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CALL TO DUTY: VIDEO GAME EFFECTS ON THE MILITARY

by

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Video games are a very popular form of media and entertainment—though not without controversy. This thesis seeks to understand the effects of video games on those who play them, because the U.S. Armed Forces have begun to adopt video games as training tools. This thesis attempts to determine whether playing video games will affect the nature of a military member's recruitment, job performance, and training. There are several potential effects that video games have on those who play them, which include increased violent and aggressive behavior on one hand, and increased cognitive ability and a more positive learning environment on the other hand. Overall, the research indicates that video games have a more positive effect on the people who play them, and in turn, would have a generally positive effect on military recruitment, job performance, and training.

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CALL TO DUTY: VIDEO GAME EFFECTS ON THE MILITARY

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ABSTRACT

Video games are a very popular form of media and entertainment—though not without controversy. This thesis seeks to understand the effects of video games on those who play them, because the U.S. Armed Forces have begun to adopt video games as training tools. This thesis attempts to determine whether playing video games will affect the nature of a military member's recruitment, job performance, and training. There are several potential effects that video games have on those who play them, which include increased violent and aggressive behavior on one hand, and increased cognitive ability and a more positive learning environment on the other hand. Overall, the research indicates that video games have a more positive effect on the people who play them, and in turn, would have a generally positive effect on military recruitment, job performance, and training.

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I.   INTRODUCTION

Video games have become a very influential part of today's society. They are played by all demographics, and they have planted a firm foothold in today's entertainment industry. As they have become more influential, they have been proven to have several different effects on human behavior. This study will attempt to explore these effects. It will begin with a brief introduction to relevant literature.

Over the last twenty years, interest in researching the effects of video games has increased due to the advent of accessible technology. Researchers have consequently begun studying the effects of video games on those who play them. This literature review will discuss the potential for violent video games to lead to aggressive behavior and the studies that attempt to dispute those claims. The review will also address some potential benefits of playing video games.

A.   CAUSING AGGRESSION

There has been a plethora of research done on the social effects of television. Researchers utilize cultivation theory to make connections between violent television media and its effects on the people who consume it. When studying video games and their effects on the people who play them, researches can also use cultivation theory to attempt to determine effects of video games on those who play them. According to Chong et al., "exposure to television viewing over time 'cultivates' viewers' perception of reality; in the words of its original proponents, 'television is the medium of the socialization of most people into standardized roles and behaviors. Its function is, in a word, enculturation…'"[1] Cultivation theory states that the more people ingest television media, the more their social realities will become like those of which they see on television. Chong et al. also state, "Applied to video gaming, cultivation theory suggests that through continuous exposure to the video game world, players' views of their real world will become more akin to that of

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[1] Yew M. Gabriel Chong et al., "Cultivation Effects of Video Games: A Longer-Term Experimental Test of First- and Second-Order Effects," *Journal of Social and Clinical Psychology* 31, no. 9 (2012): 952, doi:10.1521/jscp.2012.31.9.952.953.

the game world."[2] In their study Chong et al. found that the more exposure people had to video games, the more likely their perceptions would be altered. In their lab study, Chong et al. attempted to test video games influence on people's perception of the world. They allowed people to play either neutral or violent video games at random and followed their play time with questions of probability. For example, those who played violent video games that contained car chases were more likely to predict that a person would die in a car crash than a person who played a neutral video game. Anderson, Douglas, Gentile and Buckley applied this theory of media violence to a newer form of media, video games. In their 2007 study they found that,

> The newer interactive form of violent media (video games) had a larger impact on violent behavior than the older form (television and movies). As video games become more pervasive, more violent, more realistic, and consume a larger portion of entertainment time, the relative impact of violent video games may begin to consistently outstrip the negative impact of violent television and films.[3]

Violent video games have been found to have both short and long-term effects. Anderson et al. found that, "Effects of short-term exposure (e.g., playing a violent game for 15 minutes) include increases in aggressive thoughts and emotions and sometimes direct imitation of aggressive behavior."[4] Additionally, they found that long term exposure led to "personality change, beliefs that aggression is an acceptable way to handle a problem, increase in the availability of aggressive behavior scripts, and reduction in access to nonaggressive behavior scripts."[5] Additionally, Anderson and Bushman found that the long-term effects of violent video game exposure "can influence aggressive behavior by promoting aggressive beliefs and attitudes, and creating aggressive schema, aggressive

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[2] Chong et al., "Cultivation Effects," 952.

[3] Craig A. Anderson, Douglas A. Gentile, and Katherine E. Buckley, *Violent Video Game Effects on Children and Adolescents: Theory, Research, and Public Policy* (Oxford: Oxford University Press, 2007), 1, https://ebookcentral.proquest.com/lib/ebook-nps/reader.action?docID=416029.

[4] Kimberly D. Thomas and Ronald F. Levant, "Does the Endorsement of Traditional Masculinity Ideology Moderate the Relationship Between Exposure to Violent Video Games and Aggression?" *The Journal of Men's Studies* 20, no. 1 (2012): 48, doi:10.3149/jms.2001.47.

[5] Thomas and Levant, "Endorsement," 48.

behavioral scripts and aggressive expectations; which, in turn, may bias an individual's personality toward aggression."[6]

Other studies have been found to support the relation between violent video games and violent behavior. According to Gentile, Lynch, Linder, and Walsh, "Adolescents who expose themselves to greater amounts of video game violence were more hostile, reported getting into arguments with teachers more frequently, were more likely to be involved in physical fights, and performed more poorly in school."[7] In their 2003 study, Gentile and Anderson found that,

People exposed to a lot of violent media: (a) tend to become meaner, more aggressive, and more violent; (b) tend to see the world as a scarier place; (c) tend to become more desensitized to violence (both in the media and in real life), more callous, and less sympathetic to victims of violence; (d) tend to get an increased appetite for seeing more violent entertainment; and (e) are less likely to behave prosocially.[8]

This literature, therefore, supports the correlation between violent video games and violent tendencies.

B.   ADDITIONAL CONCERNS

In addition to potentially increasing violent behavior, video games in general have been found to cause other serious, negative effects. First, video games have been found to be addictive to some gamers. Rooij et al. found that, "In recent years, several studies have demonstrated that at least a small group of gamers has trouble controlling their online video game playing. Excessive amounts of time spent on playing online video games can be

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[6] Paul J. Adachi and Teena Willoughby, "The Effect of Violent Video Games on Aggression: Is it More Than Just the Violence?," *Aggression and Violent Behavior* 16, no. 1 (2011): 55, doi:10.1016/j.avb.2010.12.002.

[7] Douglas A. Gentile et al., "The Effects of Violent Video Game Habits on Adolescent Hostility, Aggressive Behaviors, and School Performance," *Journal of Adolescence* 27, no. 1 (2004): 5, doi:10.1016/j.adolescence.2003.10.002.

[8] Katherine. E. Buckely and Craig A. Anderson, C. A. (2006). *A Theoretical Model of the Effects and Consequences of Playing Video Games.* Chapter in *P. Vorderer & J. Bryant, Playing Video Games—Motives, Responses, and Consequences* (pp. 363–378).

severely disruptive to school, work, and 'real life' social contacts."[9] Some research has shown that playing video games can lead to smoking.[10] Video games have also been linked to obesity.[11] They have also been found to lead to poorer academic performance.[12]

C.   NOT AS BAD AS THEY SEEM

Ferguson and Kilburn found that video games do not have the effects that Anderson et al. predicted. They analyzed Anderson et al.'s experiment and found several errors, stating, "In their analysis, C. A. Anderson et al. included many studies that do not relate well to serious aggression, an apparently biased sample of unpublished studies, and a "best practices" analysis that appears unreliable and does not consider the impact of unstandardized aggression measures on the inflation of effect size estimates."[13] They found that increased exposure to video games, either short-term or long-term, did not have any correlation to violent behavior. They found that Anderson et al. conducted their experiment in a way that would lead to biased results and therefore their experiment did not conclusively prove a correlation between exposure to violent video games and violent behavior.

According to Ferguson et al. violent video games do not have any correlation with violent behavior. The participants were instructed to play either a non-violent or a violent video game.[14] The participants were either randomized or given the choice of whatever game they wanted to play: "Although males were more aggressive than females, neither randomized exposure to violent-video-game conditions nor previous real-life exposure to

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[9] Antonius J. Van Rooij et al., "Video game addiction and social responsibility," *Addiction Research & Theory* 18, no. 5 (2010): 5, doi:10.3109/16066350903168579.

[10] Buckley and Anderson, Theoretical Model, 366.

[11] Kaveri Subrahmanyam et al., "The Impact of Home Computer Use on Childrens Activities and Development," *Future of Children* 10, no. 2 (2000): 12, https://www.jstor.org/stable/pdf/1602692.pdf?refreqid=excelsior%3A0f98f528598d7134910ed374d78f5600.

[12] Anderson, Gentile, and Buckley, "Effects on Children," 2.

[13] Christopher J. Ferguson and John Kilburn, "Much Ado About Nothing: The Misestimation and Overinterpretation About Violent Video Game Effects in Eastern and Western Nations: Comment on Anderson et al. 2010," *Psychological Bulletin* 136, no. 2 (March 2010): 3, doi:10.1037/a0018566.

[14] Ferguson and Kilburn, "Misestimation," 3.

violent video games caused any differences in aggression."[15] Their second study "examined correlations between trait aggression, violent criminal acts, and exposure to both violent games and family violence."[16] The results found that exposure to violent video games was not predictive of committing violent crimes, in that "Results indicated that trait aggression, family violence, and male gender were predictive of violent crime, but exposure to violent games was not."[17] Ferguson et al. found that exposure to violent video games did not have any effect on violent behavior.

D.   BENEFITS

Multiplayer video games in which people must help each other to complete a common goal are growing more popular. Their emphasis on teamwork puts a priority on reciprocity and trust rather than selfish play. Cooperative multiplayer games have led to cooperative behavior amongst gamers. "With regard to cooperative video game play… individuals who had played a violent video game cooperatively were subsequently more cooperative toward each other than individuals who had played the same video game but competitively."[18] Additionally, playing cooperative video games increases the probability of immediate cooperation: "That is, reciprocity is assumed to be normal behavior and thus affects cooperative behavior not only toward the initial partner but also toward new interaction partners."[19] Tobias Greitemeyer and Christopher Cox attempted to prove that cooperative behavior was not just limited to violent video games, but rather cooperative behavior could be increased by playing a neutral video game, neither violent or prosocial. They found that playing a cooperative multiplayer game not only increased cooperative behavior, but also that the increased cooperative behavior was not affected by the structure of the game itself: "Moreover, the effect of video game condition on cooperative behavior

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[15] Ferguson and Kilburn, 4.

[16] Ferguson and Kilburn, 4.

[17] Ferguson and Kilburn, 4.

[18] Tobias Greitemeyer and Christopher Cox, "There's no "I" in team: Effects of Cooperative Video Games on Cooperative Behavior," *European Journal of Social Psychology* 43, no. 3 (2013): 2, doi:10.1002/ejsp.1940.

[19] Greitemeyer and Cox, "No 'I' in Team," 2.

was not affected by liking of the video game, perceived difficulty, and perceived antisocial content, and thus, it is unlikely that these video game dimensions account for the effect of cooperative video game play on cooperative behavior."[20]

Additionally, violent video games have even been shown to promote prosocial behavior. According to Gritter, Patrick and others, "Participants who played a violent video game in which the violence had an explicitly prosocial motive (i.e., protecting a friend and furthering his nonviolent goals) were found to show lower short-term aggression (Study 1) and show higher levels of prosocial cognition (Study 2) than individuals who played a violent game which the violence was motivated by more morally ambiguous motives."[21] The study found that framing the games violence as to be more cooperative seemed to eliminate the short-term aggressive behavior of those who played the game.[22] This shows that even though violent video games have been shown to cause heightened aggressive behavior, the violence can be used to also mitigate that aggression. The study indicates that through use of this prosocial framing, playing violent video games can lead to heightened prosocial behavior and decreased aggressive behavior.

E.   HYPOTHESIS

Video games have been proven to be effective training aids in the work force. According to Katherine Buckley and Craig Anderson's, McDonalds has even adopted a game that helps to train their new employees in training seminars.[23] Additionally, "One of the largest groups that has embraced the use of video games for training is the U.S. military."[24] The Army uses video games to teach soldiers a myriad of tasks ranging from flying, driving tanks, commanding soldiers, etc.[25] With this evidence, it is the author's

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[20] Greitemeyer and Cox, "No "I" in Team," 2.

[21] Seth A. Gitter et al., "Virtually Justifiable Homicide: The effects of Prosocial Contexts on the Link Between Violent Video Games, Aggression, and Prosocial and Hostile Cognition," *Aggressive Behavior* 39, no. 5 (September 2013): 3, doi:10.1002/ab.21487.

[22] Gitter et al., "Justifiable Homicide," 3.

[23] Gitter et al., 3.

[24] Gitter et al., 3.

[25] Gitter et al., 3.

hypothesis that prior exposure to video games will create better job performance within the armed forces. With having prior exposure to video games, new recruits will have been conditioned to learn in the way that the military is attempting to affect. Due to this conditioning, new recruits will be more likely to exhibit cognitive and problem-solving skills acquired through prior video game play.

Video games can have a profound impact on military recruitment. Video games can reach further than previous media could, expanding more deeply into different specific demographics. About 83 percent of teens play video games.[26] This demographic is just the market that the military is trying to reach. The Army has shown success utilizing video games to recruit new potential soldiers with its 2004 release of America's Army, a free online game that teaches the ideals of the Army and enables the player to play in simulated war environments. The operation "was conceived by director Colonel Wardynski, who hypothesized that a free, high-quality game could effectively reach young, tech-savvy recruits and that it would be economically viable if it were to yield merely 300–400 recruits, given the high cost of traditionally recruiting college-bound teens."[27] The game had 1.5 million downloads in the first month of its release, and reaching far more than Wardynski expected and later "military testimony to Congress indicates that it has been more effective for recruiting than any other method of contact."[28] Its popularity leads to the belief that video games can be an effective method of military recruitment. With their ability to reach key demographics, and their ability to promote pro-military rhetoric, utilizing video games for military recruitment can be very effective.

This study will analyze a myriad of relevant data in order to answer various questions about the effects of video games on the Armed Forces. With the military's newly adopted reliance on video games as training tools, how will playing video games affect

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[26] Dmitri Williams, Nick Yee, and Scott E. Caplan, "Who Plays, How Much, and Why? Debunking the Stereotypical Gamer Profile," *Journal of Computer-Mediated Communication* 13, no. 4 (2008): 3, doi:10.1111/j.1083-6101.2008.00428.x.

[27] John Derby, "Virtual Realities: The Use of Violent Video Games in U.S. Military Recruitment and Treatment of Mental Disability Caused by War," *Disability Studies Quarterly* 36, no. 1 (2016): 2, doi:10.18061/dsq.v36i1.4704.

[28] Derby, "Virtual realities," 2.

military job performance? Will prior experience with video games encourage or discourage positive job performance within the military? Are video games an effective medium for recruitment? Will these new recruits' experience with video games make them better than their non-video game playing peers? These questions will be the lens, therefore, with which the author will explore this topic. The overall goal of this study is to determine the effects of video games on the people who play them. Then it will examine how these effects will relate to military job performance and recruitment.

II. AGGRESSION: THE ONGOING DEBATE

Video games have been studied by psychologists and social scientists in order to determine the effects they have on the people that play them—and particularly whether they promote heightened aggressive behavior in their players. This is important to study because if one is to study the effects of video games on the military, then one should explore the notion that video games may produce more aggressive recruits. If this phenomenon is true then it could have potentially negative impacts on the military. This chapter will focus on the debate about media violence and video games causing violent or aggressive behavior. It will conclude with the determination that violent video games do not necessarily cause heightened aggressive behavior, and that the topic still remains under debate.

This study will explore the notion that violent video games may cause aggressive behavior, but it must first start at the studies roots, media violence. As video games are a type of media, it should be important to explore the notion of media violence and its relation to aggressive behavior. Once media violence has been covered, this study will then continue into the study of media violence in the form of video game play.

A. THE AGGRESSION ARGUMENT

Craig A. Anderson et al. found: "Six decades of research on media violence effects reveals that exposure to media violence increases the likelihood of aggression in real life."[29] The authors attempt to expose just how violent media effects people: "In the short term, media violence exposure increases aggressive behavior by priming aggressive cognitions, increasing aggressive affect and physiological arousal, and imitation."[30] Over longer periods of time, the authors warn, "exposure to media violence increases aggression through several learning processes that produce cognitive and affective changes, including

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[29]Craig A. Anderson et al., "Media Violence and Other Aggression Risk Factors in Seven Nations," *Personality and Social Psychology Bulletin* 43, no. 7 (July 2017): 986, http://journals.sagepub.com.libproxy.nps.edu/doi/pdf/10.1177/0146167217703064

[30] Anderson et al., "Seven Nations," 986.

the development and automatization of aggression-related scripts and schemas, emotional conditioning, and desensitization to violence."[31] This study finds that as people consume more violent media, they begin to accept it as normal behavior, and in the future they will either be numb to violent behavior, or they will begin to use it more often—or both.[32] This dynamic is potentially dangerous to society because there are more and more movies and television shows coming out that contain violence. So the more violent media that is produced and consumed should cause a more violent and aggressive society. This idea is a fundamental concern for media theorists, especially as it has to do with predicting violent behavior among people who consume violent media.

In yet another study, Anderson and his collaborators found that, "Indeed there is no convincing evidence in the extant literature that any particular group of people (by age, sex, personality disposition of trait, economic circumstances, family characteristics, or race) is wholly immune to the aggression-enhancing effects of media violence."[33] They have found that media violence increases the risk of violent behavior by serving as an additional risk, on top of pre-existing risks, of violent behavior.[34] They state that, "No single risk factor dominates an individual's overall risk of behaving violently in the future, but the presence of multiple risk factors (including habitual exposure to media violence) and the absence of resilience factors adds up to a fairly accurate probabilistic prediction of future aggressive behavior."[35] Where other studies have found that violent media has positive correlation between violent behavior, then, this study has attempted to explain how. In addition to the several factors that conventionally serve as predictors of violent behavior (family history, poverty, broken home, etc.), Anderson et al. argue that media violence adds one more factor and potentially exacerbates the others.[36]

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[31] Anderson et al., 986.

[32] Anderson et al., 986.

[33] Anderson, Gentile, and Buckley, "Effects on Children," 135.

[34] Anderson, Gentile, and Buckley, 135.

[35] Anderson, Gentile, and Buckley, 135.

[36] Anderson, Gentile, and Buckley, 138.

The early research influenced other major figures in the discourse on video games, including the U.S. Surgeon General, Dr. C. Everett Koop, who in 1984 concluded "that the issues of whether exposure to violent media causes increased aggression and warrants public concern have been resolved by the research literature with a resounding 'yes.'"[37] The same Surgeon General went on to say that, "'They [children] are into it body and soul…Their body language is tremendous and everything is zap the enemy. There's nothing constructive in the games.'"[38] Koop later admitted to having no scientific evidence to support his claim.[39] He later backtracked, releasing a statement that explained his claim to having been only personal opinion.[40] He states, "'This represented my purely personal judgment and was not based on any accumulated scientific evidence, nor does it represent the official view of the Public Health Service....Nothing in my remarks should be interpreted as implying that video games are, per se, violent in nature, or harmful to children.'"[41] This sparked the continuing debate on whether video games do indeed cause violent behavior.

Though video games have their origins in the United States, with the development and proliferation of computers and other platforms, this phenomenon has begun to appear in other countries. Studies suggest that the effects of media violence are not only prevalent in the United Sates. According to Barbara Krahe, "It is argued that, despite differences in cultural norms and practices, the evidence for a link between violent media use and aggression is remarkably consistent across different countries."[42] Krahe concludes that "these findings strengthen the conclusion that violent media are a risk factor for aggression

[37] Anderson, Gentile, and Buckley, 138.

[38] Peter Mattiace, "Video Games Don't Thrill Surgeon General," *Gainesville Sun*, n.d.20, https://news.google.com/newspapers?nid=1320&dat=19821110&id=CD1WAAAAIBAJ&sjid=nekDAAA AIBAJ&pg=2021,2939743&hl=en.

[39] Mattiace, "Surgeon General," 1.

[40] Mattiace, 1.

[41] Howard Mandel, "The Great Debate," *Video Games Magazine*, March 1983, 21, http://www.stat.colostate.edu/~zube/tgd.txt.

[42] Barbara Krahé, "*Violent Media Effects on Aggression: A Commentary from a Cross-Cultural Perspective*," Analyses of Social Issues and Public Policy 16, no. 1 (2016): 4, doi:10.1111/asap.12107.

and validate the psychological explanations for these effects."[43] This study shows that heightened aggressive behavior due to the consumption of violent media is not based on the social construct of individual countries. It shows that the effect of media violence occurs across cultures with differing norms. Most importantly it posits that the effects of media violence occur at the same rate across cultures, therefore eliminating the potential that culture has to influence the effects of media violence. As one understands this, he/she can theorize that the effects would be similar for video games. As video games are a form of media, violent video games should have the same effects as violent television.

B.   VIOLENT VIDEO GAMES AND AGGRESSION

In 2000, Anderson and Dill conducted two studies to determine correlation between violent video games and violent behavior. Their first study "found that real-life violent video game play was positively related to aggressive behavior and delinquency."[44] Additionally, their second study found that "Laboratory exposure to a graphically violent video game increased aggressive thoughts and behavior."[45] They concluded by saying, "The results from both studies are consistent with the General Affective Aggression Model, which predicts that exposure to violent video games will increase aggressive behavior in both the short term (e.g., laboratory aggression) and the long term (e.g., delinquency)."[46] These find that immediate exposure to violent video games had a positive correlation with violent thoughts and behavior.

According to Bartlett, Harris and Baldassaro, who attempted to study video games' connection with aggressive behavior, found that video games did ultimately promote increased aggressive behavior. This study used the General Aggression Model, as used in Anderson and Bushman (2002) to measure the effects of video games on aggression. Using the General Aggression Model, this study measured, "physiological arousal, state hostility,

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[43] Krahé, "Cross-Cultural Perspective," 4.

[44] Craig A. Anderson and Karen E. Dill, "*Video Games and Aggressive Thoughts, Feelings, and Behavior in the Laboratory and in Life*," Journal of Personality and Social Psychology 78, no. 4 (2000): 5, doi:10.1037//0022-3514.78.4.772.

[45] Anderson and Dill, "Aggressive Thoughts," 5.

[46] Anderson and Dill, 5.

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and how aggressively participants would respond to three hypothetical scenarios."[47] Several variables were measured in order to determine video games effects on aggression.[48] Bartlett et al. found that the "Results showed a significant increase from baseline in hostility and aggression (based on two of the three story stems), which is consistent with the General Aggression Model."[49] This study serves as an addition to existing literature supporting that video games promote aggressive behavior. It does so by "showing that increased play of a violent first person shooter video game can significantly increase aggression from baseline."[50] This also solidifies the ideas of Anderson and Bushman 2002, with their use of the General Aggression Model. It ultimately lends validity to the argument that violent video games do cause increased hostility and aggressive behavior.

In their 2010 study, Anderson et al. used Meta- analytic procedures "to test the effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, empathy/desensitization, and prosocial behavior."[51] Anderson et al. set their study apart by using unique features to their study. These features include, "(a) more restrictive methodological quality inclusion criteria than in past meta-analyses; (b) cross-cultural comparisons; (c) longitudinal studies for all outcomes except physiological arousal; (d) conservative statistical controls; (e) multiple moderator analyses; and (f) sensitivity analyses."[52] Meta-analyses generated significant correlation with all six outcome variables.[53] The pattern of results fit within the spectrum of predicted outcomes, and, "The evidence strongly suggests that exposure to violent video games is a causal risk

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[47] Christopher P. Barlett, Richard J. Harris, and Ross Baldassaro, "Longer You Play, the More Hostile You Feel: Examination of First Person Shooter Video Games and Aggression During Video Game Play," *Aggressive Behavior* 33, no. 6 (2007): 6, doi:10.1002/ab.20227.

[48] Barlett, Harris and Baldossaro, "Longer you play," 6.

[49] Barlett, Harris and Baldossaro, 6.

[50] Barlett, Harris and Baldossaro, 6.

[51] Craig A. Anderson et al., "Violent Video Game Effects On Aggression, Empathy, and Prosocial Behavior in Eastern and Western Countries: A Meta-Analytic Review," *Psychological Bulletin* 136, no. 2 (2010): 3, doi:10.1037/a0018251.

[52] Anderson et al., "Eastern and Western," 3.

[53] Anderson et al., 3.

factor for increased aggressive behavior, aggressive cognition, and aggressive affect and for decreased empathy and prosocial behavior."[54] Not only that, but violent video games also increase aggressive cognition, and decrease empathy and prosocial behavior. This is an important finding in this debate because it shows that violent video games do not only have an effect on violent behavior.

Rowell L. Huesmann commented on Anderson et al.'s study by saying,

A. Anderson et al.'s (2010) extensive meta-analysis of the effects of violent video games confirms what these theories predict and what prior research about other violent mass media has found: that violent video games stimulate aggression in the players in the short run and increase the risk for aggressive behaviors by the players later in life.[55]

Huesmann then lends his approval to Anderson et.al as he states, "Contrary to some critics' assertions, the meta-analysis of C. A. Anderson et al. is methodologically sound and comprehensive."[56] If what Anderson et al. is saying is true, the effects of violent video games is not culturally based, but rather the effects are experienced by those of both Eastern and Western cultures. This is critical when determining the importance of this topic across different nations and cultures.

C.   AGGRESSION IN ACTION

In response to literature promoting the idea that violent video games promote violent behavior, Pan et al. conducted a study to determine if there is any neurological connection between violent video games and aggressive behavior. In order to address this question "we measured the spontaneous brain activity using resting-state functional magnetic resonance imaging (fMRI). We used the amplitude of low-frequency fluctuations

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54 Anderson et al., 3.

55 L. R. Huesmann, "Nailing the Coffin Shut On Doubts That Violent Video Games Stimulate Aggression: Comment on Anderson et al. (2010)," *Psychological Bulletin* 136, no. 2 (2010): 2, doi:10.1037/a0018567.

56 Huesmann, "Coffin," 2.

(ALFF) and fractional ALFF (fALFF) to quantify spontaneous brain activity."[57] The results indicated that there was no significant difference between the study group, who played violent video games, and the control group, who did not play a violent video game.[58] Their study found these results to be relevant "indicating that long time exposure to violent video games won't significantly influence spontaneous brain activity, especially the core brain regions such as execution control, moral judgment and short-term memory."[59] This finding implied that the effect of violent video games in other studies was exaggerated.[60]

According to Pan et al., "One can speculate from the above findings that there is no causal link between violent video games and aggression. This is mainly because the cause of aggression cannot be simply determined. Many environmental factors, such as childhood trauma, and family background, contribute to aggression, mutually."[61] This study is illuminating in the sense that it is the first study that we have seen to use actual neurological analysis to attempt to disprove the connection between violent video games and violent behavior. Other studies have relied on meta-data gathered from large populations, or test questionnaires that indicate how aggressive a person might be. This one uses actual brain scanning to demonstrate the brain's activity while playing violent video games. It is important to note that their study did contain a view deficiencies. According to Pan et al., they include the fact that "our participants are all selected from college, whether our findings can apply to different groups remains uncertain. What's more, given the fact that female violent video game players are quite few, our research target mainly focused on the males."[62] All of that being said, this study is unique because of its research method. It seems much more relevant to analyze the brains activity and use that to determine potential

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[57]Wei Pan et al., "Spontaneous Brain Activity Did Not Show the Effect of Violent Video Games on Aggression: A Resting-State fMRI Study," *Frontiers in Psychology* 8 (2018): 2, doi:10.3389/fpsyg.2017.02219.

[58] Pan et al., "Spontaneous Brain Activity," 2.

[59] Pan et al., 2.

[60] Pan et al., 3.

[61] Pan et al., 4.

[62] Pan et al., 4.

effects of video games on the brain. As they concluded, Pan et al. say that, "Our results suggested that there is no strong link between long time exposure to violent video games and spontaneous brain activity, it didn't show any neuropsychological evidence of aggression, but it enhanced our understanding to the relationship between long time exposure to violent video games and aggression."[63]

In an effort to examine the relationship between violent video games and aggression, Ferguson et al. conducted two studies. First, "Study 1 participants were either randomized or allowed to choose to play a violent or nonviolent game. Although males were more aggressive than females, neither randomized exposure to violent-video-game conditions nor previous real-life exposure to violent video games caused any differences in aggression."[64] Ferguson et al. have found that violent video games do not increase aggressive behavior, which is contrary to the findings of previous researchers. Additionally, "Study 2 examined correlations between trait aggression, violent criminal acts, and exposure to both violent games and family violence. Results indicated that trait aggression, family violence, and male gender were predictive of violent crime, but exposure to violent games was not."[65] Though others have shown that violent video games could act as another factor in the effort to predict violent behavior, this study does not find any correlation. Instead it finds that other factors are the building blocks that create aggressive behavior and predictors of crime. Ferguson et al.'s final results summarize that, "Structural equation modeling suggested that family violence and innate aggression as predictors of violent crime were a better fit to the data than was exposure to video game violence. These results question the common belief that violent-video-game exposure causes violent acts."[66]

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[63] Pan et al., 5.

[64]Christopher J. Ferguson et al., "Violent Video Games and Aggression," *Criminal Justice and Behavior* 35, no. 3 (2008): 5, doi:10.1177/0093854807311719.

[65] Ferguson et al., "Games and Agression," 5.

[66] Ferguson et al., "Games and Agression," 5.

D.   THE GENERAL AGGRESSION MODEL (GAM)

The General Aggression Model, made most notably utilized in Anderson and Bushman's 2002 study and then utilized in many studies thereafter, is very important in the ongoing debate about violent video games. It is important to understand what exactly the GAM is because it has been a central component in the argument for video games causing aggression. The General Aggression Model is a model, designed to include many specific psychological theories, which can account for aggressive behavior.[67] It was not designed with media violence in mind, but it was designed in an effort to consolidate aggressive behavior research studies up to that point.[68] The GAM,

> Includes the theoretical basics of earlier psychological theories that have been applied to understand aggression and violence. It was specifically designed to encapsulate social learning theory, script theory, cognitive neoassociation theory, excitation transfer theory, social information processing theory, and also the cognitive/behavioral processes underlying systematic desensitization therapy.[69]

The motivation for creating the GAM was that there had been literature produced that was relevant to studying aggression, usually saying the same thing, but doing so with specific language that rarely coincided with other similar research.[70] The GAM was developed in order to, "(1) to integrate these various theories and literatures using more general terms and concepts, and (2) to do so in a simplified and graphic way to make it easier for scholars in diverse domains (e.g., clinical/counseling, developmental, social, personality, criminology) to communicate with each other."[71] In summary, the GAM is a "general bio-social-cognitive model" that combines complex processes in order to determine the probability that aggressive behavior will be enacted.[72] It is also important to

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[67] Craig A. Anderson and Brad J. Bushman, "Media Violence and the General Aggression Model," *Journal of Social Issues* 74, no. 2 (2018): 3, doi:10.1111/josi.12275.

[68] Anderson and Bushman, "General Aggression Model," 3.

[69] Anderson and Bushman, 4.

[70] Anderson and Bushman, 4.

[71] Anderson and Bushman, 5.

[72] Anderson and Bushman, 5.

understand that all research included in the development of the GAM are also relevant to the study of aggression.[73] With the GAM, researchers can now utilize a common language and use a common research method in order to further the study of aggressive behavior.

Though the General Aggression Model has been adopted by aggression researchers, there have been some that are critical of it. Christopher Ferguson and Dominic Dyck, posit that we should "pull the plug" on the GAM immediately. They claim that the GAM was developed with the right intentions in mind, but due to research bias, it has begun to perpetuate its own relevance.[74] They claim that when researching using the GAM, that researchers have begun to label disproven hypothesis as errors instead of findings, and that it has begun to move away from a true scientific model.[75] They continue by saying that the GAM has never provided significantly conclusive evidence of aggressive behavior, and that "the GAM and social cognitive theories of aggression more generally are not adequate to explain aggressive phenomena."[76] One example of this is that the, "GAM does not substantially distinguish from exposure to violence which occurs in the real world (child abuse, witnessing domestic violence) and that which occurs in fictional media (action movies, Tom and Jerry Cartoons, First-person-shooters, etc.)"[77] The GAM posits that exposing the human brain to any type of violence, real or fictional, has prominent effects to which the brain has few defenses.[78]

Ferguson and Dyck site evidence to the contrary by stating, "Considerable research documents that the human brain learns to distinguish between reality and fiction at an early age"[79] They go on to say that "even children as young as 3 to 5 begin to use the context of a message (i.e., whether it is told as part of a fictional story or true information) in order to

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[73] Anderson and Bushman, 7.

[74] Christopher J. Ferguson and Dominic Dyck, "Paradigm Change in Aggression Research: The Time has Come to Retire the General Aggression Model," *Aggression and Violent Behavior* 17, no. 3 (2012): 220, doi:10.1016/j.avb.2012.02.007.

[75] Ferguson and Dyck, "Paradigm Change," 220.

[76] Ferguson and Dyck, 220.

[77] Ferguson and Dyck, 223.

[78] Ferguson and Dyck, 223.

[79] Ferguson and Dyck, 223.

judge the truthfulness of information."[80] This is just one example that Ferguson and Dyck provide as evidence against the GAM. They conclude by saying,

> The GAM is the logical end product of the social learning/social cognitive paradigm of aggression. Unfortunately, it is insufficient as an explanation of aggressive behavior; its predictions do not fit with real-world aggression and violence statistics, it rests on assumptions that are problematic or demonstrably false, has largely failed to find supportive data in media violence, it's primary area of use and has calcified into a rigid ideology which risks doing more damage to our understanding of aggression than aiding it.[81]

These are bold claims about a widely adopted research framework. Though the GAM has been widely utilized in promoting the idea of increased aggressive behavior as a function of consuming media violence, one must question the process. If the GAM, which was created to aid in these findings, is itself insufficient, then one should note that all research conducted utilizing this method would be insufficient.

E.   WISHFUL IDENTIFICATION

Video games, by their nature, allow people to identify with the characters that they play with. This phenomenon is known as wishful identification.[82] This is present when a person plays a video game, watches some type of media, reads a book, etc. It is the phenomenon that a person will identify with an fictional characters perceived personality, or characteristics, and then adapt the behavior of that character as their own.[83] For example, if one were to watch the movie and observe the main character, that person could then begin acting like the main character if they begin to identify with either his personality, or his experience in the movie. This phenomenon is arguably very pervasive with violent video games.[84] Konijin, Bijvank and Bushman conducted a study in which they introduced

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[80] Ferguson and Dyck, 223.

[81] Ferguson and Dyck, 226.

[82] Elly A. Konijn, Marije Nije Bijvank, and Brad J. Bushman, "I Wish I Were a Warrior: The Role of Wishful Identification in the Effects of Violent Video Games on Aggression in Adolescent Boys," *Developmental Psychology* 43, no. 4 (2007): 136, doi:10.1037/0012-1649.43.4.1038.

[83] Konijin, Bijvank and Bushman, "I Wish I Were a Warrior," 136.

[84] Konijin, Bijvank and Bushman, 137.

adolescent boys to certain types of video games. These adolescents were exposed to 3 different types of games; passive/non-aggressive/non-violent, active/aggressive/non-violent, and active/aggressive/violent.[85]   The results were as expected, that "the most aggressive participants were those who played a violent video game and wished they were like a violent character in the game."[86] This study indicates just how important identifying with a video game character can be, and just how extensive the results may be. Konijin, Bijvank and Bushman conclude by saying, "These results show that identifying with violent video game characters makes players more aggressive. Players were especially likely to identify with violent characters in realistic games and with games they felt immersed in."[87] This study lends to the argument that video games may cause aggressive behavior.

F.   THE GENERAL AGGRESSION CONNECTION

The study of violent video games and their correlation to violent behavior begun in the 1970s with the release of the video game "Death Race."[88] Death Race "featured the player as an automobile driver whose goal was to run over screaming 'gremlins,' transforming them into tombstones. Primitive graphics caused the 'gremlins' to look like stick-figure humans; thus, the game appeared to condone the massacre of innocent civilians with a car."[89] The general uproar about this game owed to the working title of the work, "Pedestrian," which gave the impression that the gameplay incentivized killing pedestrians.[90] In several arcades across the United States the games were taken out and burned in protest.[91] Ultimately due to protest, the games production was cancelled.[92] Interest then resurfaced in the early 1990s with the release of games like "Wolfenstein 3D,"

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[85] Konijin, Bijvank and Bushman, 137.

[86] Konijin, Bijvank and Bushman, 138.

[87] Konijin, Bijvank and Bushman, 138.

[88] Ferguson et al., "Violent Video Games," 145.

[89] Ferguson et al., 145.

[90] Ferguson et al., 145.

[91] Ferguson et al., 145.

[92] Ferguson et al., 146.

"Mortal Kombat," and "Street Fighter," which depicted characters whose aim was player-on-player violence.[93]   These early studies tried to prove that there was a correlation between participation in violent video games and the demonstration of violent behavior.

In their study, Williams and Skoric chose to study Role Playing Games (RPGs). They state, "RPGs are games in which the player creates, grows, alters, and maintains a character through a longer-than-average play experience. RPGs are also the most popular PC game genre."[94] They also chose to study RPGs because "networked gaming is an extremely high growth area across all play platforms."[95] Online games are played in differing group sizes and across different time periods.[96] The largest games, such as World of Warcraft, Runescape, and the Final Fantasy, series can have up to hundreds of thousands of players playing all at once.[97] This type of game is known as a "'massively multi-player online role-playing game' (MMRPG)."[98] In an MMRPG, one creates an avatar, which is a visual representation of the player within the game, and log into and out of a "persistent" environment, which means that they game is continually running.[99] Even when a player is logged off the gameplay still occurs, allowing players to continue to achieve goals and levels even while other players are not playing. They find, "MMRPGs represent the most popular genre of today's PC games and the platform and setting that will likely mark the industry's future."[100] In their study, Williams and Skoric divided the test subjects into a control group and a participation group. The participation group was given a violent video game and instructed to only play that game for one month.[101] They then kept time logs

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[93] Ferguson et al., 146.

[94] Dmitri Williams and Marko Skoric, "Internet Fantasy Violence: A Test of Aggression in an Online Game," *Communication Monographs* 72, no. 2 (2005): 6, doi:10.1080/03637750500111781.

[95] Williams and Skoric, "Internet Fantasy Violence," 6.

[96] Williams and Skoric, 6.

[97] Williams and Skoric, 6.

[98] Williams and Skoric, 6.

[99] Williams and Skoric, 6.

[100] Williams and Skoric, 6.

[101] Williams and Skoric, 7.

and experience diaries for the hours they spent playing the game.[102] Before playing the game the participants and the control group were given a questionnaire that determined the individual's likelihood to engage in aggressive behavior.[103]   After the one month experiment both the control group and the participant group were given the same surveys in an effort to determine the member's likelihood to engage in aggressive behavior.[104] It is important to note that the video game the participant group was instructed to play contained very violent game play, more violent than most games, and the participant group was only allowed to play this one game for a month. The experiment attempted to overstimulate their subjects with very violent content, hypothesizing that this would lead to heightened aggressive behavior.[105]

This month long study of a Mass Multiplayer Role Playing Game concluded that "contrary to some expectations, there were no strong effects associated with aggression caused by this violent game. As noted in the power analysis, our study was incapable of detecting very small effects. If such small effects do exist for this game, we cannot prove or disprove them here."[106]   Interestingly, when these test subjects were introduced to violent content in video games they did not show any heightened aggressive behavior. Even in a video game that people are arguably more invested in, because of the nature of RPGs, one would hypothesize that there would be more aggressive behavior associated with violent RPGs, but this study shows no effect. Not only do RPGs not have an effect on aggressive behavior, but neither does violent content. Also of note is that the experimenters were unable to find any other effects that video games might have on their participants.

G.   THE DEMOGRAPHIC CONNECTION

In studying video games and their potential effect on aggressive behavior, one should also concentrate on whether there are any differing effects across genders. The

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[102] Williams and Skoric, 7.

[103] Williams and Skoric, 7.

[104] Williams and Skoric, 7.

[105] Williams and Skoric, 7.

[106] Williams and Skoric, 12.

debate in the scientific literature is such that one gender is more affected than another. Anderson and Dill's study "found that real-life violent video game play was positively related to aggressive behavior and delinquency. The relation was stronger for individuals who are characteristically aggressive and for men."[107] Additionally, their second study found that, "Laboratory exposure to a graphically violent video game increased aggressive thoughts and behavior. In both studies, men had a more hostile view of the world than did women."[108] Anderson and Dill have determined that men are more likely to become more aggressive when exposed to violent video games.

In another study, Anderson and his collaborators found that, "Indeed there is no convincing evidence in the extant literature that any particular group of people (by age, sex, personality disposition of trait, economic circumstances, family characteristics, or race) is wholly immune to the aggression-enhancing effects of media violence."[109] Though Anderson et al. have found that media violence increased aggressive tendencies, they found, "no evidence of sex differences in susceptibility."[110] Equally significant to the research findings, it is important to note that they did not find any research bias across cultures or gender. This increases the importance of these findings by saying that there are no differences among the effects experienced by the consumers of these games.
As further evidence to Anderson et al's study, Huesmann finds that the, "effects [of violent video games] occur for males and females and for children growing up in Eastern or Western cultures."[111] Huesmann's study posits that violent video games do cause heightened aggressive behavior, but it finds that there is no difference in the effects between men and women.

Pan, in her attempt to disprove violent video games effects on aggressive behavior, summarizes by saying, "Although males were more aggressive than females, neither

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[107] Anderson and Dill, "Aggressive Thoughts," 4.

[108] Anderson and Dill, 4.

[109] Anderson, Gentile, and Buckley, "Effects on Children and Adolescents," 9.

[110] Anderson, Gentile, and Buckley, 9.

[111] Anderson, Gentile, and Buckley, 9.

randomized exposure to violent-video-game conditions nor previous real-life exposure to violent video games caused any differences in aggression."[112] Pan claims that violent video games do not effect aggressive behavior, and she evidences this by illustrating that aggressive tendencies did not change depending on gender. This is perhaps the strongest evidence for potential gender differences in the effect of violent video games on aggressive behavior. Because there was no result found in the increase in either genders aggressive behavior, this study finds that there is no real difference in the effect of violent video games on one gender more than the other.

H.   VIDEO GAMES AND CRIME

If exposure to violent video games can cause heightened aggressive behavior, one would think that there would be ample evidence of aggressive crimes committed in correlation to the release of violent video games. Markey, Markey, and French, however, have found quite the opposite. In their 2014 study they attempted to cross reference the Federal Bureau of Investigation's (FBI) list of aggressive crimes committed with the release of violent video games.[113]   Additionally, they attempted to analyze aggregate online search data with heightened periods of violent crimes.[114]   They did this by cross referencing the times when internet searches looking for either the violent video game, or items related to the violent video game (i.e., strategy guides) were more prevalent.[115]   With this information they looked at the FBI's list of violent and aggressive crimes in an attempt to find some sort of correlation. They ultimately found that, "Unexpectedly, monthly sales of video games were related to concurrent decreases in aggregated assaults and were unrelated to homicides."[116]   This quote suggests that video games actually decreased aggressive behavior in the real world. The same thing happened with the search for the

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[112] Pan et al., "Spontaneous Brain Activity," 5.

[113] Patrick M. Markey, Charlotte N. Markey, and Juliana E. French, "*Violent Video Games and Real-World Violence: Rhetoric Versus Data*," Psychology of Popular Media Culture 4, no. 4 (2015): 290, doi:10.1037/ppm0000030.

[114] Markey, Markey and French, "Rhetoric Versus Data," 290.

[115] Markey, Markey and French, 290.

[116] Markey, Markey and French, 291.

games associated strategy guides, "Searches for violent video game walkthroughs and guides were also related to decreases to aggravated assaults and homicides 2 months later."[117] Finally, in the response to the most violent game rating, the Mature, or M, rating "homicides tended to decrease in the months following the release of a popular M-rated violent video game."[118] As many scholars have agreed that violent video games should cause increased violent behavior and aggression, this study has shown the opposite. If there is a correlation between violent video games and violent behavior in the real world, then one should expect to see a correlation between violent video game sales and violent crime. According to this study, the evidence points to the contrary.

I.   CONCLUSION

Video games have been the source of come serious debate. The fact that they cause increased aggressive behavior has never been reliably proven. Additionally, there are several researchers who have found evidence to the contrary, that video games do not cause aggressive behavior at all. This continues to fuel the debate over whether video games are good or bad for our children. Looking more deeply into it, however, the research that lends to the idea that video games cause aggressive behavior could very well be irrelevant considering that the GAM is also subject to scrutiny. Knowing that the research method that finds that video games cause aggressive behavior is biased, or incorrect in several of its assumptions, one can determine that the research conducted within that framework would be incorrect. Additionally, there is evidence suggests that video games do not cause aggressive behavior. Pan's study of Role Playing Games directly refutes the notion that wishful identification leads to heightened aggressive behavior. Finally, analyzing crime statistics aligned with video game releases, found that aggressive crimes actually decrease when a new video game is launched instead of increase, which one would hypothesize. Whether video games cause aggressive and violent behavior is still widely debated, and because it is so widely debated there cannot be a significant determination on their effect on the military. There is potential that the literature will come to a concrete consensus

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[117] Markey, Markey and French, 291.

[118] Markey, Markey and French, 291.

sometime in the future, but at this time there is not enough evidence to show one side to be correct. It is still undetermined whether violent video games have any effect on violent and/ or aggressive behavior.

III.   LEARNING: GENERAL CONSENSUS

The previous chapter described a widely debated argument about potential negative effects of playing video games. This chapter will focus on some of the benefits that people stand to gain by playing video games. As in the previous chapter, knowing the benefits of video games could potentially aid the military by effecting who they recruit. Knowing that those who play video games have the potential for advanced or specific learning types and styles, the military can tailor its efforts towards recruiting a specific demographic. Additionally, it can also aid in the military's ability to tailor and structure training for their members.

A.   CHANGING WORLD

According to Atrusi Hirumi, author of the book Playing Games in School: Video Games and Simulations for Primary and Secondary Grades, education has changed due to the introduction of advanced technology.[119] Hirumi illustrates this idea by stating that children used to be very ignorant of the world.[120] They used to be untraveled and have little working knowledge of how the world works, and teachers would slowly rescue them from the darkness that was their ignorance.[121] Educators then became proud of their role in "showing them the light" as it were.[122] Hirumi argues that in this generation kids grow up "flooded by the light of information." That they "are connected to the world and what is happening in television, internet, messaging, and much more long before their schooling begins."[123] Hirumi goes on to argue that we could provide our children with some guidance, shaping the knowledge that they have already developed, and guiding them to

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[119] Atsusi Hirumi, *Playing Games in School: Video Games and Simulations for Primary and Secondary Grades* (Eugene: ISTE, 2014), 1, https://ebookcentral.proquest.com/lib/ebook-nps/reader.action?docID=3317687&query=.

[120] Hirumi, "Games in School," 2.

[121] Hirumi, 2.

[122] Hirumi, 2.

[123] Hirumi, 2.

the correct answers.[124] He, however, finds that educators tend, instead, to rid the students of the tools that connect them, and may unintentionally "drive them back into darkness."[125] He states, "While educators in the 21st century would like to be the people who show kids the light and often think of themselves in this way, the danger is that—with the very best intentions—they wind up doing precisely the opposite."[126] Because there has been a connection associated with video games and learning, it should be important for educators to recognize this and adapt.

B.   VIDEO GAMES AND LEARNING

According to Harry Brown, author of the Book <u>Video Games and Education,</u> "In the last decade public discourse on video games has made opposing claims that the emergent medium will either elevate us, making us faster, more creative thinkers, or degrade us, making us illiterate, socially isolated, and pathologically violent."[127] As we have already explored the potential for the latter, we will now explore the merit of the former.

Marc Prensky, a designer of business and educational simulations and author of the book, Digital Game-Based Learning, is a strong supporter of the fact that video games can aid in cognitive development. He argues that, "It is possible to combine computer and video games with a wide variety of educational content, achieving as good or better results as through traditional learning methods in the process."[128] Prensky finds that video games can be effective tools because of their goal-oriented nature, and the rewards one feels while accomplishing a task.[129] These rewards serve as an incentive to perform the task presented in front of the gamer. Prensky claims this can lead to a heightened "sense of purpose" and

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[124] Hirumi, 3.

[125] Hirumi, 3.

[126] Hirumi, 4.

[127] Harry J Brown, *Videogames and Education* (London: Routledge, 2015), 10, https://ebookcentral.proquest.com/lib/ebook-nps/reader.action?docID=1899956&ppg=10.

[128] Marc Prensky, *Digital Game-Based Learning* (St. Paul: Paragon House, 2007), 1.

[129] Brown, "Videogames," 11.

ultimately "competence."[130] Prensky doesn't touch on the exact nature of how video games can effect learning, but merely that they do. He illustrates that is basic human nature that if a person is properly incentivized, he/she will perform a task more effectively. Though basic, Prensky does still provide a compelling argument about the effects of video games on learning.

James Paul Gee, author of the book What Video Games Have to Teach Us About Learning and Literacy, finds that video games help us to develop a wide variety of cognitive skills.[131] They help us to experience our world in a different way, and "to develop resources for future learning and problem solving."[132] He ultimately finds that games "operate with—that is, they build into their designs and encourage—good principles of learning, principles that are better than those in our skill-and-drill, back-to-basics, test-them-until-they-drop schools."[133] Gee finds that video games have a more basic effect on how we learn. He finds that video games aid in cognitive enhancement by allowing people to learn in a more optimized and efficient manner. Also, content aside, Gee would argue that video games teach us how to learn. Gee finds that test based schooling system of today is lacking in its ability to develop effective learners.[134]

Thinking in line with Gee, science writer Stephen Johnson, author of Everything Bad is Good for You: How Today's Popular Culture is Actually Making Us Smarter, claims that video games teach us to interact with an imaginary world full of complex challenges

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[130] Brown, "Videogames," 12.

[131] James Paul Gee, *What Video Games Have to Teach Us About Learning and Literacy* (Princeton, N.J.: Recording for the Blind & Dyslexic, 2005), https://books.google.com/ books?hl=en&lr=&id=v_XIBAAAQBAJ&oi=fnd&pg=PP2&dq=what videego games have to teach us about learning and literacy&ots=o2uyX3DEWG&sig=ncUUpfWobOr0Fzb8SzJlCGBhMfw#v=onepage&q=what videego games have to teach us about learning and literacy&f=false.

[132] Gee, "Learning and Literacy," 2.

[133] Gee, 3.

[134] Gee, 3.

and hidden meaning.[135] Gamers then form hypotheses about the results of these puzzles and then test these hypotheses in the game world.[136] Once they have tested their hypotheses, gamers then adjust their understanding of their virtual environment.[137] We can notice a trend in Johnson's thinking as he illustrates that, "They are learning the basic procedure of the scientific method."[138] This goes to further support Gee's message that video games encourage the way that we learn. Video games, according to Johnson, are framed in a way that encourage us to think utilizing the scientific method. Video games do not teach us what the scientific method is, or how important it is to scholarship, but instead they encourage gamers to naturally develop their skills in utilizing it. This demonstrates the effectiveness that video games can have on the learning process.

Johnson doesn't just stop there; however, he finds that video games are much more than just learning aids.[139] He argues that video game content is less important than the cognitive challenges that they provide their users.[140] He compares them more to the complex math and logic problems that we see in standardized testing, and less like forms of art such as novels or stories.[141] He even goes as far as saying that video games may even serve as something deeper than mere mental development by saying that playing video games are "about finding order and meaning in the world, and making decisions to help create that order."[142] This is interesting because Johnson is attempting to make a connection between learning and video games, and perhaps even cognitive well-being. He seems to argue that video games may be able to serve an even greater purpose than

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[135] Steven Johnson, *Everything Bad Is Good for You: How Today's Popular Culture Is Actually Making Us Smarter* (New York: Riverhead Books, 2006), 20, https://books.google.com/ books?hl=en&lr=&id=qcDPYuXCPTwC&oi=fnd&pg=PA1&dq=everything bad is good for you&ots=kB6GSW3gzC&sig=kMR13or6BSliJZ7U5nCKf30CTUc#v=onepage&q=everything bad is good for you&f=false.

[136] Johnson, "Everything Bad," 21.

[137] Johnson, 21.

[138] Johnson, "Everything Bad." 22

[139] Johnson, 23.

[140] Johnson, 23.

[141] Johnson, 23.

[142] Johnson, 23.

cognitive development. He says that, "They strike me as the equivalent to writing a story about the merits of the great novels and focusing on how reading them can help you improve your spelling. It's true enough, I suppose, but it doesn't do justice to the rich, textured experience of novel reading."[143] This is a bold claim. Johnson argues that researchers cannot begin to understand the benefits of video games. He argues that there are many more positive effects than the cognitive effects that other researchers agree upon. One thing is for certain though, that Johnson argues very strongly in support of video games positive effects on learning.

Will Wright, designer of the games SimCity, The Sims, and Spore, has stated that "The human imagination is an amazing thing. As children we spend much of our time in imaginary worlds, substituting toys and make-believe for the real surroundings that we are just beginning to explore and understand. As we play we learn. And as we grow our play gets more complicated. We add rules and goals. The result is something we call games."[144] This seemingly supports Johnson's view that video games can be more than just a tool for learning. They are a "mental prosthesis" developed to supplement ones imagination with a little direction.[145] Humankind has developed the ability to create whatever its imagination can dream up in the form of media. Now that we can finally interact with this media, in the form of video games, it allows us to continue to dream and advance.

According to Aguilar and Mendez, authors of the article Video Games and Education: Education in the Face of a "Parallel School," they argue that video games have become a "vital part of contemporary culture and society."[146] As such it is important for scholars to investigate the potential effects they can have on the people who play them. They identify that many authorities and educators tend to discredit video games citing their

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[143] Johnson, 24.

[144] Johnson, 25.

[145] Johnson, 25.

[146] Miguel De Aguilara and Alfanso Mendez, "Video Games in Education: Education in the Face of a "Parallel School," *Computers in Education-Theoretical and Practical Computer Applications in Entertainment*, October 2003, https://dl-acm-org.libproxy.nps.edu/citation.cfm?doid=950566.950583.

negative effects.[147] This leads to a view that video games can only bring harm to those who play them, but Aguilar and Mendez believe differently. They support their argument by compiling twenty years of research, analyzing it, and then finally offering some conclusions on the topic. They offer that video games have been proven to be a uniquely important resource in the learning and teaching environment.[148] That video games are of "unquestionable importance" in the educational realm.[149] They state that, "In addition to stimulating motivation, video games are considered very useful in acquiring practical skills, as well as increasing perception and stimulation and developing skills in problem-solving, strategy assessment, media and tools organization and obtaining intelligent answers."[150] Not only do video games have a positive effect on several intangible skills, but they can also have an effect "in the classroom to expose the values they (video games) disseminate; that is to say, to develop a critical attitude towards certain undesirable behaviors (e.g., violence) or values (e.g., sexism)."[151] Which means that educators can use video games in an effort to combat bad behavior, and to simulate undesirable values in a learning environment in an effort to educate against those undesirable values. This can provide a helpful tool when teaching developing minds how to behave in today's society. Additionally, Aguilar and Mendez find that, "Research has yet to prove that video games are intellectually harmful; on the contrary, many studies defend their great importance in the development of intellectual abilities."[152] Aguilar and Mendez conclude that video games do not cause any intellectual damage.[153] With this finding it is important to consider that video games only stand to benefit their users, and not harm them. This is an important argument in the debate about video games.

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[147] De Aguilara and Mendez, "Parallel School," 1.

[148] De Aguilara and Mendez, 1.

[149] De Aguilara and Mendez, 1.

[150] De Aguilara and Mendez, 1.

[151] De Aguilara and Mendez, 1.

[152] De Aguilara and Mendez, 1.

[153] De Aguilara and Mendez, 1.

C.   COGNITIVE DEVELOPMENT

Video games have been shown to improve various cognitive skills. According to Daphne Bavelier and Shawn Green, authors of an article entitled "The Brain Boosting Power of Video Games," posit that, "A range of mental skills appears to benefit from game play, including attention, faster processing of information, flexibility of switching from one task to another and visualizing the rotation of an object."[154] They have found that these benefits come as a result of playing Action Video Games (AVGs).[155] AVGs are classified by their game genre, that is they are video games that specifically display fast paced action such as first or third person shooters. These video games consist of fast paced gameplay that requires a player to make split second decisions in order to achieve a predetermined goal.[156]   This has shown that "a player's ability to react to events that unfold quickly gets better with regular play. Tests of reaction times of action video-game players show that performance improved by more than 10 percent compared with before they took up gaming."[157] This, they posit, would necessarily give an AVG player a leg up in the work place. This ability to make correct decisions quickly, and under pressure, seems to make for better employees. For example they cite "that laparoscopic surgeons who were also game players were able to complete surgeries more quickly while retaining the necessary precision in the operating room. Game-playing surgeons appeared to work more efficiently, not just faster."[158] Gaming, in this case, made surgeons more efficient at their trade. One can take these results and argue that AVGs would promote more technical productivity with similarly technical and high pressure jobs. This is evidence that the military could benefit from recruiting AVG players, and also encourage their employees to play AVGs. The military requires people who can make decisions under pressure, and who can do so in an efficient manner. Video games may to produce people who can do that.

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[154] Daphne Bavelier and C. S. Green, "The Brain-Boosting Power of Video Games," *Scientific American* 315, no. 1 (2016): 26, doi:10.1038/scientificamerican0716-26

[155] Bavelier and Green, "Power," 26.

[156] Bavelier and Green, 26.

[157] Bavelier and Green, 27.

[158] Bavelier and Green, 27.

Bevelier and Green have also found that video games increase ones attentional skills. They tested this by exposing subjects,

> To a series of letters, interspersed with occasional digits. Each item flashes on the screen at intervals of 100 milliseconds, less than the blink of an eye. Test takers who do not indulge in action video games typically have little difficulty identifying the first digit in the string. But if a second digit follows closely thereafter, they often do not notice it—a psychological phenomenon known as attentional blink. Some experienced action-game players, however, barely blink, catching every target digit as it passes by.[159]

This indicates the ability of AVG players to maintain close attention is greater than those who do not play AVGs. In a practical sense, AVG players are better able to notice slight changes in their environment. They can identify slight changes in movement and display better than their non-player counterparts. This can be shown, according to Bavelier and Green in brain scans, which "provide more evidence of the benefits of action games. Widely dispersed regions of the cerebral cortex, regulating attention, change their activity more in action-game players than in nonaction gamers."[160] These brain scans show that AVGs help activate the parts a person's brain that sustain attention, switch focus among different targets, and monitor ones behavior.[161] Video games seem to produce people who can pay close attention for long periods of time, efficiently multitask, and control their behavior.

Not only do AVGs help to control ones cognitive skills but they help to produce people who can process information more quickly.[162] They state that, "The greater the skill they acquire [in an AVG], the faster they process information in the quick-moving stream of events that makes up each game scene."[163] They then go on to say that "information-processing speed is a key measure of the efficiency of cognitive functioning—and action games appear to be excellent tools to make a person's reaction

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[159] Bavelier and Green, 28.

[160] Bavelier and Green, 28.

[161] Bavelier and Green, 28.

[162] Bavelier and Green, 29

[163] Bavelier and Green, 29.

time faster."[164] All of this is an indication that AVGs help train people to be able to process information more quickly and efficiently. They are then able to more appropriately react to that information at a faster rate. This would go to directly benefit people in positions where quickly processing and then reacting to information would be beneficial.

Bavelier and Green determine that, "Greater efficiency in controlling attention has a ripple effect on many forms of neural processing. It can ensure that the brain extracts more visual, auditory and other information about a task being performed—and that it excludes sources of distraction or noise. At the highest levels of cognitive processing, an individual may demonstrate a high degree of flexibility in refocusing attention from one task to another."[165] As has been previously mentioned, video games can improve the control of one's attention. In this they promote people who are not easily distracted, and who can efficiently allocate the proper attentive energy into their tasks across varying spectrums.

They conclude by saying that video games promote a rewarding learning experience that can be applied to real-life. They posit that video games can promote "better mental rotation in science or math classes or quick braking of a car if a child runs into the street to fetch a ball."[166] Whether video games produce increased attention control, faster reaction times, or an increased spatial awareness, they may serve to increase one's cognitive abilities.

Haung, Young and Fiocco have gone further. They were determined to research whether a game platform, i.e., whether you played a game on your phone or on a console, made a difference in video games' effects on cognitive ability.[167] They gathered participants who either played video games on a mobile device or on a console, and also gathered non video game players as a control group, and gave them tests of cognitive

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[164] Bavelier and Green, 29.

[165] Bavelier and Green, 26.

[166] Bavelier and Green, 26.

[167] Vivian Huang, Michaelia Young, and Alexandra J. Fiocco, "The Association Between Video Game Play and Cognitive Function: Does Gaming Platform Matter?," *Cyberpsychology, Behavior, and Social Networking* 20, no. 11 (2017): 690, doi:10.1089/cyber.2017.0241.

abilities.[168] They gave each participant a cognitive battery in order to determine executive function, learning, and memory.[169] They found that, "Frequent video game play is associated with enhanced executive function, but not learning and memory."[170] Additionally, they found that the medium with which people played video games was not unique to the benefits experienced.[171] Regardless of which medium gamers used to play games, the fact that they played games necessarily indicated that they had enhanced cognitive abilities.[172] The data indicated "that platform does not significantly determine the benefits of frequent video game play," but cognitive benefits of playing video games were still apparent.[173]

D. PROSOCIAL BEHAVIOR

Dating back to the 1970s, when video games were played in arcades, there developed a stereotype that those who enjoy playing video games are people who are loners, who do not get along with others. Gamers are seen to be somewhat out of touch with society, and impossible to interact with. Research has shown that this is not the case. Video games have been shown to promote prosocial behavior, that is voluntary behavior which is aimed to helping another person, or group of people.

Gentile is a leading researcher in video game effects. He has produced various research connecting violent video games and aggressive behavior. He came together with a team of other researchers to attempt to make a connection between prosocial video games and prosocial behavior. Gentile et al. hypothesized, "Theoretically, games in which game characters help and support each other in nonviolent ways should increase both short-term

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[168] Huang, Young, and Fiocco, "Association," 690.

[169] Huang, Young, and Fiocco, 691.

[170] Huang, Young, and Fiocco, 692.

[171] Huang, Young, and Fiocco, 693.

[172] Huang, Young, and Fiocco, 693.

[173] Huang, Young, and Fiocco, 694.

and long-term prosocial behaviors."[174] They conducted three studies in three countries, across three different age groups in order to prove this connection.[175] They find that, "Singaporean middle-school students who played more prosocial games behaved more prosocially…in Japanese children and adolescents, prosocial game play predicted later increases in prosocial behavior."[176]Additionally, they found that, in the United States, undergraduate students who were instructed to play prosocial games also behaved more prosocially when made to interact with a random student.[177] Gentile et al. conclude by saying that, "These similar results across different methodologies, ages, and cultures provide robust evidence of a prosocial game content effect."[178] This is further evidence for the ability of video games to produce beneficial effects in those who play them.

Greitemeyer and Osswald, also posited that prosocial video games could promote prosocial behavior. They conducted four experiments based on the hypothesis that playing a prosocial video game would increase, "helping behavior."[179] In their experiment, participants were asked to play either a video game that promoted prosocial thoughts, or a neutral video game that neither promoted nor rejected prosocial behavior.[180] Once the participants had played their respective games they were then assessed on various measures of helping.[181] The research found that, "Participants who had played a prosocial video game were more likely to help after a mishap, were more willing (and devoted more time) to assist in further experiments, and intervened more often in a harassment situation."[182]

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[174] Douglas A. Gentile et al., "The Effects of Prosocial Video Games on Prosocial Behaviors: International Evidence From Correlational, Longitudinal, and Experimental Studies," *Personality and Social Psychology Bulletin* 35, no. 6 (2009): 752, doi:10.1177/0146167209333045.

[175] Gentile, "Prosocial Video Games," 754.

[176] Gentile, 755.

[177] Gentile, 757.

[178] Gentile, 762.

[179] Tobias Greitemeyer and Silvia Osswald, "Playing Prosocial Video Games Increases the Accessibility of Prosocial Thoughts," *The Journal of Social Psychology* 151, no. 2 (2011): 121, doi:10.1080/00224540903365588

[180] Greitemeyer and Osswald, "Accessibility," 121.

[181] Greitemeyer and Osswald, 122.

[182] Greitemeyer and Osswald, 124.

This was due to their second finding, that "exposure to prosocial video games activated the accessibility of prosocial thoughts, which in turn promoted prosocial behavior."[183] Greitemeyer and Osswald have uncovered something that Gentile et al. did not. They found that exposure to these prosocial games necessarily primed thoughts of prosocial behavior. These thoughts then predicted increased prosocial behavior. Greitemeyer and Osswald have essentially uncovered a link between video games and the unconscious priming of prosocial behavior.

Greitemeyer has also teamed up with Christopher Cox in studying the effects of video games on cooperative behavior. They explain, "The present research tests the idea that playing a team-player video game in which players work together as teammates and assist each other in achieving a common goal increases cooperative behavior toward a new partner."[184] They argue that playing video games cooperatively with other people, as opposed to in single-player mode, increased cooperation.[185] Their findings were validated considering that each player played both styles of games. They played both cooperative and single-player style video games. They posit that "the effect on cooperative behavior can only be accounted for by the different way the game was played."[186] This promotes the idea that not only is prosocial behavior effected by playing video games, but so is cooperative behavior. The difference between prosocial behavior and cooperative behavior is that prosocial behavior indicates that a person will perform a selfless act for the benefit of another, where cooperative behavior is where an individual will sacrifice in one way or another for the benefit of the group or team that they are a part of. They conclude by explaining, "Analyses revealed that cooperative team play promoted feelings of cohesion, which activated trust (i.e., the expectation of reciprocal cooperation), which in turn increased cooperative behavior."[187] Not only can video games increase prosocial behavior, but they can produce increased cooperative behavior. This is important because prosocial

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[183] Greitemeyer and Osswald, 128.

[184] Greitemeyer and Cox, "No 'I' in Team," 43.

[185] Greitemeyer and Cox, 43.

[186] Greitemeyer and Cox, 43.

[187] Greitemeyer and Cox, 43.

behavior is behavior that one does that will help another person. One may think that someone who demonstrates prosocial behavior would necessarily also behave cooperatively. Greitemeyer and Cox have argue that video games, which have been shown to influence prosocial behavior, also influence cooperative behavior.

E.   IN SCHOOLS

Video games have been implemented across various spectrums to aid in the development of many of the aforementioned learning objectives. Various video games, and video game like devices, have been utilized by physical education teachers, for example, to make fitness fun, and to develop children's motor skills. A video game called Dance Dance Revolution (DDR) has been used by physical education teachers to get out of shape children moving in a productive manner. DDR is a game that utilizes a dance pad with four arrows pointing both forward, back, left and right. The game is viewed on a television screen, but controlled thought the dance pad. In the game instruction arrows are displayed while a song is playing and the player must follow the instructions by stomping on the arrow indicated by the game. Due to its success, "Numerous physical education programs across the country are including DDR in their curriculum to provide a fun means for students to engage in physical activity. The game has several challenge levels, requiring advancement in the following DDR skills that complement a quality physical education program."[188] DDR allows people to get exercise while engaging in a fun and rewarding activity.

Another video game, Cybex Trazer, is an interactive video game that mirrors a player's movement to his on screen avatar. Cybex Trazer "Game play involves anything from lateral movements, to catching virtual balls falling from the sky, to avoiding virtual trap doors by jumping."[189] Everything from acceleration, reaction time, power, agility, static and dynamic balance, and vertical jump are measured by this video games.[190] One

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[188] Josh Trout and Brett Christie, "Interactive Video Games in Physical Education," *Journal of Physical Education, Recreation & Dance* 78, no. 5 (2007): 29, doi:10.1080/07303084.2007.10598021

[189] Trout and Christie, "Interactive," 29.

[190] Trout and Christie, 29.

can also connect a heart monitor in order to measure heart rate, caloric expenditure, and peak and average heart rates over time played. This video game has been "designed specifically for motor skill testing, exercise, and sport performance training. The software can be modified to meet the needs, goals, and capabilities of any individual user regardless of age."[191] This video game is marketed to children ranging from kindergarten to college and has been shown to increase physical performance in many ways.[192] This further shows the ability of a video game to enhance physical performance.

The final video game that should be mentioned in the realm of enhancing physical performance is Smartwall. Smartwall is a four foot by eight foot screen type platform that can be fastened to a wall.[193] This platform displays various lights on the surface and reacts to contact. When one plays on the Smartwall one must touch lights illuminated across the wall in varying speeds in order to accomplish the objective. Smartwall is a game that has been found to be effective in developing the motor skills of young children, but still also be challenging enough to benefit high performance athletes.[194] The Smartwall, "has a variety of games designed to enhance hand-eye coordination, visual-motor integration, agility, balance, bilateral coordination, concentration and listening skills, spatial awareness, flexibility, aiming, throwing, core strength, speed, and sport-specific skill training."[195] An example of a game that one would play on a Smartwall would be an attempt to touch a displayed area of illumination with a pool noodle as many times as they could in 30 seconds. The illuminated display appears as a small circle of varying sizes in different areas all across the platform. One must utilize various motor skills in order to accomplish this task. Additionally, Smartwall can be used in a team type environment to promote teamwork and cooperation. Take the previous example of one player touching lights for 30 seconds. Players can take turns in different timed intervals and learn from their teammates. Additionally, the players who are not engaged in the activity can communicate

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[191] Trout and Christie, 29.

[192] Trout and Christie, 29.

[193] Trout and Christie, 29.

[194] Trout and Christie, 29.

[195] Trout and Christie, 29.

the lessons that they have both noticed from each other play, and learned from their experience. This can aid in building both camaraderie and teamwork.

These games promote physical activity while also developing necessary motor skills. Some of the reason that they are so effective is that instead of competing against other students, they are often competing against themselves. These video games take away the potential to be ostracized in a team environment when someone is a worse player than others. Instead, they provide an individual experience that can be measured, and then utilized to continue to measure progress. Once progress is measured it gives player's a set of goals to work towards, that are specifically tailored to their needs. These video games allow players to hone their skills depending on their weaknesses.

F.   IN THE COCKPIT

Not only can video games enhance abilities in our young children but they can also aid in improving the skills of aviation pilots. A study was conducted to measure the effectiveness of video-game-simulation-based training on pilots in flight decision making skills.[196] In the experiment, pilots were given simulation-based, in-flight judgement training, while the control group was not.[197] They then had to partake in four simulated cross-country flights in which several critical inflight events occurred.[198] Measures of judgement were collected and assessed both before and after the initial training. They found that, "Subjects in the experimental judgment-trained group performed significantly better on the posttraining simulation than did control group subjects, suggesting that significant gains in pilot decision-making skill can be obtained through the use of the judgment training materials along with simulator practice."[199] This suggests the viability of simulator-based video game training in aviation pilots. Due to its viability, the Air Force and the Navy have adopted simulator based training in their aviation training pipelines.

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[196] Thomas J. Connolly, Bishop B. Blackwell, and Lewis F. Lester, "A Simulator-Based Approach to Aeronautical Decision Making," *Aviation, Space and Environmental Medicine* 60, no. 1 (1989): xx, http://psycnet.apa.org/record/1989-20458-001.

[197] Connolly, Bishop, and Lewis, "Decision Making," 50.

[198] Connolly, Bishop, and Lewis, 50.

[199] Connolly, Bishop, and Lewis, 50.

G.   IN THE OPERATING ROOM

Surgeons also benefit from video games. Previous surgical training relied heavily on hands on participation and observation. Once they had learned enough to pass to the next level, they would then shadow a certified surgeon to gain experience.[200] They were allowed to do small parts of the surgeries in order to bolster their experience.[201] Surgeons have been essentially an apprenticeship, one that takes two to four years to obtain the skills necessary under careful supervision from a master.[202] The problem with the apprenticeship type model is that surgeons only get a chance to practice in real world conditions, which does not allow room to make mistakes. A young surgeon must perform well every time, considering they are operating on a live human, and there is little room for failure. Because surgical training takes so long and costs so much, the medical community has begun to utilize virtual reality (VR) in order to provide this much needed extra practice. It is called, however uncreatively, VR Surgery. It "is an immersive virtual reality operating room experience for trainee surgeons in oral and maxillofacial surgery," but it can be adapted to serve most other surgical fields.[203] It achieves its purpose by, "Using a combination of Oculus Rift head-mounted display, Leap Motion tracking devices, high-resolution stereoscopic 3D videos and 360-degree videos, this application allows a trainee to virtually participate in a surgical procedure and interact with the patient's anatomy."[204] This VR video game is incredibly realistic. It utilizes videos and images from previously filmed surgeries in order to provide the most realistic simulation possible.[205] This video game also allows training surgeons to practice on "live" patients to develop their hand eye coordination and special awareness, not to mention their knowledge and surgical ability. These VR simulations, "provide a sense of 'presence' to the user," that they might not

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[200] Yeshwanth Pulijala, Minhua Ma, and Ashraf Ayoub, *Serious Games and Edutainment Applications* (Springer 2017), 187, https://link-springer-com.libproxy.nps.edu/chapter/10.1007/978-3-319-51645-5_8.

[201] Pulijala, Ma, and Asraf, *Serious Games*, 187.

[202] Pulijala, Ma, and Asraf, 188.

[203] Pulijala, Ma, and Asraf, 188.

[204] Pulijala, Ma, and Asraf, 188

[205] Pulijala, Ma, and Asraf, 189.

otherwise experience. Researchers have found that VR and simulation based training aids in skill transfer, improves training efficiency, and shortens the learning curve of trainees.[206] Simulator and virtual reality video games can also be a low cost alternative to training.

H.   PRACTICAL APPLICATION

Video games have been shown to produce beneficial results in those who play them. They have been shown to improve players' ability to learn. They have been shown to improve their cognitive abilities. Finally, they have been shown to promote prosocial behavior and teamwork. Through practical application of these laboratory results, video games can indeed improve players' abilities. When utilized by athletes or developing children they can promote a myriad of different physical and mental abilities. Pilots use them to aid in decision making. Similarly surgeons utilize simulation and virtual reality based video games to practice complex surgeries. Due to the varying nature of video games, and their potential benefits to those who play them, it is safe to say that video games can create very beneficial results.

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[206] Pulijala, Ma, and Asraf, 205.

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IV. ANALYSIS AND CONCLUSION

Video games have been used by the military in several different capacities. They have been used as tools for both recruiting new people and training their existing soldiers. This chapter will explore some of these examples, and then will end with a culminating opinion on video games. This chapter will end by explaining that, in light of the evidence that this thesis has explored so far, video games have a more beneficial impact on the military than they do a detrimental one.

A. VIDEO GAMES IN THE ARMY

The Army has been using interactive media as training tools for more than 20 years.[207] In 1999, the Army granted $45 million to the Institute of Creative Technology (ICT), led by William R. Swartout at the University of Southern California, to transition technology from the film industry to military-specific training.[208] Swartout said, that the Army does "'a great job teaching people specific tasks,' such as how to shoot a rifle, or how to work with a specific piece of equipment," but lacks more complex training scenarios with which to train its soldiers.[209] In order to make training more applicable to operations in Afghanistan and Iraq, ICT introduced video games containing artificial-intelligence technology so that they can better tailor training for more complex situations.[210] Smartout said, "What we want to do is move it up to a more cognitive level-create an environment where a soldier is under a lot of stress and things are going wrong. He has to figure out what to do."[211] The goal was to create the most realistic training possible for potential real life situations. For example, "One project called 'critical leadership analysis system' uses a case-study approach to teach captains how to make

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[207] Sandra I. Erwin, "Army Video Games Shaped by Growing Need for Junior-Officer Training Tools," *National Defense* 88, no. 606 (May 2004): 18, http://libproxy.nps.edu/login?url=https://search.proquest.com/docview/213416568?accountid=12702.

[208] Erwin, 18.

[209] Erwin, 18.

[210] Erwin, 18.

[211] Erwin, 18.

sound decisions."[212] In one of these experiences, a Captain is made to watch a video of food distribution operations.[213] The simulated operation then goes quite badly, often due to the poor management of the food distribution efforts.[214] Once the video is complete the Captain must then interact in an after-action review.[215] The computer "tells him what went wrong, and the captain can interview the characters from the movie, both friendly and enemies, to get their views."[216] As the Captain generates questions he/she types them into the program and "the computer's text classification system automatically figures out the most likely answer associated with the question typed in."[217] The classification system is accurate 70 percent of the time, and the Army deemed this interactive media "good enough" for training application.[218]

ICT has also developed the "mission rehearsal exercise system."[219] The mission rehearsal exercise system was built as a foundation to other training platforms. It differs from the critical leadership analysis system because instead of watching filmed actors, the trainee "interacts with computer generated actors, whose 'artificial intelligence' understands the human language as the trainee speaks."[220] The actors are computer-generated and are designed to respond to orders and to adapt to the situation at hand.[221] This provides the advantage of "emotional modeling" which enables the characters to display simulated emotions.[222] This, according to Swartout, is the key to building believable interactive characters because it draws on human beings necessity for emotional

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[212] Erwin, 18.

[213] Erwin, 18.

[214] Erwin, 18.

[215] Erwin, 18.

[216] Erwin, 19.

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[219] Erwin, 19.

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[221] Erwin, 19.

[222] Erwin, 19.

interaction.[223] Instead of merely interacting with facts provided by a recorded actor, these trainees get the opportunity to react to interactive, computer generated characters that can simulate real emotions. This has proven itself most effective in training soldiers for complex situations. The ICT has also helped to design two other games with the help of instructors from the Infantry School at Fort Benning, GA.

These games are Full-Spectrum Command and Full Spectrum Warrior.[224] Full Spectrum Command is a game developed with Infantry instructors and teaches young infantry officers how to lead small groups of squads.[225] According to Shaffer, "In the game, that experience—the skills and knowledge of professional military expertise—is distributed between the virtual soldiers and the real-world player. The soldiers in a player's squads have been trained in movement formations; the role of the player is to select the best position for the soldiers on the field."[226] The computer-generated characters— soldiers—understand various movement formations; they also know how to practically apply these formations depending on situation and time.[227] The goal of the simulation is to provide an interactive, adaptable simulation that enables future squad leaders to interact in various combat situations.[228] In order to be successful at the game, one must utilize a wide range of knowledge about formations and their implementation, and put it to use to achieve a predetermined goal.

What makes this game so beneficial is that "the knowledge that is distributed between virtual soldiers and real-world player is not a set of inert facts; what is distributed are the values, skills, practices, and (yes) facts that constitute authentic military professional practice."[229] In this the trainee must make complex determinations, while in

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[223] Erwin, 19.

[224] Erwin, 19.

[225] David W. Shaffer et al., "Video Games and the Future of Learning," *Phi Delta Kaplan International* 87, no. 2 (October 2005): 107, doi:10.1177/003172170508700205.

[226] Shaffer, 107.

[227] Shaffer, 107.

[228] Shaffer, 107.

[229] Shaffer, 107.

a stressful environment, using everything that he/she knows about troop movements and formations.

Full Spectrum Warrior, another computer simulated video game, differs from Full Spectrum Command in that it is used to immerse an individual soldier into larger group movements in order to teach them individual small unit tactics.[230] In Full Spectrum Warrior, players learn a myriad of individual tasks, including suppression fire.[231] According to Shaffer,

> Players learn about suppression fire through the concrete experiences they have while playing. These experiences give a working definition of suppression fire, to be sure. But they also let a player come to understand how the idea applies in different contexts, what it has to do with solving particular kinds of problems, and how it relates to other practices in the domain, such as the injunction against shooting while moving.[232]

Shaffer illustrates that video games "make it possible to 'learn by doing' on a grand scale—but not just by wandering around in a rich computer environment to learn without any guidance. Asking learners to act without explicit guidance—a form of learning often associated with a loose interpretation of progressive pedagogy—reflects a bad theory of learning."[233] He goes on to say that Full Spectrum Warrior provides a viable environmental structure in which to learn the complex tasks that a soldier must know. He states, "In Full Spectrum Warrior, the player is immersed in activity, values, and ways of seeing but is guided and supported by the knowledge built into the virtual soldiers and the weapons, equipment, and environments in the game. Players are not free to invent everything for themselves."[234]

In order to be successful in the game, the player must demonstrate the abilities that would make him/her successful in the military. One must not only adapt within the

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[230] Shaffer, 107.

[231] Shaffer, 107.

[232] Shaffer, 107.

[233] Shaffer, 107.

[234] Shaffer, 107.

available training environment, but within a particular set of learned skills. The game helps the trainee master those skills and determine the intricacies of those when to apply them. Shaffer concludes by saying, "Full Spectrum Warrior is an example of what we suggest is the promise of video games and the future of learning: the development of epistemic games."[235]

B.   VIDEO GAMES FOR RECRUITING

John Derby, who has done extensive research on video games and the military, says, "Americas Army has been more effective for recruiting than any other method, reaching nearly a third of all young people, amassing 40 million downloads from 2002–2008 and 3.6 billion rounds of online gameplay by 2007." Its success owes to an extensive social networking infrastructure that can create influential bonds between players. According to Derby, "The Americas Army website has expanded this network with a host of links that have included social networking sites, widgets and mobile apps, ringtones, screensavers, wallpaper, forums, RSS feeds, music by Army bands, other games, and special tournaments."[236] Americas Army has established itself as a "monumental step into 21st-century military consumer culture," with several Fortune 500 companies trying to emulate their strategy.[237] The U.S. Army, in an attempt to modernize its image produced a free video game called Americas Army. According to Derby, "Project founder Colonel Casey Wardynski hypothesized that a free, high-quality video game with wide distribution could reach and retain young, tech-savvy recruits." The Army then released it for free on their website, and "it was later distributed through recruiting stations, air shows and sporting events, video game conventions, and video game magazines."[238] America's Army is a military shooter type video game that features first-person shooter gameplay where members play as Army personnel against a group of "bad guys."[239]

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[235] Shaffer, 108.

[236] Shaffer, 108.

[237] John Derby, "Violent Video Games and the Military: Recruitment, Training, and Treating Mental Disability," *Art Education* 67, no. 3 (2014): 21, doi:10.1080/00043125.2014.11519269

[238] Derby, 21.

[239] Derby, 21.

The game features a "swapping paradigm" that only allows players to play as members of the Army and never as the "bad guys."[240] Americas Army was hypothesized, in Wardynski's testimony to congress, "That it has been more effective for recruiting than any other method of contact."[241] Wardynski demonstrates the effectiveness of video games as a recruiting method for the military. Circulating a free video game has enabled the Army to increase contact with military age people. The video game was then able to promote the Army's message to those who played their game, and consequently, has enabled those people to decide to join the Army. The impact of America's Army shows an incredibly powerful capability of video games to influence interest in a given message.

C.   DEMOGRAPHICS OF ARMY GAMERS

According to Karin Orvis, the use of video games in military training has been perpetuated by the notion that younger soldiers have "grown up playing videogames. Accordingly, these soldiers should respond positively to their use in training; further, they may voluntarily train with military training games on their own time because they already spend their free time playing videogames."[242] Because of the large impact that video games stand to have on those who play them, Orvis et al. attempted to study the exact demographics of video game players across the Army. First she was interested in finding the demographics of gamers independent of the military, so that she might find a correlation between society and the military. The Entertainment Software Association shows that 64 percent of U.S. households own a device can play video games.[243] Their 2018 report indicates that 55% of gamers are med under the age of 32.[244] This statistic is interesting because the military usually mirrors societal demographics, as military members, indeed, do serve as members in society's well.

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[240] Derby, 21.

[241] Derby, 21.

[242] Karin A. Orvis et al., "Are Soldiers Gamers? Videogame Usage among Soldiers and Implications for the Effective Use of Serious Videogames for Military Training," *Military Psychology* 22, no. 2 (2010): 143, doi:10.1080/08995600903417225.

[243] *Essential Facts About the Computer and Video Game Industry* (Entertainment Software Association, 2018), http://www.theesa.com/about-esa/essential-facts-computer-video-game-industry/.

[244] "Essential Facts."

It remains unknown, however, whether military video game players would mirror societal demographics. In order to address this reflection, Orvis initiated a study over a two-year span that examined the frequency of video game play of more than 750 U.S. Military Academy Cadets. Their findings were consistent over the two year study "and found that as many as 60% of the cadets reported that they had no or very limited videogame experience in the past year, numbers that clearly differ from ESA's (2006) findings."[245] In other words, Orvis found that, "approximately 40% of U.S. Military Academy cadets reported moderate to heavy game-play."[246] This statistic shows that Military Cadets do not fall in line with the societal demographic of video game play.

Orvis was unsatisfied with these findings stating, "Findings were not generalizable to the entire soldier population, because entrance to West Point is highly selective. However, though this may be so, it is possible that soldiers in general are a special population and that, although cadets may differ from their civilian cohort, they may be representative of typical soldiers of the U.S. Army."[247] She determined that her findings might have been affected by the the demographic that she chose to study. She generally hypothesized that since the Cadets at West Point should have been studying or engaging in other extracurricular activities, that it would necessarily lead to less video game play. For this reason she decided to conduct another study. In this study she surveyed over 10,000 soldiers as to their video game habits. Her results showed that "fewer than 43% of over 10,000 soldiers surveyed play videogames at least weekly. Junior enlisted soldiers report the highest frequency (51–59%), whereas senior enlisted/officer ranks play much less (11– 37%)."[248] These findings are fall in line with her original findings, with one caveat.

The Army, as a whole, reflects Orvis' findings from her West Point study, but it is important to see the difference amongst the age groups. Cadets at West Point, who are the age of junior enlisted soldiers, played less video games than their age group peers. Also,

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[245] Orvis, 145.

[246] Orvis, 145.

[247] Orvis, 145.

[248] Orvis, 143.

senior enlisted soldiers and officers played much less than the youngsters did. This finding iselevant because the majority of junior enlisted soldiers played video games. Because the majority of junior enlisted soldiers play video games, there is still value to utilizing video games in training. What's more, is that because of this finding, it should put even higher priority on utilizing video games as training tools. A ccording to Marc Prensky, "Given the almost perfect overlap between the profiles of gamers and military recruits, the U.S. Military uses over 50 different video and computer games to teach everything from doctrine, to strategy and tactics."[249] This adaptation to video game training has led to increased training efficiency, lower training costs, and less time spent training new soldiers.[250]

D.   SIGNIFICANCE

The use of video games in the military is significant because, as statistics show, a majority of their younger soldiers play video games. This stands to effect the efficiency of the Army's training programs because it is the most applicable to their trainees. The Army, and the military as a whole, should recognize this and continue to adapt as they have been doing. With demographics reflecting that more than 60 percent of society plays video games, it can also stand to aid in the military's recruiting effort.[251] They should continue to team up with video game developers in order to provide accurate depictions of military life. Not only that, but they should continue to partner with video game developers to get their message out to the majority of the population. As has been seen with the America's Army video game, video games have the potential to massively impact recruiting numbers. They do so, without the increased cost of paying recruiters, or paying for advertising in mainstream media.

[249] Prensky, "Game-Based," 3.

[250] Prensky, 3.

[251] Orvis, "Are Soldiers Gamers?," 145.

E.   SUMMING UP

First, the idea that violent media can affect aggressive behavior is no new idea. Scholars like Anderson et al., Anderson, Gentile and Buckley, Anderson and Dill, and Barbara Krahe have found that violent media has the potential to increase aggressive behavior among those who consume it.[252] This is an important finding because it sets the baseline for the study of video games. If violent media content can increase aggressive behavior by just watching the content, then it would be hypothesized that video games, an interactive media, would cause the same effect. Though this issue is hotly debated, it forms the foundation of the argument against violent video games.

Since there has been an argument generated for the effects of media violence, there necessarily should be an argument that video games cause heightened aggressive behavior. Many studies have been conducted, including those by Anderson and Dill, Anderson et al., Huesman, and Bartlett, Harris and Boldassoro all showing that video games increase aggressive behavior.[253] Throughout each of these studies the findings are conclusive that playing violent video games increases aggressive thoughts and behavior. This has impacted the general opinion about violent video games. If violent video games stand to cause people to become more aggressive, then the play should be limited, and people should be encouraged not to play them. This however is not conclusive across the literature.

Though many researchers have found that violent video games cause heightened aggressive behavior, there have many who have found the opposite. Studies including those by Pan et al., and Ferguson et al. all find that video games do not cause increased aggressive behavior.[254] They find that the previous studies have resulted in affirmative findings are overblown, and that violent video games to not cause increased violent behavior in the magnitude once previously thought. In fact, Pan et al. found that there were not significant increases in aggressive behavior in their study subjects.[255] Additionally, Ferguson et al.

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[252] Anderson et al., 3; Anderson, Gentile and Buckley, 9; Anderson and Dill, 5; Krahe, 6.

[253] Anderson and Dill, 5; Anderson et al., 3; Huesman and Bartlett; Harris and Boldassoro, 6.

[254] Pan et al., 5; Ferguson et al., 5.

[255] Pan et al.. "Spontaneous Brain Activity," 5.

found that the aggressive behavior of those who played violent video games actually decreased.[256] All of this being said, there has yet to be a conclusive body of literature that has proven that violent video games promote violent behavior.

This thesis has also touched on the GAM or General Aggression Model, developed by Anderson and Bushman to measure aggressive behavior. This has been the model for assessing aggressive tendencies in the study about violent video games. Ferguson and Dyck find that the GAM is outdated and no longer relevant to the study in the field.[257] This further brings into question the validity of the literature.

In the debate we also explored ideas of wishful identification where Konjin et al. find that because people identify with the avatars who they play as, they are more likely to emulate their behavior.[258] Due to this tendency, when the avatar experiences aggressive situations, the player will be more likely to express aggressive tendencies.[259] This argument lends to the argument for video games causing aggressive behavior. Conversely, Williams and Skoric find that while playing RPG's, the games with which a player arguably has the most potential to identify with their avatar, there is no significant increase in aggressive behavior.[260] This just adds to the debate over video games and aggression.

There is also debate over whether gender effects someone's ability to be influenced by violent media and violent video games. Anderson and Dill find that men are more likely to become more aggressive when having played violent video games.[261] While Anderson, Gentile and Buckley, and Pan et al. find that there is no difference in which genders are effected. Anderson, Gentile and Buckley, though, are arguing for the fact that violent media

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256 Ferguson et al., "Games and Agression," 5.

257 Ferguson and Dyck, "Paradigm Change," 220.

258 Konijin, Bijvank and Bushman, "I Wish I Were a Warrior," 136.

259 Konijin, Bijvank and Bushman, 136.

260 Williams and Skoric, "Internet Fantasy Violence," 6.

261 Anderson and Dill, "Laboratory and Real Life," 4.

and video games effect both genders equally.[262] While Pant et al. find that neither gender is effected because violent video games do not cause any increase in violent behavior.[263]

Finally, Markey, Markey, and French, in an attempt to connect violent video game sales with crime, find that crime actually drops when violent video games are released.[264] They conclude by determining that there is no real practical connection between violent video games and aggressive behavior because when people play them the most, right when they come out, crime rates actually drop.[265] This finding furthers the debate about violent video games and aggression.

Though there is a clear and present debate about the potential negative impact of playing video games. The literature is clear that video games also cause a positive impact on the people who play them. According to Hirumi, Brown, Prensky, Gee, Johnson and Aguilar and Mendez, Video games serve to improve people's ability to learn. Video games act as an interactive environment where people can learn concepts ranging from the scientific method to complex problem solving.[266] Video games allow people to engage with their virtual environment to enhance their sense of purpose and motivation to learn.[267] Video games also serve to allow their users to experience new and differing environmental stimuli, and then react to these stimuli in order to learn real world lessons.[268]

In addition to video games ability to aid in enhanced learning, they also help increase the cognitive development of those who play them. Bevelier and Greene and Huang, Young and Fiocco both found that video games can enhance cognitive abilities. Bevelier and Greene found that video games enhanced peoples reaction times, their special

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262 Anderson, Gentile and Buckley, "Effects on Children and Adolescents," 9.

263 Pan et al.. "Spontaneous Brain Activity," 5.

264 Markey, Markey and French, "Rhetoric versus data," 290

265 Markey Markey and French, 291.

266 Gee, "Learning and Literacy," 2.

267 Prensky, "Game-Based," 3.

268 De Aguilara and Mendez, "Parallel School," 1.

recognition, their ability to quickly recognize changes in pattern, etc.[269] While Huang, Young and Fiocco found that these cognitive enhancing benefits were not platform dependent.[270] That is, that no matter how one plays video games, whether it be on a computer, a game console, or your phone, they will still experience these benefits.[271]

Lastly, video games have been shown to increase prosocial behavior, that is the behavior where people act in the interest of helping others. Researchers like Gentile, Greitemeyer and Oswald, and Greitemeyer and Cox all found that video games aid in benefiting prosocial behavior. Each researcher, or group of researchers, found that playing prosocial video games increased people's tendency towards prosocial behavior. Their findings promote the notion that prosocial video games stand to promote teamwork, cooperative behavior, and positive human interaction.[272]

F.   CONCLUSION

This thesis finds that video games do not have an appreciable negative impact. In fact, video games stand to promote many benefits. These benefits have already been implemented by the military, and the Army specifically to both train and recruit their soldiers. Video games are valuable as a training tool because they are cheaper than real-world training. The ability to put a soldier into a stressful wartime environment, without actually putting him/her at risk, is incredibly valuable. They are then able to hone their skills in a structured environment, under careful supervision. This structure optimizes the skills of the learner, and stands to benefit the organization as a whole. The ability to optimize soldiers training is the single greatest value of video games and interactive media. Whether it be simulations, computer based interactive media or VR, the fact that the benefits are not platform specific lends itself to the value of video games. The armed forces should continue to develop their video game training technology in order to continue to optimize their force.

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[269] Bavelier and Green, "Power," 28.

[270] Huang, Young, and Fiocco, "Association," 690.

[271] Huang, Young, and Fiocco, 690.

[272] Greitemeyer and Osswald, "Accessibility," 121.

Additionally, it would be unreasonable for the author to make a determination about violent video games and their effects on the military. Neither side of the argument has been able to produce viable evidence to dispute the others claims. The military should, necessarily, allow for the possibility that video games might cause violent behavior because, after all, some researchers find that they do. Conversely, other researchers have also found evidence to the contrary. Since there has been a debate about the truth of that evidence, however, the military should not treat violent video games as if they would cause aggressive behavior. It is still yet to be determined whether violent video games do indeed cause violent behavior. Because that debate is ongoing, it is not possible to determine violent video games effects on the military.

Video games are also an effective method of recruiting. Video games are one of the most popular forms of media amongst military aged men and women, which means that video games that promote the ideals of the armed forces have the greatest potential for contact. In this way, video games stand to be the greatest recruiting tool that the military has access to. They should continue their efforts to advise on the military style video games that are very popular today, and they should also continue to produce their own games like America's Army. Not only can video games be used to physically recruit new soldiers, but they can be used to screen them as well. This study has shown that video games have potential to display a myriad of benefits in those who play them. The military could stand to benefit from people who have a higher capability for learning, who have increased cognitive abilities, also who have quicker reaction times, who are able to solve complex problems more efficiently, and whose method of learning is already fine-tuned to learn from simulations and interactive media. That a recruit has played video games should be an indicator that he or she would perform well in the military environment. All in all, the impact of video games on the military is much more beneficial than it is detrimental.

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