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CHAPTER

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# The Impact of Video Game Play on Human (and Orc) Creativity

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p0085 In the early 1960s, computing technology had begun to find its way into research laboratories around the world, greatly accelerating the pace of the scientific process in assisting with myriad data processing and analysis procedures. In this rise, while many of these researchers had used computing tools to help in their daily work, few had known the limits of these machines. How much information can they process at one time, and can they handle constant user input? Could this information bet displayed graphically in unique and interesting ways, and could the user alter the on-screen display instantaneously? Finally, could the experience be a fun one perhaps that engages the researcher to experiment or even play with the machine itself? These curiosities set into motion the first criteria for "a good computer demonstration" (Graetz, 1981, para. 26) that, through decades of refinement and engagement, became the modern video game.

p0090 A visit to the Massachusetts Institutes of Technology during this time would have surely included a stop at the Electrical Engineering Department, running one of these early computers in the Programmed Data Processor-1 (PDP-1)—one of the first commercially available computers with a specific focus on user interface rather than computing cycles (Computer History Museum, n.d.). For budding programmers in MIT's Kluge Room (a word with snarky connotations that describes a set of mismatched parts, often cobbled together for a single function—derived from the German word "Kluge" for "clever"), the PDP-1 represented, according to Graetz (1981), the world's first "toy computer": a mini-computer (compared to then-standard room-sized mainframes) with a native display and an open programming language.

p0095 The Kluge Room saw the birth of several different "hacker" computer programs not so much aimed at performing or solving discrete computational problems, but rather to demonstrate the capability of the machines of the time—such as a Bouncing Ball program that displayed (as its namesake suggests) a single pixel "ball" bouncing and careening off the different surfaces of a virtual box, mimicking the physical properties of a real ball. Another game saw onlookers drawing a maze with a light pen, and watching as an animated mouse tried to navigate the maze to find a wedge of cheese (and, for added fun, onlookers could give the mouse a martini to hinder its navigational acumen). A third game was a standard tic-tac-toe variety, which had onlookers playing the classic game against a rudimentary artificial intelligence.

p0100 In each of these games—and indeed in the criteria laid out by the original Kluge Room scientists—we see a common element related to play and creativity. Each program was built as a means to an end (demonstration) rather than an end to a means (discrete computation). As such, and as can be deduced by the nature of the nomenclature of the Kluge Room itself, it was a space where play and creativity were encouraged as necessary to push the limits of early computing technology.



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p0105 The most enduring result of this early activity was the development of *SpaceWar!*, considered by most the first true video game. In the game, two players took control of warring spaceships (the slender Needle and the broad Wedge) locked in space combat around a high-gravity star core located in the center of the screen. Programming of this game required many elements of the earlier playful demonstrations (such as programmable physics logic from Bouncing Ball, and interface design from the mouse maze game) but provided a few novel elements, such as a multifunction joystick that allowed human players to combat each other with their own strategies—learning the affordances of the system as well as the behaviors of the other in order to create and execute effective combat strategies.

p0110 To us, the preceding story illustrates the inextricable link between video games and creativity. The earliest known video game was both borne out of and built to encourage creative and playful behavior. Likewise, this chapter provides a discussion of theory and research demonstrating the association between video game play and human creativity. The chapter will begin with a discussion of creativity and a general overview of play to orient the reader with these general concepts, and how they are linked to learning processes. Following this, video games are framed as inherently creative and playful endeavors that are well suited to stimulate the creative process as well as motivate more formal learning. The chapter will conclude by addressing popular dissent around violent video games as entertainment endeavors without redeeming qualities, suggesting that the very unsavory-yet-popular content being critiqued is also quite adept at encouraging creative thought.

s0010

## CREATIVITY DEFINED

p0115 While creativity is an easy concept to understand, it is difficult to define. Numerous definitions have been proposed and many tests and models have been developed that aim to quantify this concept; however, there remains little consensus on how to best explain creativity and the creative power of the brain. One of the reasons for this lack of agreement is because creativity is not a singular concept, but rather represents traits and abilities (i.e., who we are; e.g., "he/she is creative"), processes (i.e., what we do; e.g., "the creative process") and outcomes (i.e., what we produce; e.g., "creative solutions").

p0120 Creativity as a product or something that can lead to the production of something is perhaps the most common use of the term. Definitions of this sort include ones that refer to creativity as a "novel combination of old ideas" (Boden, 1996, p. 75), the "process of 'making up' something new and valuable by transforming what is into something better" (Young, 1985, p. 77), or the ability to produce something that is both



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novel (i.e., original) and appropriate (i.e., useful: Ochse, 1990; Sternberg, 1988). This production of new thoughts, words, or deeds is also thought to be creativity at its most basic level (Fisher, 2004). The innate features of the person who develops the creative product or outcome (e.g., "a creative person") and the processes leading up to these outcomes can also be conceptualized as creativity (e.g., "the creative process"). Similarly, Kaufman (1999) discusses creativity as a multilevel construct that considers the process of being creative, the result of creative thinking, understanding individual differences in creativity as well as studying the times and spaces in which we enact creativity. For example, Gardner (1997) and Russ (1998) define creativity as the ability to solve problems and raise new questions. For them, it is the innate features of the person that are creative and the outcome of that creativity is simply a by-product of the individual's features. Ability-based definitions such as these are reminiscent of the right-brained/left-brained debates, which contend that some people are innately more creative (i.e., right-brained) whilst others are more logical in nature (i.e., left-brained). Conversely, Robinson (2001) argues that it is not the individual nor the outcome that constitutes creativity, but the imaginative *process*. Similarly, Lucas (2001) states that creativity is a *state of mind*.

p0125 Due to the multifaceted nature of creativity, it may be more sensible to adopt a working definition that integrates the aspects of "being" (e.g., traits, abilities, processes) and "doing" (e.g., creating, producing). In other words, rather than of quantifying creativity as a *trait*, *process*, *or outcome*, creativity should be considered the assimilation of these factors and the integration of thoughts, ideas, and actions into new directions, solutions, and viewpoints (Young, 1985). A definition such as this provides a better understanding of the concept as well as contributing to a better understanding of its potential impact on individuals, processes, and outcomes.

p0130 On the individual level, creativity has been connected with positive psychological development and the achievement of self-actualization, personal fulfillment, and improved mental health (Cropley, 1990; Garfield, Cohen, & Roth, 1969; Rogers, 1961) as well as a range of positive personal characteristics such as flexibility, openness, and courage (Rogers, 1961). More broadly, creativity has been identified as an essential tool for innovation and finding new ways to solve problems (Fisher, 2004; Legrenzi, 2005). Due to its associations with innovation, problem solving, and mental health, there has been a constant interest in understanding the ways in which creativity can be fostered. The role of play has received particular attention in terms of its ability to encourage creativity and promote creative thinking.



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## PLAY AS A CREATIVE PROCESS

p0135 As defined by Huizinga (1949), play is:

> … a free activity standing quite consciously outside 'ordinary' life as being 'not serious,' but at the same time absorbing the player intensely and utterly. It is an activity connected with no material interest, and no profit can be gained by it. It proceeds within its own proper boundaries of time and space according to fixed rules and in an orderly manner (p. 143).

p0140 The core attributes of play described by Huizinga (1949) are integrated within all play forms, from structured activities with explicit rules (e.g., games) to unstructured and spontaneous activities (e.g., playfulness). Playfulness in and of itself has also been discussed as an individual trait (Lieberman, 1977) or as a state of being (Ellis, 1973). To help to better understand the complexity of structured play, Caillois (1958) identified four play types: Agon, Alea, Mimicry, and Ilinx. Agon refers to the competitive play, as is commonly found in traditional games such as chess or checkers. Alea refers to chance-based games, such as slot machine or lottery play. Mimicry refers to role playing, or assuming the role of a character and progressing through a narrative, and Ilinx refers to play that alters one's perceptions.

p0145 In general, the links between play—both structured and unstructured—and creative thinking skills are well documented (e.g., Getzels & Csikszentmihalyi, 1976; Howard-Jones, Taylor, & Sutton, 2002; Lieberman, 1977; Mainemelis & Ronson, 2006; Russ, Robins, & Christiano, 1999; Sternberg, 1988). When establishing the first kindergarten in 1937, Friedrich Froebel developed a set of toys with the explicit goal of helping children learn about numbers, sizes, shapes, and colors (Brosterman, 1997). Montessori (1912) also created a range of materials to promote learning through play. Play has also been associated with a greater disposition towards creativity later in life (Clark, Griffing, & Johnson, 1989; Russ et al., 1999) as well as the stimulation and development of a range of creative processes such as problem finding, framing, and solving, divergent thinking, and practice with alternative solutions (Getzels & Csikszentmihalyi, 1976; Mainemelis & Ronson, 2006; Russ et al., 1999; Sternberg, 1988).

p0150 Part of the reason why play is so successful at stimulating creative thinking is because play is a creative process in and of itself. Playful activities allow individuals to approach new and novel situations in unique ways free from external constraints. Play can free one from "means-end" thinking and allow for the adoption of novel and new solutions (Basadur, 1994; Mainemelis & Ronson, 2006; Runco & Sakamoto, 1999). Furthermore, engagement in the activity is intrinsically rewarding, as it offers the spontaneous pleasures of play and playfulness, self-expression,



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and satisfaction (Fisher, 2004). Through this process, play can foster new, novel associations between ideas, objects, and behaviors (Bruner, 1963). Play stimulates creativity by allowing the exploration and practice of many alternative responses to a particular task without restriction (Getzels & Csikszentmihalyi, 1976; Torrance, 1995).

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## VIDEO GAMES: TECHNOLOGIES CREATED FOR (CREATIVE) PLAY

p0155 While some activities incorporate only a single form of play from Caillois (1958) taxonomy, video games often incorporate a variety of these elements. For instance, popular video games such as *World of Warcraft (WoW)* and *Call of Duty (CoD)* combine Alea (e.g., through the randomly generated encounters and rewards), Agon (through competition with other players and strategy to navigate the game space), and Mimicry (through the role playing of a character in a fantasy-based world in *WoW* and the adoption of a main character and progressing through the narrative in *CoD*). While these examples highlight the multidimensionality of structured play within video games, video games can also foster unstructured play. For example, *Minecraft*, a highly popular sandbox game (i.e., the player has tools to modify the game space and choose how they want to engage within it), is characterized by its lack of rules and free-form play. In this unstructured space, players are free to engage in almost any way they choose, whether it be through exploring the environment, generating content within the game (e.g., building structures), or interacting with others within the space.

p0160 Moreover, video games are unique outlets for play as they provide users a range of playful activities within a single game space. For example, players can explore new lands, solve riddles and puzzles, and cooperate with others to achieve a difficult task, or craft something, all within a relatively short play period. Indeed, Gee (2003) argues that video game play is inherently a learning endeavor, as most video games require the player to familiarize themselves with and eventually master a novel set of associations and rules in any number of novel game environments. This range of playful activities not only contributes to the enjoyment of the medium but also potentially provides a wide range of learning experiences. Furthermore, as "simulated environments," video games are also encouraging players to solve various "real" in-game problems in creative ways, and allow them to do so without real-world consequences (Fisher, 2004; Glynn, 1994). For example, in the popular *SimCity* games, players are tasked with the role of a civil engineer—tasked with building and maintaining successful and thriving cities while carefully balancing economic, environmental and social issues, and threats. However, these



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consequences are free of real-world penalties, as the player can simply "retry" the challenge. In this sense, video games are unique, as they are able to prove playful spaces that resemble real-world scenarios and situations but yet are distinct from everyday life. On this point, Koster (2003) writes about video game play as a form of inherent edutainment, as progressing through a video game requires the player to constantly learn how to understand and enact any number of abstract activities and associations in a digital space.

## Video Games and Flow

While video game play is often thought of as simply a source of fun and entertainment, it is also a vehicle for learning, particularly creative learning, as specified by Koster (2003). Video games are particularly effective sources of creative learning due to the fact that they often induce a state of "flow" (Csikszentmihalyi, 1975, 1990, 1993; Csikszentmihalyi & Csikszentmihalyi, 1988; Moneta & Csikszentmihalyi, 1996, 1999). A "flow experience" refers to a situation of complete absorption or engagement in an activity (Csikszentmihalyi, 1990). As further described by Csikszentmihalyi (1975), when in a flow state:

> … players [here, not specific to video games] shift into a common mode of experience when they become absorbed in their activity. This mode is characterized by a narrowing of the focus of awareness, so that irrelevant perceptions and thoughts are filtered out; by a loss of self-consciousness, by a responsiveness to clear goals and unambiguous feedback; and by a sense of control over the environment … it is this common flow experience that people adduce as the main reason for performing the activity (p. 72).

Video games are particularly suited to encourage flow and stimulate learning as they meet the preconditions described by Csikszentmihalyi (1993) that are needed to induce a flow state. As described by Sherry (2004), video games: (1) often provide detailed concrete goals and rules; (2) provide action that can be manually or automatically adjusted to one's capabilities; (3) provide clear feedback (e.g., through scores, achievements, or progress reports, etc.); and (4) provide visual and aural information that helps remove distractions from the task and facilitates the user's concentration. Perhaps most importantly, video games are able to induce flow states when they allow for an optimal balancing of system challenge and player skill (Bowman, 2008; Sherry, 2004) and games that are able to adjust this balance dynamically are often the most successful (Chen, 2007).

When in a state of flow, people experience improved focus on the task, a sense of active control, the merging of action and awareness, a loss of self-awareness, a distortion of the experience of time, and they experience the task as being the only necessary justification for continuing it



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(Csikszentmihalyi, 1990). Due to the conglomeration of these qualities, video games are able to induce a state of flow in games ranging from the most casual puzzle games such as *Candy Crush* (in which players learn the role and placement of different colored candy shapes before the system challenges this knowledge with increasingly impossible reaction time pressure and increasingly complex candy obstacles) to more complicated role-playing games like the *Fable* series (in which players learn the basics of navigation and character customization before being challenged by an increasingly complex social and functional hierarchy). These features, combined with video games' accessibility, popularity, and social reinforcement (i.e., players are highly motivated to compete with their peers in video game spaces; see Lucas & Sherry, 2004), contribute to video games being an ideal environment to create and maintain flow experiences (Sherry, 2004) and stimulate learning (Csikszentmihalyi & LeFevre, 1989; Kirriemuir, 2003; Moneta & Csikszentmihalyi, 1996). In fact, games designers such as Chen and Koster and education scholars such as Gee all contend that not only is learning a proxy outcome of video game play (games must be learned in order to be continually played), the lessons learned in video games are not related to uncovering the one solution to a finite problem but, rather, uncovering the multitude of solutions to an infinite number of problems in a given "possibility space" (the term for games coined by famous designer Will Wright of *SimCity* fame). Games designed to encourage flow are games that are constantly challenging the player, who in turn is constantly developing creative ways to overcome those challenges.

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## Video Games and Authorship

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When playing a video game, one is essentially interacting with an unfinished text: developers have written lines of code to represent a digital space populated with its own system of rules and mechanics, narrative, sounds, and digital citizenry. These pieces are carefully crafted so as to be as functional and interesting as possible, yet are given to the player in an inherently incomplete form. Unlike more traditional forms of entertainment media that are created as complete and closed texts (such as books, movies, and television shows), Collins (2013) notes that games are required to be actively used in order to be fully experienced. Moreover, these experiences—as they are subject to the ability and creativity of the gamer—can vary greatly from player to player, or even from one play experience to the next. Indeed, the implicit contract of any interactive environment is that it provides the user control over the form and content of on-screen content (Steuer, 1992), and this interactivity is key to the medium's ability to immerse the player into the game (Tamborini & Bowman, 2010). Bowman and Banks (in press) argued from a Bartheian perspective



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(re: *Death of the Author*; Barthes, 1967) that video games can be considered an example of co-authorship between the designers and the authors, requiring the creative efforts of both in order to be fully realized as finished products.

s0035

## VIDEO GAMES AS CREATIVE TOOLS: EMPIRICAL RESULTS

p0185 To this point, we have demonstrated broadly that video games are tools tailor-made for creativity and play. While not all of the arguments proposed above have been empirically tested, a few studies have found significant associations—both causal and correlational—between increased video game play and a variety of different cognitive and affective faculties associated with creativity. Other work has found that video game players tend to show more positive attitudes towards creative endeavors, as in fact creativity as a novel pursuit in its own right.

s0040

### Video Games and Cognitive Ability

p0190 In early 2010, the US Office of Naval Research (ONR) released the results of an internal study that demonstrated video game players to be as much as 20% "smarter" than nonplayers—at least as reported by mainstream media at the time. More specifically, educational psychologist Ray Perez found that gamers had increased perceptual and cognitive abilities, likely attributed to the manner in which gamers interface with video games. These findings were considered integral to the Department of Defense, as explained by Perez:

> We have to train people to be quick on their feet—agile problem solvers, agile thinkers—to be able to counteract and develop counter tactics to terrorists on the battlefield … It's really about human inventiveness and creativeness and being able to match wits with the enemy. ***Freeman (2010)*****, *para. 5***

p0195 While the claim that video game play could be more than a mindless leisure activity might have appeared novel at the level of public discourse, it had been an increasingly intense focus of research since at least the mid-1980s. Greenfield (1984) speculated that video games could positively impact our human cognitive capacities, in particular visual capabilities—claims based on correlational data by Griffith, Voloschin, Gibb, and Bailey (1983). Many of Greenfield's speculations were tested with modest empirical support (outlined in Green and Bavelier, 2006), such as the ability for gamers to be more adept at dividing their attention between different tasks (Greenfield, DeWinstanley, Kilpatrick, & Kaye, 1994). Green and

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Bavelier (2003) found that playing (at the time) popular video games—such as the sandbox game *Grand Theft Auto 3*, first-person shooters *Half-Life* and *Halo*, and the animated fighting game *Marvel vs. Capcom*—lead to substantial increases in visual attention. Other work using first-person shooters such as *Quake 3* and games from the *Call of Duty* series (Bowman & Boyan, 2008; Bowman, Weber, Tamborini, & Sherry, 2013) has found that cognitive skills associated with eye–hand coordination as well as mental rotation and targeting ability (both moving and fixed) are positive predictors of video game performance and, to a lesser degree, enjoyment.

p0200 In terms of broad intelligence—such as those claims made by popular media in response to ORN's 2010 press release—work by van Schie and Wiegman (2006) did find that in a group of Dutch schoolchildren, general intelligence was higher for children who spent an increased amount of their leisure time playing video games. In fact, by the late 1980s, Rabbitt, Banerji, and Szymanski (1989) had found strong and significant correlations between intelligence quotient exam scores and performance at the arcade game *Space Fortress*. Notably, while specific cognitive skills and general intelligence are not per se creativity, both—along with trait personality factors (outside the focus of this chapter)—have been linked to increased creativity (cf. Eysenck, 1995; Guilford, 1968).

## s0045 Video Games and Creative Ability

p0205 While a good deal of research has focused on the association between video games and cognitive skills, recent work has examined the role of video game play in encouraging more positive affect towards creativity and creative thought. As one of the first studies on the topic, Jackson (2012) and Jackson et al. (2012) found in a population of 12-year-olds that those who played more video games as part of their leisure time were significantly more creative than those who did not. Their work found that when given a task to write a story about an elf, there were significant correlations (ranging from 0.40 to 0.59, all at the $p<0.01$ level of greater) between video game play and the student's creativeness when drawing forms (given an "egg" as a starting point, gamers drew more elaborate shapes than nongamers) and their ability to write a novel story about a fictitious elf character. In addition, these effects held when controlling for race, gender (although boys did play more games than girls, both benefited in creativity gains), other technology usage (such as computers and the internet), general intelligence, and even the content of the game (both violent and nonviolent games increased creativity).

p0210 Studies have also found video games to foster positive feelings about the creative process. Ott and Pozzi (2012) gave primary school studies access to a variety of casual puzzle games over a three-year period, and found that as students played more of these games, they demonstrated more



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curiosity, motivation, and joy related to creativity. Sundar and Hutton (2010) found that heightened arousal levels associated with playing the physical activity game *Dance Dance Revolution* were associated with increased mood and creativity. While one might question whether arousal and mood in their study were induced by game play or physical activity inherent to the game played, other work by Bowman and Tamborini (2012, 2015) has demonstrated that video game play can impact mood—with more demanding games (games that require more control input from the player) resulting in more positive post-game-play mood to a point at which controls are too demanding, resulting in negative mood.

## s0050 Video Games as Creative Expression

p0215 One of the more enduring elements of video games that fosters a creative spirit is the manner in which they allow players to construct identities. Grodal (2000) and Nakamura (2000) similarly argue that a particularly appealing element of video games is their ability to allow users to create and experiment with a variety of different personae. In creating these in-game personae, players have also been known to personify their on-screen character, imbuing them with a sense of agency and personality. In deep interviews with a set of highly engaged *World of Warcraft* players, Banks (2013) found that players actively construct headcanons—or idiosyncratic stories about the gaming experience—that include speculations about how the avatar (the on-screen character) might be affected at the cognitive, behavioral, and emotional level by the relationship between player and avatar. Such an act requires a great deal of thought-projection on the player's behalf into the digital space, as was suggested by subsequent linguistic analyses on these interviews (Banks & Bowman, 2013, in press).

p0220 In a content analysis of in-game behaviors, Wright, Boria, and Breidenbach (2002) found several instances of gamer-created content consider by most to be far beyond a simple act of game play. For example, textual analysis of chat logs from players of the first-person shooter *Counter-Strike* found highly sophisticated usage of contextualized humor and joke-work, from simple naming mechanics (naming oneself "Osama bin laggin" referring to a then-topical news item and referring to lagging—a common issue in online gaming by which a computer network is unable to process data at the same speed as a computer terminal, resulting in a temporarily broken play experience). Perhaps more related to creativity *per se*, their study also found *Counter-Strike* players to be highly adept at using in-game tools to recreate (with great accuracy) real-world simulations of game maps, as well as logos and other elements not native to the original game environment. Related to Wright et al.'s findings (albeit not a research report), in mid-2013 *Time* magazine profiled Jacob Granberry, an artist and fan of the *Game of Thrones* novel-cum-television



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series, who has overseen a complete digital reconstruction of the land of Westeros in the construction video game *Minecraft*.[1] The land, estimated to be the size of South America in the novels, is built to 1/100 scale in the video game and has had thousands of contributors who apply to assist in the land's construction at http://westeroscraft.com. When working on this construction, gamers usually configure *Minecraft* be played in what is called "Creative Mode" by which players are able to navigate the land freely (by flight, no less) without taking any damage from other players, or needing sustenance in order to survive.

s0055

## CREATIVITY FROM DIGITAL VIOLENCE?

p0225 On first blush, this might seem an odd discussion to have within the larger focus on gaming and creativity. However, given the preponderance of research focused on video games and aggressive outcomes (cf. Anderson & Bushman, 2001; Sherry, 2001) as well as the general popularity and prevalence of the content itself (Smith, Lachlan, & Tamborini, 2003), it seems germane to discuss the impact of such content on players' creativity and playful outcomes.

s0060

### Labeling Content in Video Games

p0230 One of the lingering debates regarding video games involves violent content and whether such content is harmful, particularly for minors. We note upfront that exactly what constitutes a "violent video game" is often vague. For example, in one recent court case in which defense attorneys attempted to blame video games for a mass homicide, one scholar had to acknowledge that definitions of "violent video games" were so broad that even games such as *Pac Man* could be considered "violent video games" (Rushton, 2013). Indeed many older studies of violent video games included games such as *Centipede* and *Zaxxon* (see Ferguson, 2013) as "violent video games" despite that few people consider such games threats to society several decades later. From this, we proceed with the label "violent video games" with considerable caution, noting that this term is so broad and vague that the conceptual space occupied by this term is less meaningful than it may appear.

p0235 That having been said, games with violent content certainly tend to be popular sellers. For example, the 2013 release of *Grand Theft Auto V* has set at least seven records for entertainment media sales, including the

np0010 [1] Footage from the *Time* interview can be found at *Time*'s official YouTube channel: https://www.youtube.com/watch?v=WOZ6RjoNKbw



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generation of $815.7 million within 24 h of its worldwide release while selling nearly 12 million individual units (Guenette, 2013). These sales figures are not surprising. Media with violent content have historically been popular, from the epic of *Gilgamesh* through religious texts with violence such as the Judeo-Christian Torah/Bible through Greek and Shakespearian plays, literature and, more recently, movies, television, comic books and, ultimately, video games.[2]

p0240 As noted above, exactly what is considered "violent media" or "violent video games" is ill-defined, so much so that a wide variety of art from religious texts such as the Bible of Hindu Ramayana through fairy tales, Disney movies, Looney Tunes cartoons, rock music by bands such as Pink Floyd or Twisted Sister, and basic video games could all be considered "violent media." Indeed, vague definitions of "violent video games" have been used to make frightening claims about violence in even E-rated games (games rated appropriate for all children) despite that most such games would be considered non-offensive by most individuals (Thompson & Haninger, 2001). Regarding the general notion of violence as a construct, recent work by Tamborini, Weber, Bowman, Eden, and Skalski (2013) reported that violence is not only a many-splintered perception variable comprised of audience interpretations of a given act's justification, graphicness and realism, but also that relative perceptions of graphicness (depictions of blood and gore) were the *least* important perception in explaining audiences labeling an act as violent or not. Indeed, such lack of clarity in these terms was one issue that led the US Supreme Court case to strike down attempts to regulate violent video games in the Brown v EMA (2011) case.

p0245 Moreover, we posit that assumptions regarding the inherently antisocial and damaging impact of violent video game content is a potentially naïve one. Some studies have implied that video games are easily divided into pools of "violent" and "prosocial" games, with the implication that "violent games are antisocial, and prosocial games appropriate for children" (e.g., Gentile et al., 2009). However, even these studies consistently find that exposure to "violent" and "prosocial" content are highly correlated, suggesting that many games include both violent and prosocial content. Thus we argue it is time to conceptualize games in ways that are more sophisticated and move beyond the content-heavy approach to discussion of "violent video games."

np0015 [2] This historical popularity of media with violent content has led some scholars to suggest that such media appeal to intrinsic human needs both to confront their own dark side, as well as to confront their fears of death (see J. Kottler's 2011 book *The Lust For Blood*: *Why We Are Fascinated by Death, Murder, Horror and Violence* for a protracted discussion on this point). Critiques of media with violent content have also been historical, given that such content bridges debates about morality and freedom of expression.

## 1. CREATIVITY AND VIDEO GAME PLAY



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p0250 Moreover, not all audiences who play games with questionable content necessarily view the content as such. In a study on morality and decision making, Joeckel, Bowman, and Dogruel (2012) found that players were more likely to violate tenets of morality such as fairness and harm only when those tenets were not particularly salient to their personal worldview (cf. Haidt & Joseph, 2004). Conversely, when these moral dilemmas were associated with strong moral leanings, violations of those moral tenets were observed less than 20% of the time. Such a finding led the researchers to conclude that video game play is not automatically a question between behaving in a moral or immoral fashion, but also must consider the fact that some in-game decisions are amoral—at least, in the eyes of the player. Similar work by Banks and Bowman (2014) also finds that even in highly immersive and social worlds such as *World of Warcraft*, there is a good deal of variability in how players view their in-game avatar—some regarding the character as a tool used to accomplish nonvalenced (at least, from a moral standpoint) goals.

## s0065 Objectionable Content and Creativity

p0255 Given so much of the debate on video games with violent content has focused on the potential "harm" of such content, relatively little research has focused on the positive aspects of video games with violent content on creativity. Early discussion of the impact of violent games and media on children's creativity mainly was speculative. For instance, Jones (2003) argued that media with violent content serves a developmental purpose for kids both in confronting fears and in fostering creativity. Such early work was non-empirical in nature, however.

p0260 More recently, Olson (2010) has drawn on the developmental literature to conclude that interest in video games with violent content is a normal part of development for youth and does not represent a risk factor for negative outcomes. Instead, exploring "edgy" material appears to increase children's ability to process and consider such material, particularly with parental involvement. Indeed, excessive restriction of such content may result in a truncated set of experiences that both decrease children's ability to process negative events in real life, but also decrease the full range of expressive activities. It is important to note that many video games with violent content, including games such as *Doom*, *Bioshock Tom Clancy's Splinter Cell*, and *God of War*, have been enshrined as art by the Smithsonian Institute (2012), and there is increasing societal-level appreciation of video games as an art form (cf. Bogost, 2011; Clarke & Mitchell, 2007). Whether censorship/regulation of video games would restrict the creative achievements of youth is a fair question and one yet to be fully explored.



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p0265 The recent review of video game research by Granic, Lobel, and Engels (2014) provides an excellent backdrop for considering influences on creativity. Granic et al. specifically note that video games with violent content contribute to positive developments in many areas including creativity—findings collaborated by work cited earlier in this chapter (cf. Jackson et al., 2012; Wright et al., 2002). Research by Karla Hamlen has also linked playing video games, including genres with violent content, to creativity. For instance, in one recent paper, Hamlen (2011) found that children who participated in adventure and role-playing games were particularly likely to use their imaginations to put themselves into the story and character motivations. Such games, which would include examples such as *Skyrim* or *Tomb Raider*, may be particularly effective in promoting creativity and imagination in children. Other research by Hamlen (2009) has indicated that video game play, including play in genres with violent content, is associated with increased creativity as indicated by standardized assessment instruments.

s0070

## FUTURE RESEARCH

p0270 At this point, we have defined and explained creativity and play—both at a general level and specific to video games. We have argued that video games are a technology borne of and tailor-made to foster creativity, and we have demonstrated emerging empirical evidence to support these claims. At the same time, we recognize that there has been scant work specifically aimed at studying the impact of video games on fostering creativity in people—with only a handful of studies on the topic since 2010. However, as research into video games begins to broaden in scope beyond a myopic focus on aggressive and antisocial impacts of gaming content to also consider their potential prosocial benefits, future work might consider with much more scientific rigor the impact of these technologies (and their content) on the creative process.

p0275 One area of future work might consider giving more careful attention to the more granular associations between different types of video games and creative outcomes. For example, ludic differences that tend to be represented in different video game genres (such as the heavy emphasis on planning and prediction in strategy games or the improvisational nature of game play encouraged by open-ended sandbox games) and these differences are likely related to more specific aspects of creativity (in this case, creative problem solving or expression). In addition, content-specific differences in games—such as games that are more fun and enjoyable compared to games with more somber and meaningful content (cf. Oliver et al., 2013)—might also invoke different emotional



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and cognitive responses in players, which could relate to various creative outcomes. Related to these points, future work could look to design and test more rigorous case/control designs so that nascent correlational findings (such as those reported by Jackson et al., 2012) can be examined through a causal lens.

p0280 Another area of future research might consider the role that video game play has in neuroplasticity—the brain's ability to alter its interconnected structure in response to outside stimuli. While classical thought assumed the brain to be in a comparatively static form from birth, groundbreaking work by Pasual-Leone, Amedi, Fregni, and Merabet (2005) argues that the brain is a dynamic system constantly altered through experience throughout the life-span. Work associating cognitive and video game play has shown these effects to be enduring—for as much as 18 months according to data from the ONR studies, but these studies have not been extended to studying lasting impacts of video game play on creative processes. Already scholars in communication and media psychology have begun to incorporate research involving the neural correlates of game play in terms of the neural synchrony associated with flow states (Weber, Tamborini, Westcott-Baker, & Kantor, 2009), and such work might hold promise for understanding the impact of gaming on the formation and maintenance of neurological networks conducive to creativity.

p0285 Yet another area of work might further investigate arguments suggesting simply that more creative individuals are more drawn to video game play in the first place. Sherry, Rosaen, Bowman, and Huh (2006) found that increased cognitive skill scores were more robust predictors of video game preference and enjoyment than social factors (such as self-reported gender) or actual game performance, which can be interpreted to suggest that those with higher cognitive skills (skills related to creativity) are more motivated to play games. Ventura, Shute, and Kim (2012) found that children with higher openness to experience scores, which is a trait often linked with divergent thinking (one facet of creativity; McCrae, 1987) and general creativity (Harris, 2004) across a wide range of domains (Fiest, 1998), were more likely to play a more diverse number of video games. If creative types are playing more video games than noncreative types at very early developmental stages, there is concern that a "Matthew effect" (Walberg & Tsai, 1983) might be observed; that is, individuals already higher in creativity continue to enhance those skills even as those lower in initial creativity begin to play games. Although video games are quite popular in modern culture, not all individuals (in particular, children) play games for a variety of cultural and economic reasons, which could potentially result in creativity skill gaps.



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# CONCLUSION

p0290 As video games occupy a substantially larger role in media and entertainment cultures, social scientists should continue to earnestly and rightfully study their potential impact on our thoughts, feelings, and actions. At the same time, there must be a greater recognition that the impact of this medium can be just as powerful in encouraging the better parts of our humanity as they can the more deleterious parts. In the 1950s, the infamous psychologist Fredric Wertham lambasted the content of then-popular comic books for their sexual and violent nature, arguing that their seductive influences on youth culture served as a corrosive social agent contributing directly to juvenile delinquency (Wertham, 1955). While parents, popular press, and political leaders hailed Wertham as a public health evangelist for his findings, they all overlooked another aspect of comic books: their ability to encourage young minds to read and think creatively about the world around them, such as fans of the serial Flash Gordon aspiring to careers in space exploration (including current NASA chief Charles Bolden; cf. Gonzalez, 2012). Indeed later in life, Wertham spoke at the 1973 New York Comic Art Convention and expressed regret in that his work resulted in untold numbers of children having their stories—their sources of curiosity into the world and universe around them, and their autotelic exposure to problem-solving and alternative perspectives—destroyed by over-zealous public interest groups (fueled by one steadfast researcher).[3] In this vein, it is our hope that this chapter presents a case for video games to be a potentially powerful tool which can foster and encourage creative thoughts, feelings, and actions. While there is still much work to be done (indeed, a paucity of research exists on this topic), we are hopeful that this chapter might serve as an orientation to this promising area of future research. After all, the last group of gamers who sat in a darkened college dorm room engaging in violent and wanton acts of war ended up establishing the groundwork for modern computer science and engineering—fields with creativity at their (star)core.

np0020 [3] In fact, in 1973 Wertham published a book, *The World of Fanzines: A Special Form of Communication* (Southern Illinois University Press), in which he outlined his theories and findings on the correlation between comic book fanzines (a special type of comic book usually written by fans rather than original publishers) and creativity. However, given allegations about the scientific veracity of his original research as well as public disinterest in his later work on television and children, Wertham's research was largely ignored. Indeed, his appearance at the comic convention was viewed at best as dubious.



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# Non-Print Items

**Abstract**

The impact of video games on society has been debated for decades. In this chapter we examine the potential impact of video games, both violent and non-violent, on players' creativity. We examine video games as a play activity that can foster creativity. We examine how the unique environment of video games makes them particularly well suited for fostering creativity and how examining darker material can create a safe space for examining the darker side of life creatively.

**Keywords:** Video games, Creativity, Flow, Violence



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