be "on par with the technology," both in terms of what it shows and in terms of graphic sophistication:

> Maybe these soldiers are playing these games and are desensitized. PlayStation 1 games might be not enough. Or maybe low level of trauma wouldn't work for them. Some of these games are just crazy. (interview, June 30, 2011)

From the artist's perspective, this is part of the necessary functionality of the system given the imperative to create a controllable Iraq and Afghanistan environment. It is not only a part of the reality of war, but part of the media environment that they are accustomed to, and therefore necessary to make available for therapists.

After interviewing Benny, I asked Rizzo why the team was including these graphic trigger stimuli, even though he had attended each of the clinical training sessions. His explanation was not that graphic imagery could create faster results, but he did agree that different patients have different baselines for stimulation. However, his distinction was not based on whether or not service members played video games, but rather based on their military role: he pointed out that medical personnel *do* need to be desensitized to blood and gore.

Still unsure what to make of this, I emailed Rothbaum to ask if there were any cases in which it would be appropriate to show physical injury during VRET. She replied that, "Yes. Medics and others who do need to be desensitized to blood and other traumatic stimuli might need to see this." However, other clinicians I interviewed did not think it was necessary to provide special medic-specific imagery: "Some people say need something for medics … But even if the patient is a medic and we don't have environment, the Humvee is still evocative" (interview, May 23, 2011).

Additionally, from early in the project, Rizzo and his collaborators began writing that they believed that Virtual Iraq might have additional value as an assessment tool. McLay, for example, has described how in Fallujah he sometimes used the system in order to validate his opinion that a Marine was ready to return to combat operations after seeking treatment for PTSD. Others have suggested using Virtual Iraq as a part of post-deployment screening. In these cases, the violent imagery is not actually intended to be therapeutic, but rather as a stimulus testing material to be used in evaluating a service member's ability to tolerate violent imagery.[177]

In both the case of medics and of assessment, having the technical capability to produce violent imagery clearly influenced how members of the collaboration, especially clinicians, understood how the system could be used in practice. But because the system was flexible, and features could be used selectively, any individual clinician could decide

[177] Another possible answer is that these features need to be available for demos for potential funders and other supporters for the military. Maybe military personnel believed that showing graphic imagery *was* necessary and wanted it to be an option. The technology would not get onto bases or onto clinicians' desks, unless someone at a high level position was willing to sponsor the project, to devote time and resources and money to bring it onto the base.

in any given therapy session which features were appropriate to use or not use: the design did not require them to use, or not use, violent imagery. But from a design standpoint, removing this feature between versions was not an option, precisely because their goal was to expand the number of elements that therapists could use to customize the system. Even if some therapists said not to use the wound states, others might already be using them in ways that the design team was not aware of. Therefore, features could be added, but they could not be taken away.

Case 3: Are the Sounds of War Therapeutic?

Though shooting was not permitted in the system, the sound of gunfire was nonetheless considered an important feature by clinicians. What could not be seen could still be heard. As the sound designer for Virtual Vietnam, Jarrell Pair had set a precedent for using detailed immersive sound as a key component of designing a PTSD VRET system. Though clinicians requested virtual characters and other features that Hodges' lab did not have the resources to produce, Pair was able to create an extensive sound library and presented in high-quality surround-sound. In his estimation, the sound made up for the lack of visual information.[178] People even told him they felt that exposure therapy could be done with sound alone.

The design team had drawn on diverse resources for creating the Virtual Iraq audio, including the *Apolocalypse Now* audio CD library, recordings made with actors at

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[178] Along similar lines, in his guidelines for designing VRET systems, Hollander had proposed that one of the ways to help take patients to the "magic mountain" was to use sound to disambiguate otherwise ambiguous scenes.[178]

ICT, and recordings made on military bases. But their focus had been more on creating the visuals than in audio. The sound design for BRAVEMIND would attain much higher production values. In October 2011, I met the sound designer, Martin Daughtry, an assistant professor of Ethnomusicology from New York University in a soundproof room on the third floor of ICT. Overall, Daughtry's approach to sound design is very different from the approach of the graphic designers; while the graphic designers relied on reference materials in order to create representations that were simultaneously specific and generic, Daughtry aimed to capture Iraq itself by recording it.

Daughtry had become involved with the project while working on a book about the sonic regimes of the war in Iraq. He was planning to spend a year in Abu Dhabi, but wanted military permission to go into Iraq. For months, though, he had been hitting bureaucratic roadblocks.[179] After seeing a press piece about Virtual Iraq, he contacted Rizzo to see if he could help him get military access to Iraq if Daughtry contributed to the sound design by making high-quality professional recordings of the war in Iraq. Rizzo did. When I met Daughtry, he had returned from his trip where he had recorded 17 hours of audio.[180]

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[179] In his own work Daughtry is approaching what French film theorist Christian Metz has called scopic regimes—which is a way to theorize the visual experience of an era. Some people have adapted Metz's idea to talk about aural regimes, but Daughtry wants to talk about *sonic regimes*, which is a more localized way of thinking about the sounds of a situation rather than an era. The idea raises questions about who is responsible for the sounds in this scape. In this case the scape is war. For example, IEDs are less directly damaging to the U.S. military than they are sonic evidence for both sides and civilians that the insurgency still exists.

[180] He told the military that he would like to do sound and conduct interviews, but it became clear that this interview issue was a non-starter. Even after agreeing to do no formal research, it took over 400 email exchanges to get permission, sponsorship, and organization for the trip. I asked if

Daughtry drew on a number of resources in choosing what to record. First, he visited ICT to meet the design team and demo Virtual Iraq, which gave him a sense of the sounds already being used. The lead designer also gave him a list of desired sounds to take with him to Baghdad, such as a Humvee engine at different gears and the sound of a gun turret turning. ("Items on this list such as 'RPG, incoming' generated a lot of laughter among my military colleagues," he told me.) Two other factors influenced what he gathered: The first was his own interviews with service members about the sounds that they found most memorable that he had conducted as research for his book. These included the sound of boots walking on the smooth stone gravel that covers military bases and the beeps of comms systems before a radio message. The second important factor was the constraints on his movements, which were limited to Camp Victory and one day in the Green Zone. These last two factors were very different from those that affected the visual design: no one on the design team either went to Iraq or did research directly with service members. Their understanding of what the system needed to be was based on clinician requests, reference materials, and what it was possible to engineer. What was important to Daughtry, in contrast, was capturing what was remembered and familiar to warfighters, not necessarily what was traumatic. Therefore, he captured many sounds that were specifically not associated with trauma or even battle. Whereas the graphic design

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he had any sense that the military personnel he was communicating with was skeptical about Rizzo's work. He said that he got no sense that they were skeptical about *PTSD*; they all said we respect what you're doing but we have no protocol to govern what you want to do, no box to check. This was made more complicated because he is not on the official payroll for the project, so that required more paperwork.

was about representing elements of traumatic experience, for Daughtry sound design was about capturing sounds of war.

The importance of capturing the sounds of war and attention to detail was evident as Daughtry took me on an audio tour of the recording that he was editing. In order to be useful, recordings needed to be cut into discrete sounds that could be linked to specific actions and clinician controls. Once Daughtry finished editing the sound files he recorded into discrete elements, they would be relatively easy to engineer into the system. Compared to adding visual elements or animations, adding sound elements was a low cost to the design team in terms of managing their resources. He was aiming for a total of about 80 discrete sounds as well as enough hours of ambient sounds that they should not have to be looped during a single session of PE. Whereas a patient who continues driving for 20 minutes will necessarily pass the same landscape markers, Daughtry recorded enough audio to be able to provide new sounds throughout a 90-minute therapy session.

Common ambient sounds included wind, birds, and—because it is often over 100 degrees—the whir of air conditioners. However, Daughtry points out that the ambient sounds were different when he recorded from what they would have been early in the war. For example, blast walls have gone up, creating new echoes. Also, the electric grid that once provided Baghdad's electricity has gone down so that now the city buzzes with constant whirs of gas generators. Daughtry points out that while some of his recordings are highly distorted by noise, this noise is not caused by the quality of the recording equipment, but rather by the omnipresence of generators. A recording of speech without this noise would not sound like words spoken in Iraq as he experienced it, though this may not be the case for someone deployed early in the war. Daughtry did not believe that

Virtual Iraq could capture a *place*, because Iraq itself is constantly changing. Instead, it can only capture *experience*, in the sense that it could evoke feelings and memories. Recording technology allowed him to literally capture experiences, but changes in Iraq itself prevented him from capturing the place as those who fought earlier in the war may have experienced it.

One of Daughtry's goals was to record high quality vehicle sounds. When playing the sound of a Humvee at the correct volume he pointed out that this was much louder than it would be in a movie. The sound also rattles, and is accompanied by the whir of the AC system. The lead designer told him that in order to get the original Humvee sound he had gone out to Twenty-Nine Palms where he had recorded an engine turned on, but without the vehicle moving. All other details of the sound were created in post-production: for example, to get enough time, he had looped the recording, and to represent the shifting of gears, he had either sped it up or down. Though the design team had not yet built a simulation of an MRAP, a mine-resistant ambush protected vehicle, Daughtry also collected sounds of these vehicles. In the latter part of the war, MRAPs became more common that Humvees because they are designed to withstand IEDs. They have a v-shaped bottom and a much bigger engine. In addition to the loud engine and air conditioning fan, we can hear sirens, which Daughtry explains soldiers put on whenever they drive in traffic.

Daughtry also recorded sounds from the base. "There will be a test fire of a phalanx weapons system in 5 minutes" repeats multiple times in English over a loud speaker, followed by the sound of a C-RAM. This is the counter rocket, artillery, and mortar system used to detect and destroy weapons launched at bases. The sound of the C-

RAM itself is striking: a deep electric zipping sound caused by the rapid fire of thousands of exploding bullets. The C-RAM is the sonic memory most prominent for people in the green zone, Daughtry tells me, probably because it was something they could hear far away. The sound was less of an issue for people on base, perhaps because it was part of their training, or perhaps because it sounded to them like they were being protected. I ask if the warning is only played in English. He says yes, but only because it is a test: there is no warning before the real thing. We both understand, but don't say, that as sonic warfare, even a test must be terrifying to Iraqi civilians.

He tells me he is going to play me some *real* gun sounds—but, of course, these are not the sounds of real gun battles or violence, but rather something much more mundane for service members: recordings from the base's firing range. Used in VRET, these living recordings will be iconic rather than indexical representations. He plays an M-4, pointing out the "popping" that "you don't get at the movies."[181] He recorded at 4 meters, and then at 50 meters, and from behind a berm, but was not allowed to get any closer, or stand behind the gun.[182] Then he opens several firing range audio files and plays them simultaneously in order to simulate the sound of a gunfight. While the gun sounds are individually "real," he points out sonic differences between this simulation and a real battle: There are no voices or other background noise, and the distances

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[181] Given the loudness of these sounds, a novice sound person would have blown out most microphones, even with the gain all the way down, he explains. He shows me the sound software. "See how those lines go all the way up and down? That means that the recording is missing some information at the extremes. As a sound engineer, you want little lines. But it's impossible at four meters not to have it clip. At a greater distance, the microphone captures everything, though."

[182] Daughtry had far less control over the sounds he could record from soldiers than from his Iraqi volunteer actors.

between the recording device and the various weapons are too regular. Also missing are the sound of birds: he learned rounds of gunfire near birds erupt into a cacophony of chirping and cawing. To better simulate a gunfight he says that he could supplement the sounds with some from the *Apocalypse Now* audio library CDs, but laments that the Vietnam War–era M-16s probably sound a little different from those used in the War on Terror. [183]

In addition to recording the live sounds of Iraq, upon request from the lead designer, Daughtry also recorded several staged scenarios. This was especially important for capturing voices. For example, he drove around with some soldiers and had them pretend that an IED had gone off. We hear shouting. Male voices say, "How's it going gunner?" "Dispatch your meters!" and "Out of the way!" Daughtry also recorded the sounds of Iraqi people talking from various distances, as well as background voices speaking both indoors and outside. He plays a recording of man speaking close to his microphone. Daughtry says that the man is talking about his feelings about Iraq, Saddam Hussein, and America. More voices: "American dollar!" a phrase Iraqis often shout at passing platoons; "All the way, sir," the habitual greeting of the 82nd Airborne, with whom Daughtry was embedded; a Iraqi woman's voice, speaking softly in Arabic; and voices yelling, "Get down! Get down!"

But in choosing what to record for his own work, he was less interested in staged scenarios than in capturing ways of listening that were learned in the context of war: "We

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[183] He says *Apocalypse Now* was designed with total control by Walter Merch, who was the top sound recorder of his day.

would hear a sound and I would flinch and the major would say, 'that's a construction site' but other times I'd hear nothing and he'd say 'did you hear that?'" Soldiers are not supposed to listen to music on missions, but they do. Riding with soldiers he noticed that at first he could only hear profound engine noise,

> but then a pattern emerges and eventually you start to hear music, and then realize it's Phil Collins. But the sound is so deeply buried. They're not really listening, just getting a little sonic information, just enough to trigger a memory of that song. It's deeply personal. They listen through the white noise for the music. (interview)

He wanted to record this strange sound, music playing over cheap speakers, barely audible over the roar and sirens of an MRAP.

Though Daughtry's choices in recording sounds pushed the system towards representing war rather than traumatic experience, ultimately, what would be used and what was considered necessary for the system would be shaped by clinician requests.

> So in the end I did the best that I could with the resources at hand. I wish I could go back and record a bunch of iterations of the call to prayer, and children playing soccer, and more marketplace sounds, and AK-47s, and an Abrams tank, and many more combat reenactments, etc. etc. etc. But hopefully we'll be able to cobble together decent facsimiles of most of the stuff we currently lack. (personal communication, October 7, 2011).

This illustrates the tensions of the design process between the need to meet clinician needs, the desire for high production values, and the need to work within technical resource limitations. Daughtry's choices in recording sounds made the system specifically about recording the sonic regime of war, while the design choices around shooting and using violent imagery illustrate how the system became less about representing war itself and more about concepts of trauma.

Conclusion

Because it was designed using a distributed, iterative process in which designers were separated from both clinical culture and military culture, Virtual Iraq has never represented any one person or community's understanding of the role technology should play in therapy. As it was developed, all parties that contributed to the development of Virtual Iraq had to figure out what it should and could be. Its design has never been entirely guided by either an ideological standpoint towards war or even trauma, but rather has been negotiated through efforts to balance engineering requirements and limitations, high production values, and clinician desires. In the three cases above we see that these elements often conflicted and created odd tensions. But because the flexibility of the system as a whole allowed clinicians not to use elements that they did not believe would be therapeutically useful, these tensions have often been resolved by erring on the side of constantly adding to the system as resources became available to do so … making something that could represent as many "traumatic experiences" and situations as possible.

The system is not static, nor should be studied as such, but rather evolves as more resources become available, and should be understood both in its present form and as a current iteration towards a future, imagined form. We do not yet know what clinicians think of the new BRAVEMIND system. Will they find its expansion of features useful or not? Will the increased production values help to create therapeutic engagement or will patients lose track of their own narratives when confronted with the attractive new virtual environment?

Because the project was designed using user-feedback models, the design was both a reflection of the designer's limited glimpse in another professional world and an effort to make something graphically attractive with limited resources. As long as clinicians continued to use the device, designers did not need to worry about what trauma was or how to treat it. When it "works," the theory is not important. Up to the point where the user interface becomes unusably cluttered, adding more features on the design side is never a problem for the user, who just will choose not to use them.

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CONCLUSION:
MEDIATION, IMAGINATION, AND MACHINE AGENCY

The purpose of this dissertation has been to trace the making of a new modality of posttraumatic stress disorder treatment (PTSD) for military veterans, Virtual Iraq, and explain how its creators positioned it as the right tool for this job. I have argued throughout that in order to understand these accomplishments, we must consider Virtual Iraq from multiple levels of mediation: technical, as a medical device designed to augment a therapeutic practice; social, as a boundary object between multiple social worlds with an interest in novel PTSD treatment; and cultural, and as an artifact used to transform the public image of therapy. The success of Virtual Iraq necessarily involved each of these three forms of mediation.

I approached this study from the perspective of science and technology studies (STS), using ethnographic and historical methods to follow both the technical and social development of a new technology, but at the same time showing the importance of cultural imaginaries to technological development. A new technology cannot succeed unless it is culturally appropriate; society has to see it as something that makes sense to use. Before we delegate agency to machines within sociotechnical systems we imagine it. Therefore, to study Virtual Iraq only as a medical device for the technical remediation of therapy would be to ignore its role in culturally remediating the way that therapy is understood.

Therefore, in order to tell this story, I first analyzed media coverage to show how journalists and others have used Virtual Iraq to illustrate PTSD therapy in ways that keep its meaning in line with preferred modes of thinking about military masculinity. Then I explained how its inventor makes the technology perform for publics as though both videogame and scientific tool, which he negotiates to make it attractive diverse audiences. Next, I provided historical evidence that VRET originates not with the military-entertainment complex, but through the collaboration of clinicians and computer scientists—based on view of PTSD as a 'war phobia' which comes from what technology can do and clinical psychology can prove, not an ideology about war. Finally, I drew on my fieldwork to show that the people who made Virtual Iraq did not know very much about trauma or therapy but did have high expectations for the technology's features and production values.

Those invested in the success of Virtual Iraq, especially its inventor, Dr. Skip Rizzo needed to bring together many cultural, technical, social factors together. As we have seen, the creators of Virtual Iraq designed it to (re)mediate exposure therapy by offering therapists new affordances for carrying out the activity. Before Virtual Iraq could become a significant psychotherapeutic tool, it needed military funding and therapist support. In order to gain this funding and support, it had to have scientific legitimacy and technological authority. To obtain funding for the development of the system, it was important that the technology was targeted at a specific logistical problem of interest in the United States military, whose diverse divisions offered many opportunities for copious funding. To justify military investment in and development of a

VR system for clinicians to use, there needed to be a significant population with a "shared" domain of traumatic experience for whom the virtual environment could be designed. This was also necessary for establishing that it would be possible to conduct statistically significant research with the device. Research also required a significant population of therapists working primarily with the target treatment population. Therapists working with this population also needed to be willing and able to learn new techniques, which was afforded by the Department of Defense and Veterans Administration 2007 imperative to train their therapists in new evidence-based PTSD treatments. For VRET to be included in this training, the method of therapy needed to be based on an empirically support technique. Given that Virtual Iraq was being developed at the same time that PTSD was becoming a significant issue, precedents were necessary to show that the VR modality was safe and at least as effective as the version of therapy done in traditional modalities.

Even though we still do not know whether exposure therapy conducted with Virtual Iraq has a greater capacity to promote healing from the traumatic wounds of war than traditional PE, it has nevertheless become an important symbol of the American military's commitment to investing in innovative new therapies for PTSD. Yet, precisely because this project was not a top-down solution to the Department of Defense's PTSD crisis, its proponents needed to inspire the imagination in order to earn military investment in the project. Though the military often requests technological projects to help it attain its logistic goals, this was a bottom-up, an inventor-driven innovation for making large-scale changes to large-scale problems. In describing the history of the project, all members of the team—including Rizzo—described the difficulty to getting

money to build it. Only by figuring a world in which Virtual Iraq appeared self-evident as a tool for treating military PTSD could the necessary groups be enrolled into that world and in so doing, make it a social and material reality. The necessary scientific legitimacy and technological authority were achieved with social activities of representation—including media appearances, demos, and conference presentations—that contextualize praxis in cultural imaginaries. These representations shape what we imagine what is possible—how Virtual Iraq could be understood as a tool for making therapy attractive to young male service members.

But to the extent that these representations were public, they simultaneously conveyed this understanding of Virtual Iraq as a cool technology within the broader arena of the cultural imagination, which was necessary for both gaining the attention of veterans and their families and for attracting diverse public interest and demand. Attention to these representations itself was contingent on the broad contemporary interest in the treatment population because of their intimate connection to national identity via the their involvement in the war. For the technology to gain so much attention, it was important that it was considered to some degree to be "cool" and "high tech" in and of itself. Just as important was the cultural association between this particular technology as the target population. Widespread knowledge of military investment in video game and simulation technology helped to make this work make intuitive sense, while the actual history of military investment in this technology had created the Institute for Creative Technologies, which provided the institutional framework and concentration of expertise necessary for building the technology quickly and providing a trading zone where military leaders already went to get ideas about

which technologies to invest in.

I argued that public representations of the technology have created an image of military trauma itself as a medical entity whose source can be known and represented within the digital archive of a VR program. Only in this way was it able to be imagined as having the agency to allow therapists to compel patients to face their traumatic memories. By making it appear to already be an extant clinical tool, public representations helped to constitute a world in which the audiences necessary for the project's success would already see Virtual Iraq as a real PTSD treatment even before seeing the device or meeting its inventor.

In chapters 1 and 2, I focused on the construction of the public imagination of Virtual Iraq. I demonstrated that in order to become part of a sociotechnical network, it needed to be meaningful in different ways for several different kinds of publics, including the military, clinicians, patients, and the wider public. Many parties have benefitted from the belief that PTSD can be healed by technologically mediated exposure to traumatic imagery, and from the belief that VR can help to achieve this. For the military, it helps to reduce the perceived burden presented by PTSD, making it into merely logistical problem that does not raise questions about the wisdom or psychic cost of going to war. For therapists, it promises that the new technologies available to their profession may help them to offer effective new treatments that will lend them the prestige of other areas of medicine. For service members with PTSD, it promises that new science and technology can help them to recover. For the public at large, it provides a certain reassurance that the military cares enough about its service members to invest in cutting edge new treatments.

I used media and performance analysis as an important tool for studying how

cultural practices render the value of the technology meaningful for its publics during the development process. These techniques enabled me to explain the how Virtual Iraq's promoters drew on hegemonic ideas about the gender identity of military service members and their relationship to technology—especially video games—in order make it seem that it was the right tool for the job of treating PTSD. Both discourses and the performance of video game drag in the media and demos to military leaders figure a world where digital remediation can costume traditional therapy by making it resemble the games young men enjoy, and in so doing make it attractive by erasing its cultural connotations of emasculating stigma. Additionally, given the argument that PE cannot work when patients are insufficiently engaged, the figure of the video game player insomniac addicted to his virtual world makes intuitive that Virtual Iraq have the technological agency to overcome this problem.

The idea that the performance of video game drag will overcome stigma as a barrier to care has been powerful in legitimizing the technology for non-patient audience—indeed, one that has at times even superseded questions of whether the technology actually improves the efficacy of prolonged exposure (PE). However, video game drag is unlikely to be where Virtual Iraq's power to destigmatize therapy—or PTSD—lies. Digital generation service members are likely to be more discerning regarding what makes for a good video game than they are given credit for.[184] Video

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[184] Several researchers have cited the 2008 *CyberPsychology & Behavior* article "Soldier Attitudes about Technology-Based Approaches to Mental Health Care" as evidence that the use of technology will attract more soldiers to treatment (Wilson, Onorati, Mishkind, Reger, &

game drag is an unsophisticated way of thinking about how to solve problems with technology—and yet, it works to inspire the cultural imagination.

Perhaps Virtual Iraq's most important contribution to PE is no specific technological affordance, but rather a different kind of exposure: *media* exposure. More than anything else, Virtual Iraq provides a story-worthy public representation of therapeutic progress. At the same time that the technology is legitimized by the discourse that it will ostensibly attract Soldier 2.0 to therapy, media exposure produces the desire for the technology. Rizzo could not provide Virtual Iraq directly to veterans, he could but he could provide it to interested therapists who called him after seeing media pieces—though with the understanding that it was a research prototype. This was a useful way to find other groups to collaborate with in order to conduct research on the effectiveness of the technology for improving therapeutic outcomes.

But this would only be the first step. As a project manager on development team explained to me, when it comes to the success of VRET, he has faith in the market that will be produced through media attention to Virtual Iraq. Once publicity has established

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Gahm, 2008, cited by Gerardi, Cukor, Difede, Rizzo, & Rothbaum, 2010; Reger & Gahm, 2008; Stetz, Ganz, & Folen, 2010). The actual data, however, are not so straightforward. Of the 325 survey respondents, 283 were willing to do both traditional therapy and technology-based therapy of any kind, showing that the while the majority was willing to use technology, but were also comfortable traditional therapy. Of these, 196 were willing to try VR. Only 43 respondents answered that they would be unwilling to participate traditional talk therapy, but out of those only 14 (33%) said they would being willing try a technology-based therapy. Of those 14 who were only amenable to trying technology-based therapy, slightly more than half, eight, reported that VR was one of the technologies they would be willing to try. Though, to be fair, the only technologies with better results were "Alternative therapy programs" (10) including those using the Internet (9) or home computer (8) or "Responding to anonymous questions online" (10).

as an empirically supported technique, it will not be necessary to convince therapists to use it, because once veterans or their families who hear about it and come believe that it is the most advanced and efficacious therapy for PTSD, they will ask for it and will turn away from providers who do not give it to them.

* * *

While media and performance analysis were valuable for uncovering how the figure of Soldier 2.0 was being constructed as the ideal user for the technology, taken alone they could not answer important questions of knowledge and legitimacy. Nor could they explain where the technology came from, the process through which it was made, or why therapists would be willing to take it seriously as a clinical tool. Indeed, they could not help me to explain why it needed to be constituted within the cultural imagination years before research had established its clinical value, which was essential for understanding the process of technological development in this case. Therefore, even though my interpretations of representations of Virtual Iraq could illustrate how meanings were produced for public and military audiences, engaging with those involved in the development process added sociological and historical depth to the project by revealing how choices were made that subsequently resulted in the cultural forms that I witnessed. Following the actors involved also allowed me to evaluate these questions.

In the second two chapters of the dissertation, I focused on the internal process of making Virtual Iraq and how decisions about the actual affordances of the technology—both interactional and aesthetic—were made. I showed how concepts of legitimate clinical care as well as issues of technical feasibility have shaped the design of Virtual Iraq and its predecessors, but so too have public expectations about what the technology

should look like. Though neither the designers nor clinicians knew in advance that the technology would be an effective modality for exposure therapy for anxiety disorders, they felt an imperative to make it match the expectations of its various publics that it would resemble a video game.

While laboratory studies have played an important role in STS, revealing how knowledge is made through the coordinated actions of humans and non-humans, including inscription devices, infrastructures, and instruments, the MedVR lab was different from many of the labs that STS has traditionally studied. Knowledge about how to use Virtual Iraq in therapy was not created there. Though the lab brought new objects into the world and disseminated ideas about how to use them, it did not actually produce clinical knowledge: experiments were not run and data was not analyzed. These knowledge-making activities took place elsewhere and therefore being in the lab necessarily deferred many of my questions about the feasibility of the technology in therapy.

The MedVR lab was largely engaged in producing the meaning of the technology for its diverse publics. It was a trading zone that provided an institutional and physical context wherein technologies could be made to perform and these performances attached to discourses. From Rizzo's promotional work to the actual design of the Virtual Iraq based on realistic military video game production values, the lab always had an eye to an audience—real or imagined—which structured how they worked. Their consciousness that Virtual Iraq would to need perform for diverse audience also shaped how they designed the system itself, always striving to give it additional features and make it look like cutting edge technology and with the realistic aesthetic of military video games.

This is not to say that knowledge was not produced at the MedVR lab: instead the knowledge the lab created was not whether the technology could help in therapy, but rather whether they could build a technology *that others would believe could help in therapy.* This could only be evaluated based on the extent to which they could keep the project active within a network of military, academic, and clinical actors invested in its study and use.

Table 1: Forms of Mediation of Virtual Iraq

Forms of mediation of Virtual Iraq
Technical Mediation
Therapeutic mediation, making the subjective objective and available for reworking—which can also happen through the imagination and narration
The mediated experience that demonstrators get when they play Virtual Iraq (though slightly internal, really isn't…)
The mediated representation of Iraq that patients see
The mediated access that the therapist has to the patient via the Wizard of Oz display
Social Mediation
The clinical trainings that shape how clinicians understand the accepted way to use the technology.
The mediated experience of scientific papers, reading about the effects on others mediated through scientific inscriptions and measurement conventions
The mediated experience of Rizzo's presentations themselves, which color all other interpretations—both through his appearance/performance and through the content of his master narrative
Drawing on military interest in logistic solutions to problems.
Cultural Mediation
The mediated image of the technology that television viewers have when they see people in HMDs and see Rizzo helping them interpret it
The mediated understanding of Iraq that the designers and engineers have based on their source material
The designers' understandings of the production values for digital media expected by both "gamers" and military funders.

Impersonal Therapy, Depoliticized Trauma, and Behaviorism

It is worth returning to one of the issues that I raised in the introduction: does Virtual Iraq militarize therapy? By militarizing therapy, I specifically mean applying militaristic technologies to the practice in order to depoliticize trauma and render its treatment merely a logistic problem, and, to combine Foucauldian concepts, make treatment a matter of disciplinary biopolitics. I've suggested a couple reasons to be skeptical about this. The first reason is the fact that the practice of VRET for PTSD did not emerge from the military, but rather from a separate institutional context. Second, the design itself does not include killing as an activity veterans should be desensitized to during therapy. Nevertheless, I want to suggest here in order to make Virtual Iraq recognizable to the military as the kind of logistical solution to the problem of PTSD that they rely heavily upon as an institution, Rizzo and the technology's other supporters have implicated it in the cultural and historical process of the depoliticization of war trauma.

Rizzo did not seek to "militarize" therapy; his agenda was genuinely built on a desire to help those suffering from war. But the conditions for his success—and that of Virtual Iraq—were enabled by cultural conditions in which PTSD and its treatment were already being depoliticized. The medicalization of PTSD moved war trauma from a political issue—the question of whether we should engage in war given its effects on the psyche of those who fight—to a medical one—how to best treat PTSD once it has developed. Therapy is no longer a practice through which the traumatic nature of war is discovered, but rather is taken for granted and seen as a problem to solve through meditational practices that access and reorganize the disordered self.

I see Virtual Iraq not as the militarization of therapy, but rather as a new confluence between cognitive-behavior therapy techniques and the training models used by the military. They share particularly behaviorist ways of thinking about selves and how to modify them—specifically, that repeated exposure to stimuli can remake subjects better oriented to the realities of war. Behaviorism does not exclude emotions, though it does render them the object of technical intervention. Though authors have criticized the glamorization of war in military war games, the development of emotionally engaging material is not only an effort to train recruits in military culture and tactics, but is also a part of an effort to emotionally prepare them for the atrocities of battle. It is an expression of a profound faith that soldiers can be made, especially by conditioning them to the conditions of combat. The driving metaphor behind cognitive-behavioral approaches is that of conditioning or restoring a machine to proper functioning.

To be accepted by its various publics, therefore, Virtual Iraq was designed with depoliticized view of war trauma that conforms to a behaviorist understanding of both trauma and its treatment. It treats the symptoms of PTSD as merely learned behaviors and treatment a matter of unlearning facilitated by controlled stimuli in the "ultimate skinner box" (Rizzo et al., 2010, p. 116). The "traumatic" is built into the system, available to put on a screen. The problem of PTSD in the VRET model is not that war creates traumatic events, but rather lies in how individual service members relate to and respond to their memories of war and its associated stimuli. This frames PTSD treatment as systematic process of habituation in order to overcome an entirely justified war phobia.

Virtual Iraq therefore has been designed with a behaviorist aesthetic. It is designed to elicit responses that will encourage learning based on the behaviorist

definition of learning as creating or breaking associations between stimuli and responses. This view does not question that having more control over more vivid stimuli would by necessity improve the strength of a subject's response. Likewise, it expresses behaviorism's suspicion towards mental life as something that cannot be observed; the patient's imagination is an unreliable clinical instrument. Though Virtual Iraq does not promote forgetting or repression of traumatic memories, neither does it acknowledges what service members do in the course of war fighting—their meetings, their calls back home, the negotiations with families at checkpoints, and when clearing out homes. Or the endless waiting for something to happen. Its goal is not even to represent Iraq, but rather a particular perspective on particular events believed to be traumatic.

Commitment to behaviorism necessitates a commitment to the idea that the only reason that the veteran may be experiencing problems in life is because of the specifically traumatic experiences of combat. Indeed, PE and VRET require the full length of 90-minute therapeutic sessions, thereby removing time to talk about other issues related to either conducting war or returning home that the veteran may be experiencing. Traumatic memory is only a concern because it is symptom-producing. The connection between memory and symptoms is treated as a glitch to be corrected in the patient's psyche: that the therapist understand the content of the memory as it pertains to the overall life of the PTSD-subject is unnecessary for effective treatment. Neither his personal history nor the moral conditions of war fighting are up for debate as potential sources of distress. The veteran is neither a coward, nor a degenerate, nor a victim, but rather someone who learned to fear stimuli that, in the past, was adaptive to fear, but which, at the present, he

needs to stop responding to. The image of VRET is one of bravery and acceptance; as well as giving veterans power over their memories of what happened to them.

The explanation of Virtual Iraq as merely a militaristic therapy elides the role that science and technology play in providing hope. They promise the traumatized service member—and all of us—that there is nothing wrong with him, or the war that he has participated in, but rather that he is merely suffering from a temporary ailment, one that can be fixed using advanced technologies. The behaviorist model represents a therapeutic optimism, not only towards therapy itself, but towards the possibility of conducting war without permanently psychologically disabling those who fight. Veterans do not need to forget or avoid the memory in order to heal, nor do they need to speak out against what happened as an atrocity. Instead, repeated, therapeutically guided exposure can transform their behavior.

This also suggests that if we could know the traumatic ahead of time, that we could create better trainings and could prepare people better—which is precisely what Rizzo is doing with one of his latest projects, an immersion emotional training simulation system called STIVE (stress resilience training in virtual environments). And yet, when considering the application of logistical thinking to problems of training—implemented through these behaviorist virtual technology projects—I find myself agreeing with Sharon Ghamari-Tabrizi (2011), who has argued that within the U.S. military there exists a profound desire to prepare for war through simulation. Military technology planners desperately want to believe that war can be known ahead of its enactment, and that if we could just practice interacting with its terrible scenarios enough beforehand, we will be able to adapt in ways that will allow us to do the right things, defeat our enemies, and

emerge physically and psychologically unscathed. We just need the experience to feel real enough that we truly respond in transformative ways. But how could anyone claim to know what a war would be, or what would be traumatic about it? Why do we assume that preparing for one emotionally difficult situation will help us to deal with another?

* * *

The making of Virtual Iraq is not only a story of the invention a treatment technology but also of a culture of impersonal power being applied the to domain of therapy. For this concept of impersonal power, I am drawing on Chandra Mukerji's concept of impersonal rule, which she uses to describe the kind of political power created through the building of the Canal du Midi in France (Mukerji, 2009). The canal transformed the base of power from the personal and authoritative rule of the king into a technocratic form of rule based on the administration of land and engineering; it ruled as a material fact—rather than a law—that influenced the lifeworlds of those in Languedoc. Along similar lines, as a cultural artifact Virtual Iraq aims to make therapy impersonal because its material design and the discourses surrounding it make the case that trauma is merely a "technical" problem of war: a misalignment of subjects and environment that can be realigned through the techno-psychological process of human-computer interaction. As such, Virtual Iraq contributes to normalizing the concept of the traumatic as a technical problem.

The success of Virtual Iraq as an imagined, if not yet actual, treatment regime for contemporary American veterans illustrates how PTSD treatments are cultural artifacts that reflect contemporary beliefs about soldiering. In their historical chapters in *The Empire of Trauma,* anthropologists and therapists Didier Fassin and Richard Rechtman

(2009) illustrate how treatment regimes derive from the meaning of trauma in relation to service member identity. When traumatized service members are considered disobedient to military orders during war, treatments are designed as punishments that will encourage them to fall in line (approaches based on physical pain). When they are considered to be constitutionally weak-willed, treatments are designed to encourage them to admit to their weakness and express their own desire to overcome it (psychoanalytic approaches). When they are considered pawns of an unjust war, treatments are designed to encourage them to become anti-war activists who speak truth to power (rap groups and narrative therapy). And when both war itself and subsequent trauma both seem inevitable, treatments are designed to patch people up in a way that we believe will be both effective and even enjoyable: therapy becomes an impersonal practice that neither condemns war or mental illness.

By studying how technocrats *imagine* how service members should be healed if they do become traumatized helps us see how scientific medicine, in the form of behaviorism, can serve to depoliticize service member subjectivity, while at the same time legitimizing this depoliticized view in the name of healing. As we have seen, the digital generation service member—as he exists in the minds of technocrats—is one who chooses to be made, who does not want to question his wartime experience, does not want to reflect on it, but rather is committed to using virtual technologies to shape and reshape himself into an instrument of state projects. Virtual Iraq and similar technologies provide a material object through which these meanings are both codified and disseminated. They are structured by and structure a behaviorist notion of the service member, which in turn serves to depoliticize combat trauma.

However, future research is needed to analyze how both users and non-users actually respond to the technology.

Future research: Users' Perspectives

Though the cultural imagination of Virtual Iraq reflects its role in culturally and historically situated ideas about therapy and trauma, we cannot say what its effect will be on therapy without studying both therapists and patients. There are important questions about Virtual Iraq that this dissertation has not answered, especially regarding how it is used, whether its actually attracts service members to clinics, and whether therapists believe that it actually extends their ability heal veterans compared to traditional methods. That is, in practice, to what extend does the technology actually benefit therapy in the way claimed in the master discourses Rizzo has used to promote it? As Virtual Iraq becomes ever more real as a medical technology as more therapists begin to use it, understanding users will become increasingly important to understanding the technology.

I did not conduct participant observation in a VRET clinic, though I did talk to therapists involved in with the project. Some therapists are trying to use the technology they bought—many groups are now involved in the DCS trial, or in other efforts to use it. Often it just sits in a room—as I found when I tried to visit the system that had been bought by a local VA hospital. Among the therapists who were using the technology or were interested in using it, many had surprising ideas about how to use it. Despite the issues of legitimacy around specifically using it as a tool for enhancing PE, several of the therapists involved with the project imagine using Virtual Iraq in very different ways. One therapist suggested using the technology as part of couples' counseling, in order to

help military spouses empathize with their PTSD. Others suggested, for example, that it could be used more as a form of narrative psychology or even sand tray therapy that would allow the patient and therapist to share in a collective memory and explore the meaning of the experience together. The virtual space would allow for a non-verbal form of intersubjective communication that might otherwise take hard work and months of trust-building to develop.

In future research, it would be valuable to conduct additional interviews with therapists, and ideally participant observation in a VRET clinic treating military PTSD in order to better understand how therapists actually use the technology. When therapists are actually working with individual patients in the privacy of their offices, do their practices and understandings of their work actually conform to the behaviorist mode that has been so important in legitimizing Virtual Iraq for clinical researchers and military personnel?

Writing in the early 1970s, politically active anti-war psychologist Robert Lifton (1973) expressed concern that clinical psychologists working for the military would take pride in their technicism and that they would flaunt the tools of their trade as a message that service members should go ahead and indiscriminately kill because psychology would be there to pick up the psychological pieces and put them back together. But we cannot truly answer the question of how Virtual Iraq transforms therapy—or whether it condones violence—without knowing how therapists use it and what it contributes to their existing practices. Virtual Iraq does not say, as a technology, that it is okay to kill. If a clinician chooses to make that part of therapy, then that is not something that the machine reinforces as a message or other contributes to. For example, if it were already Veterans Administration policy for therapists not to discuss the traumatic nature of

killing, then Virtual Iraq would not contradict this but rather reflects existing institutional practices.

I would like to believe that when people heal from trauma, when they gain mastery over it and are no longer being controlled by diverse stimuli, both external and internal, that they can become even better political actors. However, we cannot assess this idea without talking to service members. While I did analyze public representations of service members' responses to Virtual Iraq, I did not conduct interviews with this population. Therefore, while I have been able to analyze how a few people who have gone through the therapy have described their experience, this sample is obviously biased in that it is limited only to those who benefited from the therapy *and* were willing to speak publically about this experience. Though it may be difficult to find other veterans who have been through the therapy—and to obtain IRB approval to do so—it would be valuable to interview them and ask questions such as how they learned about VRET, why they chose to do the therapy, what their experience of it was like, and if they did not complete the treatment, why this was the case. It would also be valuable to interview service members who specifically rejected VRET in favor of other treatments, though such individuals may be even more difficult to locate.

Conclusion: Beyond Critique

At the time that I began my research, VR had not changed therapeutic culture. It was a technology in the making, seeking legitimacy. There was good reason to believe that Virtual Iraq was an illusion, a magic trick being played for the cameras. And yet, over the course of my research, Virtual Iraq came to have an ever-more tangible reality; it

was being adopted by ever-more clinics, treating ever-more patients, serving as the subject of ever-more studies, and being referenced as the inspiration for ever-more digital media projects designed to reach veterans with PTSD.

Cultural studies tools allowed me to conduct an STS analysis that was not hindered by my early discovery that for all the media coverage of the project, it was hardly actually being used in clinical practice. Instead, by considering the importance of the cultural imaginary (in this case, the imagined capacities of VR and the imagined technological affinities of young, male military service members) in helping to create a technoscientific reality, I have been able to provide an analysis of how the technology came into being. I brought together cultural studies' interest in the content and dissemination of cultural meanings with STS's interest in how knowledge is made and materialized in practice.

And yet, as I write this in late April 2013, two years into the multi-sited clinical trial comparing VRET and PE with and without D-cyclosterine, I was saddened to learn only yesterday that in response to governmental sequestration, ICT shut down Jacki Morie's Virtual Worlds Research lab. During my fieldwork, Morie was one of my important mentors and facilitators in helping me to understand the practice of developing digital media for the military. Her lab was active in developing a several truly creative therapeutic virtual technologies for PTSD, including a veterans' center conducting avatar-based mindfulness meditation, guided storytelling based on Joseph Conrad's Warrior Myth, haptic and neuro-feedback based stress-reduction activities, and even avatar-based narrative exposure therapy using a virtual Iraqi village she had designed in Second Life. She was always working to integrate ideas from art, philosophy,

neuroscience, and clinical psychology in the design of therapeutic technologies for veterans. And yet, her projects never achieved the acclaim of Virtual Iraq.

In future work, I would like to move beyond critique in my analysis of the development of digital media technologies for mental health therapy. One of the benefits of working on contemporary issues is that they offer opportunities for real-time experimentations. At this time, I can only surmise that Morie's work failed to gain the permanence of Virtual Iraq because her projects were truly novel and therefore required significant research programs to establish as "empirically supported" interventions. However, they were never the given chance. As we have seen, in order for the technology to be considered legitimate even before it was made or used, the development of Virtual Iraq followed a conservative trajectory reliant on it being seen as a tool for conducting an already empirically supported therapy. It is less expensive and less risky to fund small clinical trials to show that something can be used as a tool compared to the copious work of scientifically and clinically validating entirely new methods of treatment. These institutional factors foreclose creative alternatives that push the boundaries of what digital media is capable of as a technology of therapeutic mediation.

As a project of critical design and making, I would like to collaborate with therapists and technologists in order to work on digital media projects that would allow us to investigate the challenges of making novel therapeutic technologies that people will be willing and able to use.

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