Encyclopedia of
MEDIA VIOLENCE

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Virtual Reality, Violent Content in

Virtual reality (VR) technologies promise to immerse users in media environments, some of which may include violent content. This entry begins by defining violent content in VR and distinguishing it from other forms of media violence. It then describes the types of content that have been used in research on VR violence effects before shifting to a discussion of applications of VR violent content. The entry concludes by considering the future of violence in virtual reality.

VR Violent Content Versus Other Forms of Media Violence

Virtual reality violent content is defined here as media violence designed for and appearing predominantly in immersive virtual environment technology (IVET). The two most common types of IVET are head-mounted displays, which include head and motion tracking to simulate being in a real environment, and cave automatic virtual environments (CAVEs), which involve surrounding the user with projection screens. By treating VR in terms of IVET, this definition differentiates VR violent content from other forms of media violence. Although violent video game content could be experienced through some forms of IVET, it would not be classified as VR violent content unless it was specifically designed to be played through an immersive virtual reality (IVR) system (VR and IVR are used synonymously in this entry).

IVR systems have several characteristics that distinguish them from other media technologies. According to researchers Aitor Rovira, David Swapp, Bernhard Spanlang, and Mel Slater (2009), IVR must afford users perception through sensorimotor contingencies similar to those in reality. For example, people who experience VR violent content should be able to turn their heads to look at foes and swing their arms or kick their legs to strike them. Rovira and colleagues have argued that when natural sensorimotor contingencies are in place, participants may experience place illusion. This is similar to what has been called "(tele)presence," but *place illusion* refers to the perception of being "in" an IVR environment specifically, such as a virtual war zone. The authors also identified *plausibility,* or the illusion that real things are happening, as another important aspect of IVR. For example, if a user of an IVR system physically moves to avoid bullets being shot and aims to fire at virtual characters as if holding a gun, these reactions would suggest plausibility. When both place illusion and plausibility are in place, IVR users should respond realistically to violence and other virtual content, according to Rovira and colleagues, even though they may cognitively know that the experience is artificial. The extreme realism of VR violent content, above all other forms of media including video games, seems to be another important distinguishing feature of this manifestation of media violence.

Content Used in Research on Virtual Reality Violence Effects

A handful of experiments have examined the effects of VR violence with varying content. In an effort to establish the validity of using IVR to study human behavior, one stream of research has replicated classic media violence studies in virtual environments. For example, Slater and colleagues (as described in Rovira et al.) conducted a virtual version of the Milgram experiment, Yale psychology professor Stanley Milgram's obedience to authority study. A blended reality, CAVE-type environment was created for the investigation in which the teacher (study participant) sat at a table with a "shock machine" across from a virtual reality learner who appeared to be a person behind a glass partition. In the experimental condition, the learner was visible, responded with pain, and complained after the subject pressed the shock button. The virtual character even intervened when the authority figure told the participant to continue, by uttering responses like "Don't listen to him, I want to stop now." Participants with a visible virtual learner became more aroused and stressed

(as assessed through a skin conductance test) than those in a nonvisible learner condition, suggesting that the content was perceived as more real.

In a follow-up study, Rovira and colleagues (2009) used similar IVR technology to examine bystander responses during violent situations. They constructed a VR bar environment in which participants were approached by a life-sized virtual character, "the victim," who would engage in a conversation about football. A second virtual character, "the perpetrator," would approach shortly into the conversation and become verbally aggressive toward the victim, including shouting, swearing, and making aggressive gestures. This would escalate into the perpetrator violently pushing the victim into the wall. One manipulated variable was having the victim glance at the participant in some conditions, which the researches believed would enhance the plausibility illusion. Consistent with expectations, participants who received the gaze were more likely to intervene during initial trials, and overall, a number of subjects attempted to break up the conflict. They became involved in a realistic way, lending further support to the notion that IVR violent content may be perceived as real. This type of interactive violent content is interesting in that it does not involve a game; rather, it attempts to simulate real life or at least real-world experimental situations. Additional research following this paradigm replicated Bandura's social learning study in VR.

Another line of experiments by Susan Persky and Jim Blascovich (2007) adopted more of the video game violence research paradigm, using specially designed violent and nonviolent versions of a VR game as stimuli. The violent version had the player engage in a gunfight in a computer-generated environment against computer-controlled opponents. This combat took place in a virtual room with walls for both the participant and opponents to hide behind. The object of the game was to minimize bullet hits to oneself (by hiding and dodging) and shoot opponents as many times as possible. When hit, the virtual characters exhibited three violent cues: they lurched, groaned, and splattered blood. When the player was hit, there was a bullet wound sound, and a flash of red briefly filled the screen. The nonviolent version of the game had a similar setup, but instead of shooting a gun across the room, participants painted across the space onto a virtual canvas. All VR participants wore a head-mounted display that tracked their head movement and orientation, and they controlled the game with a gun-like controller (modified to look like a paint chamber in the nonviolent condition). In another set of conditions players engaged in the experiences on a computer instead of through VR technology. Persky and Blascovich found that players of the IVR violent game experienced more aggressive feelings than those in the other conditions. Research using commercially available video game content played through VR technology has reported similar results. The Persky and Blascovich studies are especially noteworthy, however, for being one of the only lines of research to test for VR violence effects through violent content designed for IVR technology. Taking this custom approach maximizes the match between the capabilities of VR systems and potential actions of players, providing a more immersive experience and increased validity.

Applications of Virtual Reality Violent Content

Although there are potentially harmful consequences of exposure to VR violent content, it has positive applications as well, particularly for military and therapeutic purposes. For example, the U.S. Department of Defense implemented a $20 million virtual training program called *Urban Resolve* in 2006. As discussed by Jim Blascovich and Jeremy Bailenson in their book *Infinite Reality* (2011), the virtual environment created for *Urban Resolve* provides a highly realistic model of Baghdad, including 3D physical structures comprised of more than 2 million digital objects. It also simulates macro-level political, economic, and sociological forces that would be present in a city, providing trainees with a highly accurate depiction of urban warfare. Users have to cope with such factors as improvised explosive devices and different types of enemies. This type of VR content can help prepare military personnel for combat situations in a way that not only simulates reality but makes it more useful for real-world training situations. For example, soldiers may be exposed to conditions that would be impossible to simulate in reality, such as weather patterns unique to a particular region. These and other variables can also be changed with relative ease, quickly preparing users for different contingencies. Most important, perhaps, training through violent VR content is safer than engaging in risky behaviors such as aerial combat training in the real world. Because of these and other advantages, violent VR content has become a staple of military training.

There are also therapeutic applications of military and other types of VR violent content. Virtual reality exposure therapy involves exposing patients to the subjects of their fears within the confines of a virtual environment. It has been successful at treating a number of anxiety disorders, ranging from fear of bugs to fear of flying. Research by Barbara Rothbaum, Skip Rizzo, and JoAnn Difede (2010) has illustrated how violent VR content may be created for the treatment of posttraumatic stress disorder (PTSD). Following up on the first use of VR to treat PTSD, a "Virtual Vietnam" environment tested on veterans of the Vietnam War, Rothbaum and colleagues discussed the development and implementation of "Virtual Iraq," designed to treat PTSD in veterans of more recent wars. Virtual Iraq includes first-person point of view scenarios in which participants are either in a Middle Eastern city or driving on a desert road in a Humvee. During each experience, they can be subjected to a variety of trigger stimuli (in multisensory fashion), including weapons fire and explosions (auditory), wrecked vehicles (static visual), and insurgent attacks (dynamic audiovisual). The reality of this violent content may be enhanced through additional stimuli such as smells of body odor and gunpowder (olfactory) and vibrations from gunfire and explosion (tactile). Other variables that can be manipulated include time of day, weather, and user perspective. These types of controls allow clinicians to offer custom treatment to a patient depending on his or her needs, and Virtual Iraq has been successful at helping a number of veterans overcome PTSD. Among the advantages of this type of treatment (discussed by Rothbaum et al.) is that it has been shown to be particularly appealing to digital natives.

The Future of Virtual Reality Violent Content

The manifestations of VR violent content reviewed in this entry have one key ingredient in common: they all strive to deliver highly realistic experiences of violence, exceeding those of all other media forms. What does the future hold for VR violent content, then? Given how technology continues to advance, it seems likely that these experiences will grow increasingly real over time, perhaps to the point of being indistinguishable from reality. With this in mind, it may be instructive to look to popular science fiction for insight into virtual reality violence in the future. IVR violence has been depicted in narrative fiction for decades, spanning media forms, including literature (e.g., *Neuromancer* [1984], *Snow Crash* [1992], and *Ready Player One* [2011]), television (e.g., *Star Trek: The Next Generation* [1987–1994]), and film (e.g., *Tron* [1982], *Strange Days* [1995], and *The Matrix* [1999]). A common feature of these works is that they depict complete immersion in virtual worlds containing violence. In some cases, such as in *The Matrix,* VR is depicted as part of a dystopian future. In others, such as with the Holodeck in *Star Trek: The Next Generation,* VR offers more of a utopian experience. Whether humanity moves in one direction or the other with this technology remains to be seen. The research and applications reviewed in this entry suggest both positive (training, therapy) and negative (increased aggression) possibilities for VR violent content in the coming years.

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See also Interactive Media, Aggressive Outcomes of; User Involvement in Violent Content, Effects of; Video Game Platforms, Effects

Further Readings

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