

The Effects of Violent Video Games on Aggressive Behavior and the Relationship to School Shootings

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I. Objectives

The impact of playing violent video games on the manifestation of aggressive behaviors in young people is controversial. The objectives of this research project were as follows: (1) to review scientific studies of the effects of violent video games on aggressiveness; and (2) to examine the evidence that playing violent video games plays a role in the behaviors of school shooters.

Video games occupied a large amount of my time as a child, and I found that the experience of playing largely nonviolent games was a cognitively stimulating exercise that increased my perceptual-motor, learning, memory, problem-solving, and executive functioning abilities and skills. As an adult, I have been fascinated by public beliefs that violent video games are related to assaultive and sometimes lethal behaviors (1), and I wanted to examine the evidence touted in the media that playing violent video games may contribute to aggressive behavior.

II. Background and Significance

A. Growth of Video Game Industry

The video game industry has evolved into a dominant player in the entertainment industry, and video games of all genres have quickly become one of the most popular forms of media (2). Employment in the industry has been increasing since 2005, consistently experiencing annual growth rates of 9%, and most positions are engineering jobs with annual salaries of \$80,000 - \$90,000.

Video game revenues surpassed movie industry sales in this country in 2005 and worldwide in 2008. In 2005, sales surpassed those in the music industry sales in the United

States. The gaming industry is still growing rapidly in contrast to slow growth for movies and negative growth for music, since piracy has hurt both industries. However, the growth of video game products and sales has been characterized by an increased number of violent video games, a trend that has made these games a target of government and the media once focused on violent television shows and certain music genres.

B. Growth of Video Games with Mature and/or Violent Content

Contrary to public perceptions, video games play a role in the lives of adults as well as children and adolescents. According to Nielson Media Research, at least 45 million households in the United States have at least one video game console (3). The average age of video game players has increased to age 34 (4), and about 60% of Americans play interactive games on a regular basis (2). However, researchers suspect that younger children are more susceptible to the negative effects of playing violent video games compared to older teenagers and adults (5). Furthermore, games that include violence have raised serious concerns among parents, educators, medical professionals, and policy makers about their potentially harmful effects on abnormal child development and behavior (6).

Public concerns about youth violence, including school shootings, have escalated since the 1999 Columbine shootings in Littleton, Colorado (2). Table 1 provides a timeline for the evolution of video games with increasing violent content. Many violent games became popular in the years prior to Columbine, including Doom and Resident Evil, two games well-known for their use of guns, brutality and gore. The two Columbine perpetrators, Dylan Klebold and Eric Harris, were fans of Doom (7), and many media features speculated about a connection between playing the violent game and the massacre.

Following Columbine, President Bill Clinton ordered the Federal Trade Commission (FTC) to conduct a study, and the results were critical of practices in the video game industry. Many companies were marketing games with parental warnings or age restrictions to children, and the marketing plans of some companies included children ages 12-17 in their “Mature (M)” video products (6). Implementation of study recommendations to monitor and restrict sales to children significantly reduced their availability. Children were able to buy “M” games 85% of the time in 2000, that number was reduced to 20% in 2010 (8).

Although only 5% of games released in 2010 were given the “M” rating, those same “M” games accounted for 26% of video games sales. The popularity of these “M” titles is disturbing, because it is likely that children are playing them without adult supervision, even if they did not buy them directly.

C. Impact of Violent Video Games on Young Players

Video games, including those with violence, have become a significant pastime of children and adolescents. They may provide an escape from school work and social activities with family and peers (5), or they may offer opportunities to display gaming proficiencies, increase cognitive skills, and promote self-confidence. Violent video games may also have negative consequences for youth with aggressive or violent tendencies who find these games enjoyable, especially when they actively allow the player to play active killer roles with “blood and gore.” Significant increases in computer processing speed have led to graphic realism that makes the video game appear very real (1).

Over the past several decades, the association between playing video games and the emergence of violence in young people has been controversial in the scientific and political

communities. A body of research suggests that violent video games cause short term and/or long term increases in aggression and violent behavior, whereas a substantial set of research studies indicate that violent video games do not cause increases in aggressiveness or may be associated with changes in certain individuals under specific circumstances. However, media stories of school shootings and related violence over the years have reported violent video game involvement when known and have often attributed this activity to violent events.

D. Medical and Professional Association Policies

Policy statements by a number of medical and advocacy organizations have generally expressed serious concern about the negative effects of violent video games on young people.

The policy statement by the American Academy of Child & Adolescent Psychiatry (AACAP) states that video game content may not only lead to potentially dangerous behavior, but also that the act of playing these games minimizes healthy social interactions with family and friends as well involvement in hobbies, sports, and activities in and out of school. The AACAP also reviews the content of individual video games, helping parents decide which games to allow their children to play.

The American Academy of Pediatrics (AAP) has stated concerns about the negative effect of playing all video games for long periods of time on the ability of youth and young adults to pay attention. The AAP recommends that parents monitor video game content, limit the time children devote to these game activities, and encourage interaction with friends when video games are played. The AAP has also taken the position that violent video games are harmful to children and that exposure should be limited.

The American Medical Association (AMA) has expressed concerns that video games are not properly rated and that violent games have potentially harmful effects, but the AMA has not make a definitive recommendation about the effects of violent video games.

The Constitutional Rights Foundation has issued a statement that rates of school violence are directly related to higher rates of community violence. Environmental and social variables are more potent mediators of aggression in contrast to the personal behaviors of young people playing individual video games (9).

III. Methods and Procedures

The following procedures were used to examine the evidence for the impact of violent video games on aggression in youth, including the violence and lethal behaviors of young school shooters: (1) a review of journal data bases, including PSYCHINFO, and PubMed, to retrieve articles from 1999 through 2011 using the following keywords: Violent video games, aggressive behavior and video games, and school shooters; (2) a search for national media reports from 1999-2011 using Lexus-Nexus; and (3) a review of articles recommended by committee members.

IV. Results

A. Research Models

Two models have emerged as useful to examine the effects of violent video games on behavior: the GAM (General Aggression Model) and the Catalyst models. The GAM framework posits that violent video games teach adolescents to be violent by learning violent thoughts through repetition. Repetition forms violent cognitive scripts, and when presented with a situation, persons playing violent games act more violently or interpret nonviolent situations in

violent ways (10). Also, since most video games are based on a reward system that reinforces learning, violent video games reward players for being successful in violent tasks (6). Exposure to violent video games increases physiological arousal as well as aggressive thoughts, emotions, actions, and decreases positive social behavior (11).

The Catalyst Model proposes that persons who are prone to violence because of other biopsychosocial variables will be “catalyzed” or stimulated to enjoy the violence in video games. The violent video game does not cause them to become violent (10). The model also predicts that those individuals with preexisting risk factors for violence might be pushed "over the edge" because of violent video games and choose violence as a valid solution to problems.

B. Research Findings

A meta-analysis of research articles by Anderson based on 130 reports including more than 130,000 subjects of both genders, all ages, and various races and ethnicities supported the GAM model. The analysis concluded that exposure to violent video games is associated with more aggression and less compassion in children regardless of age, sex, or culture. Violent video games were a causal risk factor for increased aggressive thoughts and behaviors, decreased empathy, and antisocial behavior. Anderson proposed that that exposure to violent video games was a factor that could be controlled by parental involvement, in contrast to other risk factors for violence that are difficult to change, including genetic factors, family environment, and poverty (10).

However, a number of studies contradict the findings of Anderson’s meta-analysis (12). Other investigators reported no correlation between playing violent video games and increased aggression levels, whereas others suggested that violent video games only caused increased

aggression in subjects who scored in the top quartile of trait aggression on psychological tests (3). A wide variety of other factors are more important antecedents of aggression than violent video games, including child abuse and neglect, victimization, bullying, drug and alcohol abuse, exposure to violence in the home, neurobiological indicators, low socioeconomic status, and access to guns (3, 5, 8, 10)

Christopher Ferguson, a prominent researcher in the field who has been critical of Craig Anderson's position, has argued that many of the studies included in the meta-analysis had statistically marginal significance, were methodologically flawed, lacked valid measures of aggression, or were not published in peer-reviewed journals (13). One researcher emphasized the importance of using standardized measures of aggression (12).

Important questions remain unanswered in the studies to date: "If violent video games translate to violent thoughts, do those thoughts translate into violent actions? Are the violent thoughts associated with the violence in the context of video games or are they associated with violence toward other people in real life?" Some researchers have suggested that violent video games are a risk factor, not a causal factor. Indeed, many other variables, such as substance abuse, are likely more important. High school students who use alcohol and illegal drugs have been reported to be at least three times more likely to get into fights and twice as likely to bring weapons to school (20).

Several investigators have examined the relationship of cynical shyness to lethal violence. Carducci and Nethery (14) studied eight young men who committed seven deadly school shootings between 1995 and 2004 and concluded that they all displayed characteristics of "cynical shyness." The term refers to a specific type of shyness seen in a small percentage of

shy individuals who try very hard to develop relationship with others but are rejected, resulting in rage and loss of empathy for others that can end in violent acts such as school shootings. Most people who are shy do not respond with anger, but some shy persons who want attention from others and are rebuffed, isolate themselves, become angry and frustrated, and make plans to get back at those who hurt them. According to Philip Zimbardo (15) "Cynical shyness makes sense in that a constant feeling of being rejected can lead to fantasies of retaliation;" In the case of the school shooters, "it's not simply revenge against the bully, it's revenge that gets generalized to all people who in any way have slighted you."

Douglas Gentile (16), who has studied the impact of media on children and adults, including the effects of video games on physiology and behavior, has argued that violent video games cause increased arousal, aggressive thoughts and feelings, aggressive behavior, and decreased socially appropriate behavior. Gentile has interpreted the inverse relationship between the increased number of violent video games and decreases in school-associated violent deaths (Table 2) with a variety of psychosocial factors in the period 2000 through 2010. improved economic conditions, laws, gun availability, and longer prison sentences. He also He has argued that school shootings result from highly extreme behaviors by perpetrators who have many risk factors for lethal violence, including violent video games (16).

C. Secret Service/Department of Education Safe School Initiative Study

The United States Secret Service in conjunction with the Department of education published a comprehensive report targeting 37 incidents of school shootings and attacks from the earliest known event in 1974 through June 2000 (17). The results showed that children in grades 9 through 12 had a 7-8% chance of being threatened or injured with a weapon and a

15% chance of getting into a physical fight. The likelihood that a child would die or commit suicide in school was only 1 in a million. However, each school attack has dramatic, long-lasting effects on the school and community where the violence occurs, leading to increased fear and increased risk for mental health problems in students, parents, and school employees.

The report concluded that there were no accurate or useful profiles to describe students who engaged in school shootings. Although all perpetrators were male, there were no other common characteristics. Most were doing well in school and had friends. Only one-third considered themselves to be loners, and nearly half participated in social activities in or out of school. Only one-third has records of behavioral problems and 10% had been expelled from school. Most attackers showed no change in academic performance, friendship patterns, interest in school, or school disciplinary problems prior to their attack. However, many attackers felt bullied, persecuted or injured by others prior to the attack, and over 50% described revenge as a motive for killing.

More than half showed interest in violent movies. Most attackers had no prior history of violence or criminal behavior, but some had a record of being arrested. A common theme among 95% of the offenders was to harm their targets before the attack took place. The most unfortunate fact mentioned in the report was that in 81% of the attacks, at least one other person had information about the plan to attack the school.

The Chicago Sun-Times investigation (18) of the 37 school shootings using public information emphasized the conclusions of the Secret Service/Department of Education report that although the majority of school shooters showed interest in violent media of all types, not just violent video games, there is no predictive profile of sociodemographic, psychological, and

behavioral characteristics. School shooters come from different racial and ethnic groups, family structures, and income levels. Many of the shooters imagined violence as a way to solve their perceived problems, such as being bullied, school reprimands, peer rejection, family problems, and other relationship issues. Shootings and attacks were premeditated and carefully planned, often for months or even years, and targets, whether principals, teachers, students, and/or family members, were clearly identified. The Chicago Times echoed the recommendations of the Secret Service/Education study that most school shootings could be prevented if staff were trained to recognize potentially dangerous students and talk with them about getting help to deal with their anger and grievances, such as bullying, and if students were educated and used effectively as resources in prevention. Evan Ramsey, a school shooter from Alaska who killed his principal, said that if the principal had called him in, he would have "told him the truth."

V. Discussion

A number of different research designs have been used to date—intensive clinical studies of young perpetrators of school shootings and attacks, laboratory studies with biopsychosocial measures, cross-sectional studies of subjects with psychological measures, and a few much needed longitudinal studies. Most studies have been designed to examine short-term changes in aggression, which may have little if any predictive accuracy for aggressive and/or violent behaviors in the real world.

Researchers on both sides of the controversy agree about the need for longitudinal studies to see the long-term effects of playing violent video games (2). As of 2006, only two longitudinal studies have been conducted (19). Researchers also agree about the importance of

studies that examine the additive and multiplicative effects of many risk factors for perpetrators of school shootings.

Some researchers have expressed concerns that laboratory research does not adequately elucidate the social context of game play (1, 13). The social aspects of video games have changed significantly since Columbine. There has been a major transition from single players games to multiplayer and co-op game styles. At least 60% of gamers play with friends and at least 25% play with their spouse or family members (2). Therefore, it is possible that video games, even those with some violent content that once favored exclusivity now promote friendship and family bonding (5).

It is possible that playing violent video games only has a negative effect on children during stressed during specific developmental periods or on children who have other significant risk factors for dangerous and lethal behaviors. Although many youth who engaged in violent school events were video game players, most also had maladaptive personality traits and characteristics (3). With over 90% of children exposed to video games of some kind (4), it is likely that any single school shooter has played video games. However, since most individuals exposed to violent video games do not display assaultive or lethal violence in the real world, other factors are probably have causative effects. These may include a stressful, disrupted, and/or abusive family life, poverty, negative peer group influence, and bullying.

Scientific evidence does not always translate into effective public policy, but it is an important consideration (19). My belief is that the public policy for violent video games should be similar to that for smoking: educate society on the potential negative effects and restrict access to minors. More research with longitudinal designs including multiple risk factors should

be a priority, but the research to date is not conclusive. Regardless of the antecedent/causal role of violent video games, we should use our available knowledge to prevent school violence. This should be a national priority.

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TABLE 1			
Violent Video Game Introduction Timeline			
1972	Magnavox Odyssey	1994	Sega Saturn
1973	Maze War - First First-Person Shooter	1996	Resident Evil
1975	First MUD created - Colossal Cave Adventure	1996	Nintendo 64
1975	Atari	1997	GoldenEye 007
1979	Microvision - First Interchangeable Cartridge-Based Handheld System	1997	Ultima Online
1980	Pac-Man	1997	Diablo
1981	Donkey Kong - First Platformer (Introduced Mario)	1998	Half-Life
1981	Turbo - First 3rd Person Racing Game	1998	Tom Clancy's Rainbow Six - Tactical First Person Shooter
1982	Dragonstomper - First Console RPG	1998	Sega Dreamcast
1983	Mario Bros.	1999	Medal of Honor
1985	Dragon Slayer II: Xanadu - First Full-Fledged Action RPG	1999	Counter-Strike
1985	Nintendo Entertainment System	1999	Everquest
1986	Metroid - Combined Platformer and RPG	2000	The Sims
1986	The Legend of Zelda	2000	Sony Playstation 2
1986	Dragon Quest	2001	Halo
1987	Street Fighter	2001	Microsoft XBOX
1987	Final Fantasy - Side-View Turn-Based Battle System - Most Successful RPG Franchise	2001	Nintendo Gamecube
1989	Prince of Persia - First Cinematic Platformer	2002	Battlefield 1942
1989	Nintendo Gameboy	2003	Eve Online
1991	Sonic the Hedgehog	2004	World of Warcraft
1992	Wolfenstein 3D	2005	Microsoft XBOX 360
1993	Doom	2006	Sony Playstation 3
1994	Sony Playstation	2006	Nintendo Wii

TABLE 2												
School-Associated Violent Deaths: Method of Death Breakdown												
Method	Total	2009-2010	2008-2009	2007-2008	2006-2007	2005-2006	2004-2005	2003-2004	2002-2003	2001-2002	2000-2001	1999-2000
Shooting	130	7	8	8	13	15	24	23	3	5	14	10
Suicide	49	0	4	4	6	1	4	5	6	3	8	8
Murder-Suicide	34	0	0	0	8	4	2	6	2	6	2	4
Fighting	16	1	0	2	1	0	2	4	0	1	1	4
Stabbing	41	3	2	2	4	3	6	10	4	1	3	3
Other	15	0	0	0	0	4	1	1	1	1	3	4
Total	285	11	14	16	32	27	39	49	16	17	31	33