

Running Head: VIOLENT VIDEO GAMES

Research on Violent Video Games and Aggression:

A Translation

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Although less research has been done on the impact of violent interactive entertainment (video games and other interactive media) on young people, preliminary studies indicate that the negative impact may be significantly more severe than that wrought by television, movies, or music.
Joint Statement by the American Academy of Pediatrics, American Medical Association, American Psychological Association, American Academy of Child and Adolescent Psychiatry, American Academy of Family Physicians, American Psychiatric Association (2000)

Playing violent video games has been found to account for a 13% to 22% increase in adolescents' violent behavior; by comparison, smoking tobacco accounts for 14% of the increase in lung cancer.
Statement of American Academy of Pediatrics, Committee on Public Education (2001)

My research colleagues are correct in claiming that high exposure to media violence is a major contributing cause of the high rate of violence in modern U.S. society.
Craig Anderson, PhD. Chair, Department of Psychology, Iowa State University

Video games are murder simulators which over time, teach a person how to look another person in the eye and snuff their life out.
David Grossman, PhD, military training expert (Claymon, 1999)

Epidemiologists studying factors associated with violence, including poverty, racial discrimination, substance abuse, inadequate schools, joblessness and family dissolution found that exposure to violent media was a factor in half of the 10,000 homicides committed each year.
Michael Rich (2000), MD, MPH, FAAP for the American Academy of Pediatrics

Based on the pronouncements of experts, video games would appear to be a major health hazard in the United States. Experts claim that these “murder simulators” and other violent media are a “major contributing cause of the high rate of violence in American society” and are a factor in 5,000 homicides each year. In fact, video games’ “negative impact may be significantly more severe than that wrought by television, movies, or music.” Further, it would appear from the pronouncements made by experts that the question of whether video game violence causes players to be aggressive is settled. But upon what evidence are these conclusions based? This

paper peels back the curtain of academic discourse to reveal the research the claims are based on. It is my hope that translating the research from academic statistical language into a form in which all scholars, politicians, parents, industry leaders, and others can understand will allow the discussion of the consequences of these findings to proceed as fruitfully as possible. In this paper, I attempt to make the literature clear; to tell exactly what research has been done and how.

What Exactly is the Literature Telling Us?

In this section, I'll attempt to demystify the statistics and methodology underlying scholarly claims and attempt to communicate the consequences of game play as it applies to behavior effects in everyday life. Before taking a close look at the research, it is important to understand the research process and the philosophical ideas underlying social scientific inquiry. Then, I examine three ways which are commonly used by researchers to speak to different aspects of the relationship: association (Pearson's product moment correlation coefficients), difference (Cohen's d as a measure of effect size), and comparative epidemiological evidence.

In the course of this article I will make reference to two studies in particular; both meta-analyses of the violent video game literature (Anderson & Bushman, 2001; Sherry, 2001). Meta-analysis is a statistical method used summarize overall findings across a large literature. Rather than looking at the results of an individual study, which could be misleading, meta-analysis combines the findings from all studies on that topic. This allows us to determine the overall effect and to find trends within the studies that could be important for theory building. Overall, Anderson & Bushman found an effect of $r = .19$ while I found an effect of $r = .15$ (more on the meaning of these effects will follow).

On Method: Some Cautionary Notes

In many ways, research on human behavior is more difficult than research in the hard sciences such as physics, chemistry, and biology. The main difficulty in doing social science

research is that the subject of the research, human beings, cannot be manipulated as easily as molecules or photons due to ethical considerations. We can design perfect experiments to understand human behavior, but cannot execute these experiments. One colleague speaks of an imaginary island on which we can perform any experimental manipulation of people we want. On this island, we could run the ideal experiment to understand the relationship between cigarette smoking and cancer. Groups of a few thousand randomly chosen individuals would need to be taken from their daily life and randomly assigned to one of several experimental conditions: smoking 10 packs of cigarettes a day, smoking five packs a day, smoking one pack a day, or no smoking. After 10 years of enforced smoking, we could see whether people in the heavy smoking conditions had more cancer than those assigned to the non-smoking condition. Fortunately for the people who were forced into the heavy smoking condition, the island remains imaginary.

Because we don't have the ability to control all aspects of our experiments, social scientists must approximate the types of laboratory control that those in the hard sciences enjoy. Participants are recruited to come to a lab on campus and act out situations that occur in real life such as group interactions, persuasion attempts, or interacting with media. Most often, the participants in these experiments are college students because they are most easily and inexpensively available. In the case of video game research, the participants come to the lab to play video games. An obvious problem is that game play in a university laboratory is not very similar to game play in real life. First, the surroundings are not as comfortable as home. In the lab, there are researchers directing behaviors including what game to play and how long the game is played. Thus, media use becomes a forced rather than voluntary activity. Typically, media is used with friends, but friends are not allowed in the lab. In fact, game play often occurs with no other person in the room.

One way to get around the artificiality of the lab is to conduct field research. Field research takes the researcher out of the lab and into the real world where people are interacting. There are a number of ways to do this. The most common type of field research which has been done with video games research is the survey. Surveys attempt to find trends among large numbers of people by having them respond to a series of questions. In this way, they are able to report every day behaviors and preferences. The disadvantage of surveys is that the researcher loses control over a number of factors that are under control in the laboratory. First, the researcher loses control of time order. Even if there is a relationship between violent video game play and some form of aggression, it is difficult to establish whether 1) video game play causes individuals to act aggressively; 2) aggressive people like playing video games; or 3) some other factor (e.g. personality) causes both violent video game play and aggression. Second, there are any number of other variables that could effect the way that participants respond to questions. In the lab, the researcher can control time order (have the participants play the game before measuring aggression) and other variables (by excluding them from the lab).

Key to the research process is clear definition. Words such as “violence” or “aggression” can mean a number of different things to different people. In fact, “violence” and “aggression” are commonly used interchangeably in common conversation. For the social scientist, these words have very different meanings, with “violence” often connoting a more extreme form of aggression such as murder, physical assault with or without a weapon, or rape. Therefore we would never conduct an experiment in which we expected the subject to act violently. Instead, we use a variety of measures of aggression or the willingness to hurt others. These measures include paper and pen assessments of aggressive feelings, simulated aggression such as willingness to administer electric shock or a noise blast, positive or negative ratings of a research associate, and verbal or physical aggressiveness during free play. Further, the researcher must be

clear about what is meant by “violent media”. For example, some past video game researchers have used *Missile Command* or *Centipede* as the violent game while others have used *Mortal Kombat*. Certainly, there are a number of factors that may be included in the definition of “violent media” including the type of violence, use of weapons, amount of violence, type of victim and perpetrator, and graphicness of the violence. A game like *Mortal Kombat* depicts two human-like creatures fighting martial arts style with weapons such as swords while *Quake* features a first person perspective as the game player hunts humans characters with high powered weapons such as rocket launchers and machine guns.

Statistical Relationships- Association

Pearson’s correlation coefficient is a measure of linear association between two variables. In this case, we are looking at the extent to which more violent video game play is associated with greater amounts of aggression. The correlation metric ranges from 0, meaning no relationship at all, to 1 meaning a perfect association. The relationship can be positive, meaning that as one variable gets larger, the other one also gets larger, or negative, meaning that as one variable gets larger, the other one gets smaller. Therefore, a correlation of -1 means that there is a perfect relationship; as one variable gets larger, the other variable gets smaller.

Let’s look at a couple of hypothetical examples. The first case is the relationship between age and height for children age 3 to 15 (see Table 1). Our data are as follows:

Table 1.

Data for child age and height

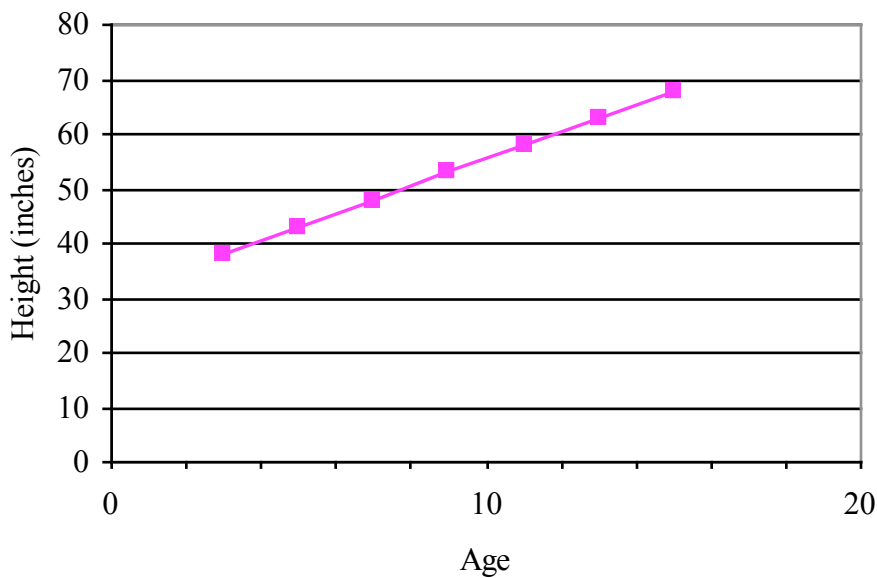
Child	Age	Height (inches)
Billy	3	38
Anna	5	43
Maria	7	48

Tommy	9	53
Johanna	11	58
Mandy	13	63
Joe	15	68

We can see the relationship clearly when represented on a scatterplot with each participants scores on height and age plotted (see Figure 1).

Figure 1.

Scatterplot of child age and height data



As expected, there is a perfect positive correlation between age and height with children ($r = 1.00$); the older the child, the taller the child. However, the same would not be the case with adults 25 years to 40 years old. In this case, I have generated another set of hypothetical data (see Table 2):

Table 2.

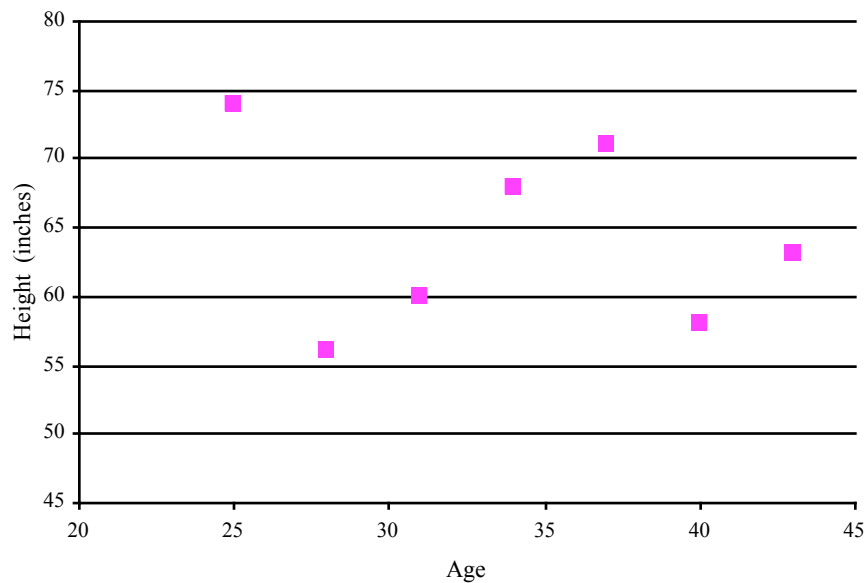
Adult age and height data

Adult	Age	Height (inches)
Thomas	25	74
Richard	28	56
Alice	31	60
Alexandria	34	68
George	37	71
Bridget	40	58
Alfred	43	63

The relationship, when presented on a scatterplot, is much less clear (see Figure 2).

Figure 2.

Scatterplot of adult age and height data



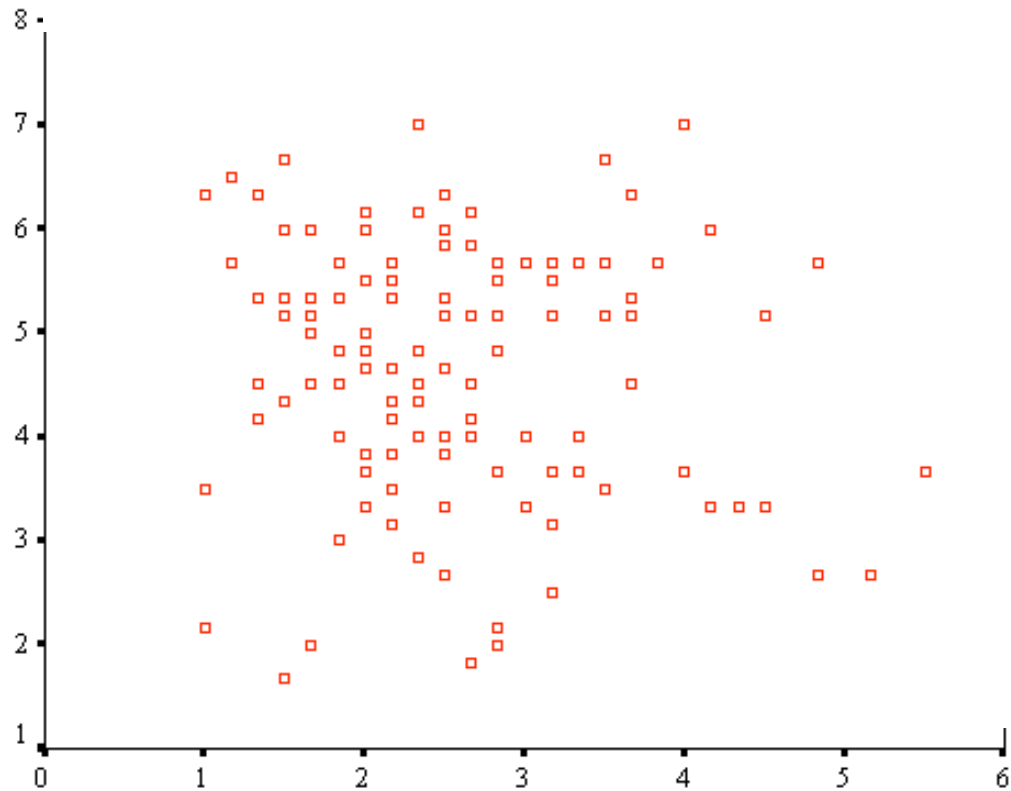
It would be difficult to discern a trend among these data. Are older adults taller than younger adults? The correlation between age and height in this case is $r = .20$; much closer to 0 or no relationship.

Often when dealing with measures of association, scientists will speak of something called “the percent of variance explained”. Variance explained is often misinterpreted to mean the contribution that one variable makes to the other, particularly in an individual case. Certainly, this appears to be the type of argument being made by the AAP when they say that video game play “... accounts for a 13% to 22% increase in adolescent violent behavior”. With a correlation coefficient, variance explained is calculated by squaring the correlation. Thus, in the age/height relationship for children, the variance explained is 1.00^2 or 100% whereas in the adult case the variance explained is $.20^2$ or 4%. Some take this statistic to mean that age accounts for 100% of height in children but only 4% of height in adults. Others will say that 100% of the reason that a particular child is tall is due to age whereas only 4% of the reason a particular adult is tall is due to age. Thinking logically about the data above, one can see that this way of thinking can be deceptive. Height may be related to age a certain times in the lifespan in a particular set of individuals, but height does not cause age or vice versa.

Figure 3 represents a correlation of $r = .15$. That is the relationship I found between playing violent video games and subsequent aggression to be in my meta-analysis (Sherry, 2001). Figure 2 represents (roughly) the strength of correlation found by Anderson & Bushman (2001). Would you feel comfortable predicting how aggressive a person was if I told you how much violent video game play they engaged in based on these patterns? Can you tell whether the relationship is positive or negative?

Figure 3.

Pearson's Correlation equal to .15



Statistical Relationship- Difference

Much experimental research focuses on behavior that results from the introduction of a stimulus. We compare a group of people who are exposed to the stimulus to a separate group who are not exposed. The difference observed is referred to as an increase or decrease associated with exposure to the stimulus. Experts have claimed that exposure to violent video games increases violent behavior by 13% to 22%.

In experiments, we test whether exposure to the treatment condition will cause a increase or decrease in the outcome measure as compared to the treatment condition. As an example of a typical experiment, let's say that we have conducted an experiment in which one group of

children is randomly assigned to play *Doom* for twenty minutes and a second group of children watches a pleasant documentary about flowers. Children who play *Doom* are said to be in the “treatment condition” because they are exposed to the stimulus that we believe will cause increased aggression. Children in the documentary group provide a comparison or “control” group to determine the average amount of child aggression without exposure to violent media. After exposing the children to different conditions, we allow them to freely play in the school yard where we count the number of aggressive acts performed by the children. The number of aggressive acts is referred to as the “dependent variable” or “outcome measure”. A common statistic for calculating the size of the difference is Cohen’s *d*.

The formula for Cohen’s *d* is quite simple; subtract the average aggression score of the people in the violent video game treatment condition (\bar{t}) from those in the control condition (\bar{c}). In order to put both groups on a common metric for easier interpretation, we divide by the average standard deviation (*s*).

$$d = \frac{\bar{t} - \bar{c}}{s}. \quad (1)$$

Cohen (1988) provides a guideline for understanding magnitude of effect size in terms of small ($d = .20$), medium ($d = .50$) and large ($d = .80$) effects. An example of a small effect that Cohen provides is the difference in average height between 15- and 16-year-old girls. By comparison, a medium effect size is found in the average difference in height between 14- and 18-year-old girls. Converting the overall effect size of video game play on aggression in the Sherry meta-analysis into Cohen’s *d* metric translates to a small effect size of $d = .30$, while Cohen’s *d* for the Anderson & Bushman meta-analysis is $d = .39$. For comparison, Paik and Comstock (1994) arrived at an effect size estimate for the effect of television violence on aggression of $d = .65$. Anderson and Bushman (2002) dispute the Paik and Comstock figure and place television violence and aggression effect size for television at $d = .43$.

What does a .30 or .39 effect size mean in terms of behavioral consequences resulting from game play observed in the experiments? Table 3 provides details of experiments that showed the greatest behavioral effects of playing violent video games. Excluded were studies that showed small behavioral effects (Brusa, 1987; Cohn, 1995) or negative behavioral effects (Austin, 1987; Graybill, et al., 1987; Walker, 1984; Winkel, et al., 1987). An example in the average effect size range is Anderson & Dill's (2001) experiment ($d = .32$). In this experiment, Anderson & Dill (2001) had college students play either *Wolfenstein 3D*, a first-person shooter game in which players navigate a castle killing Nazi guards with knives, automatic weapons, a revolver, and a flame thrower, or *Myst*, a first-person perspective puzzle solving game. Immediately after playing the assigned video game for 15 minutes, participants took part in a competitive reaction time test in which they tried to push a button faster than their competitor. They were allowed to set a "noise blast" level and duration that their competitor would receive upon losing. Participants who had been in the violent video game condition set the noise blast duration for 6.81 seconds while those who had played the non-violent game set the noise blast duration for 6.65 seconds. This difference is approximately the same as the average effect size found across all violent video game studies.

Table 3.

Effect sizes of the violent video game experiments

Study	ES (d)	Violent VG	Aggression Measure	Control	Treatment
Anderson & Dill	.31	Wolfenstein 3D	Noise blast duration	6.65 sec.	6.81 sec.
Ballard & Lineberger	.45	Mortal Kombat	Cold pressor task	4.62 sec.	5.77 sec.
Bartholow &	.90	Mortal	Noise blast intensity	4.60	5.97

Anderson		Kombat			
Cooper & Mackie	.61	Missile	Play with violent toys	46.48 sec.	82.13 sec.
		Command			
			Bad buzzer	n.s.	
Irwin & Gross	.65	Double	Free play aggression- others	.85	1.3
		Dragon			
	.74		Free play aggression- objects	4.4	9.9
Schutte et al.	.65	Karate	Free-play aggression- others	.00	1.2
	.16	Karate	Free play aggression- hit toys	4.75	7.13
Silvern &	.32	Space	Free-play aggression	5.31	9.44
Williamson		Invaders			

Bartholow and Anderson (2002) found a larger effect than anyone else in their experiment (see Table 3). Using the same protocol as Anderson & Dill, but different games, they found a large difference in the intensity of noise blast settings assigned by those who played the violent video game (*Mortal Kombat*) from those who played the non-violent game (*PGA Golf*). They did not report a measure of duration noise blast in their study. Other measures that have been used to show aggression include (see Table 3): a cold pressor task in which violent game players punished a confederate longer by holding their hand in cold water (5.77 seconds vs. 4.62 seconds); counts of the number of aggressive acts during free play aimed at others (Irwin & Gross, Schutte, et al. Silvern & Williamson) or at inanimate objects (Irwin & Gross; Schutte, et al.); and number of seconds playing with violent toys during free play (Cooper & Mackie,).

Statistical Relationships- Epidemiological Comparisons

In order to help average Americans understand the extent of the threat posed by video games, researchers have provided epidemiological comparisons that most people can relate to. Epidemiology is the scientific study of the causes, distribution, and control of health threats that effect a large population. Epidemics show up as aberrations from normal health trends. The American Academy of Pediatrics claims that the relationship between playing violent video games and aggression is greater than the relationship between cigarette smoking and cancer and that violent media is a factor in half of the murders committed each year. It is not clear where these statistics came from as both meta-analyses of the literature place the average effect size much lower than that claimed by the AAP.

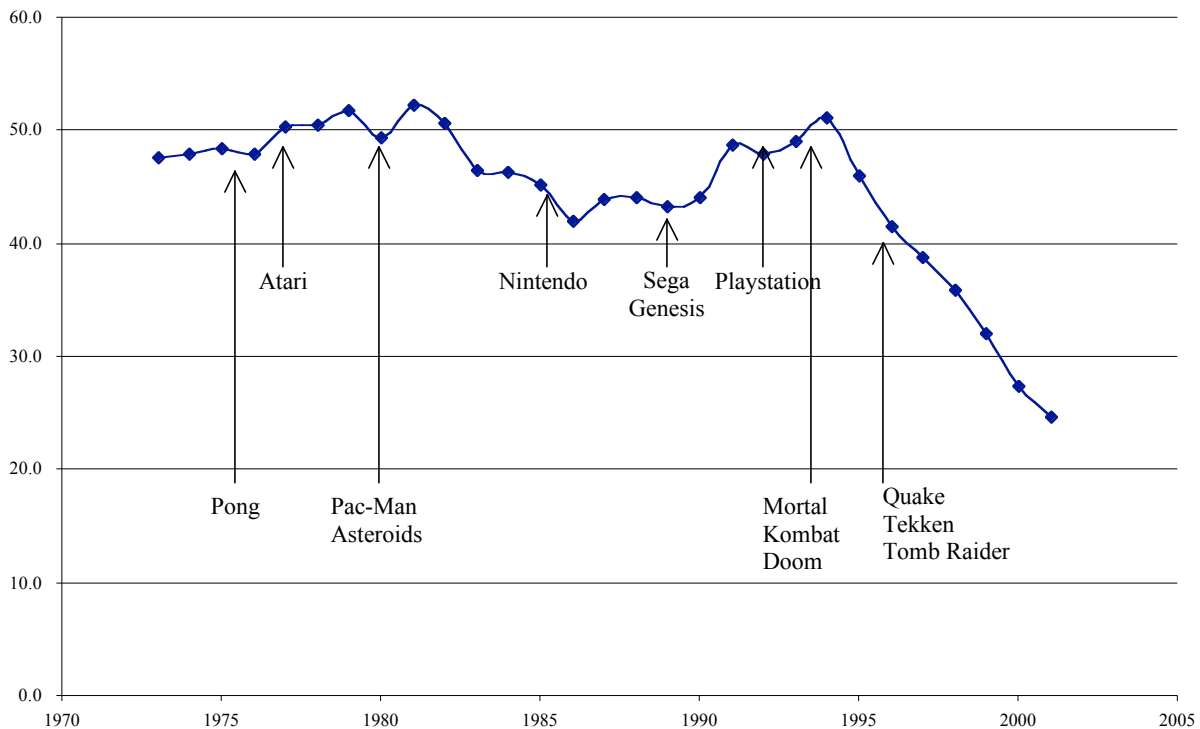
A frequently used method for examining epidemiological data is to plot the introduction of the suspected cause (in this case violent video games) against a time series trend in some variable of interest (e.g., violent crime). This allows us to trace the impact of the cause on society. This technique has been used in the past to investigate the causes of violence. For example, Anderson and Anderson (1996) were able to show that heat is a causal factor in violent crime by comparing crime reports with temperatures in a number of cities in the U. S. Because experts are claiming that the introduction of violent video games are a clear and present health hazard due to the enactment of violent behavior, we should be able to see an increase in violent crime following the introduction of various highly popular violent video games such as *Mortal Kombat* and *Tekken*; first person shooters such as *Doom* and *Quake*; and violent action games such as *Tomb Raider*.

Figure 4 plots the violent crime trend in United States in the time since the introduction of highly graphic, violent video games. The crime data are from the U. S. Department of Justice Bureau of Crime Statistics National Crime Victimization Survey (NCVS). Each year since 1973,

the DOJ surveys 8,000 randomly chosen Americans to determine their experience of crime victimization. The NCVS is considered a more accurate measure of actual crime than FBI Uniform Crime Report because the FBI only records crimes that are reported to authorities (Rand & Rennison, 2002). The NCVS contains instances of crime that were not reported to police. The only exception is the crime of murder, which the victim cannot report and which crime experts believe the FBI has the most accurate statistics because almost all murders are reported. Therefore, the crime trend data in Figure 4 includes the NCVS estimates of simple and aggravated assault, rape, and robbery and the FBI Uniform Crime Report statistics on murder.

Figure 4.

Trend of violent crime in the U. S. 1973-2001



As can be seen in the data, there is a significant decrease in violent crime in years subsequent to the introduction of violent video games. There are at least three conclusions that

can be drawn from these data: 1) that video games have little or no effect on natural trends in crime; 2) that the presence of video games caused a decrease in the amount of violent crime; and 3) that crime would be even worse if video games were not introduced. It is impossible to know the answer with complete certainty because there is no possible comparison group.

Assessment and Recommendations

The data are presented here in hopes that the readers can make their own assessment of the claims made by experts. I'd also like to provide my assessment of the claims made, the state of the literature, and future directions that researchers may want to pursue.

To date, researchers have tried to create experiments that demonstrate a relationship between playing violent video games and subsequent aggression with limited success. While the experiments were well conceived and conducted, they do not show a clear and powerful effect. Undoubtedly, they will continue to refine methods to demonstrate the expected effect. While this is a function of scientific inquiry, Karl Popper (1968) proposed a more rigorous way to determine the strength of theorized relationships; the falsification criteria. Instead of trying to show that a relationship does exist, Popper suggests that scientists show try to disprove the theoretical relationship. The extent to which the relationship stands up to repeated attempts to falsify it, the stronger the relationship. Take as an example the testing of a highway bridge over a deep river. Engineers could test the bridge by 1) trying to show it will hold the weight of a car, or 2) trying to show it won't hold the weight of a car. The first test could be satisfied by placing the weight of a car at the strongest part of the bridge. However, the second test, falsification, can only be accomplished by placing weight at the weakest point in the bridge under extreme conditions such as during heavy winds. The extent to which the bridge does not break under these circumstances is the extent to which the bridge is strong. Which bridge would you rather drive over?

This same logic should be applied to video game research. Rather than continuing to try to prove that video games cause aggression by creating extreme conditions in the laboratory, it is time to try to falsify the notion that video games cause aggression. The extent to which the relationship holds up in ecologically valid tests is the extent to which the relationship between violent video games and aggression is something that we should be concerned about. What would such test look like? In order to understand that, we need to think about some plausible explanations for the relationships seen in the lab and compare those to real life. First, researchers to date have been working in a dose-response model. That is, they have made the differences between conditions extreme in order to see if they could create the effect. In order to find an effect, they use games that are very different, isolate players from all other distractions, and use measures that are highly sensitive to any type of aggression. But because you can find aggression in the lab does not mean it is a threat in daily life. For example, lab tests on mice showed that the artificial sweetener saccharin, given in very large doses, leads to bladder cancer in male rats. Subsequent studies on human populations have failed to show that saccharin use is a risk for humans (National Cancer Institute, 1997). Just because a negative effect can be created in a lab does not mean that it presents a threat in the real world.

Recent laboratory evidence exists suggesting that the effect of video games is not as threatening as has been claimed. In a recent experiment, we (Sherry, Curtis, & Sparks, 2001) assigned college students to one of three groups: a violent video game condition in which they played a popular fighting game (*Soul Calibur*) on a highly graphic system (Dreamcast), a non-violent game playing condition (*Bass Fishing*), and a control condition in which they read an article about internet infrastructure. After playing the game, all participants watched an eight minute film featuring the types of violence that has been shown to cause an aggressive effect in many lab studies. After the film, we measure participant hostility using the Multiple Affect

Adjective Checklist, a commonly used measure of aggressive feelings. We did not find a difference between the three groups on level of hostility. Physiological data that we took during the experiment showed an initial arousal effect of violent video game play that disappeared by the end of the movie. It is possible that the aggression reactions that researchers have been finding may be related to arousal, which dissipates rapidly after game play. Another study that I am reviewing for a journal had participants play a violent video game (*Duke Nukem 3D*) in one of three conditions: using a virtual reality interface, using a standard game interface, and observing the standard game play. There was also a fourth condition that observed a non-violent game (*Coolboarders*). The researchers were unable to show a behavioral aggressive effect between the four conditions using a standard behavioral measure that has shown differences in television experiments.

In addition to the questions raised by physiological arousal and playing modalities, future research will need to address issues of ecological validity or how well the research mimics real world situations. Laboratory research will need to recreate the game playing experience by allowing participants some choice in whether to play a violent video game or not. What are the conditions under which an individual may choose to play a violent game? Zillmann and Bryant (1996) have pursued this line of research with television; a similar research line needs to be opened with video games. Once we understand who chooses to play violent video games and why, we will be able to better appreciate the conditions under which persistent aggression effects may (or may not) occur.

Another way to increase the ecological validity of violent video game research is to step out of the lab and conduct field research. Research in the real world is difficult and expensive. It is not possible to gain the level of control that researchers in the lab enjoy because of complicating factors in the environment. One method of studying effects in the real world is to

employ epidemiological data, such as tracking crime rates over time or examining the aftermath of unusual events. Using Popper's criteria in the epidemiological case, it seems likely that the claims made by the experts are vastly overstated. If their dire predictions were true, we would see an epidemic of cold hearted killers running up the national crime statistics. Not only is there not such an epidemic, the opposite is the case. Violent crime has dropped dramatically in the time since the release of the most violent video games and continues to drop. Taking an unusual event as an example, we can look at the aftermath of the recent QuakeCon event in which thousands of gamers came to Dallas on the weekend of August 14-17, 2003 to play violent networked games in a large tournament. This year's event featured the unveiling of Id Software's most intense and graphically violent game to date, *Doom 3*. If expert predictions were correct, the event would have been a particularly dangerous situation with thousands of frequent players, desensitized to violence by games, and with activated hostile thoughts in their minds, jammed together in a hotel. Contrary to expert expectations, there were no reports of any unusual increase in crime resulting from the conference.

Another option is to conduct experiments in the field using quasi-experimental techniques (Shadish, Cook, & Campbell, 2002). Field studies attempt to recreate as many of the laboratory controls as possible in a real world setting. Such research demands a greater amount of creativity (and funding) from the researcher in order to control extraneous variables, but the pay off is a greater sense of how people behave in the real world. Field studies use a variety of proven methods such as multiple non-random comparison groups, matching of participants within groups, and time-series designs. They often try to take advantage of naturally occurring events as manipulations. For example, Id Software is scheduled to release *Doom 3* around Christmas time. This unique event allows for data collection before and after the release of *Doom 3* to track whether the introduction of the new violent game has an effect on actual

behavior. In order to conduct valid research, we will need a priori knowledge of a number of factors such as: who are likely players, why they are likely players, how frequently they might play and under what conditions, and what type of actual aggression are we interested in.

Knowledge of these factors inform our choice of participants for the research and guide us in the design of valid measures.

One field study of violent video games failed to find an increase in aggressiveness after a month of playing a violent on-line game. Williams & Skoric (2003) recruited 521 participants to take part in the study. Participants in the treatment condition were given a copy of *Asheron's Call 2*, a violent massively multiplayer online role playing game and told to keep track of the amount of time they spend playing during the month. The control group did not receive the game, but were promised the opportunity to win prizes if they stayed through the month. After a month, there were no significant differences between the treatment and control groups on physical aggression, verbal aggression, or aggressive cognitions.

Other behavioral effects

If we abandon the a priori assumption that violent video games are necessarily bad and instead try to study games objectively, then we can posit a number of other possible effects that may be worthy of investigation. An obvious direction is to return to the issue of dropping crime rates since the introduction of the most violent video games. Is it possible that violent video games have a role in reducing violent crime on the streets? The idea is not that far fetched. A simple explanation is that individuals who are inclined to act violently may prefer to stay indoors and play out their violent fantasies in ways that are not possible in the real world. Because male street fighting is often more about establishing dominance than inflicting pain, video games give individuals an outlet for demonstrations of dominance. Games such as *Quake* allow players to

engage in heavily armed combat against the computer or against other players. It is certainly a safer form of contest than street fighting.

While no one has directly tested the notion of video games as surrogates for dominance displays, there are data supporting such a notion. Kestenbaum & Weinstein (1985) conducted a survey of adolescent males in which they concluded that adolescents use violent video games to manage feelings of anger (cast by the researchers as a Freudian Oedipal conflict). My own focus group and survey research suggests that games are frequently used to live out competitive fantasies against both friends and strangers (Sherry & Lucas, 2003). Certainly, the QuakeCon tournament and the forming professional video game playing leagues provide a safe opportunity to demonstrate dominance.

Video games have been shown to provide an outlet for control for players (Sherry, et al. 2003). As such, it may play a useful role in helping children manage difficult developmental situations. I was struck by this possibility recently while talking to a 6-year-old boy who is a very avid game player. He plays video games as often as possible and has memorized the personalities of all the characters in the virtual worlds he plays in. While he plays, he blocks out everything that is going on around him. Normally, this addictive behavior would have bothered me. But I talked to the child and asked him why he likes playing video games; his response was so that he could be strong. This child lives in a chaotic situation. His parents are divorced and he lives with his inconsistent mother during the week and spends weekends with his emotionally disturbed father. He is the youngest child in the family and is seldom listened to. His mother is getting married soon and he will be forced to integrate with a new family where he will remain on the bottom of the pecking order. Video games seem to allow him to escape into a world where events are predictable and controllable, and where he has the ability to dictate behavior. Those opportunities simply do not exist in the real world for him.

Beyond this anecdotal story, there is evidence that children may use video games to manage difficult developmental situations. We have come to a similar conclusion based on a survey of 5th grade children's game playing habits (Sherry, Desouza, & Holmstrom, 2003). We looked at the temperament of children who report liking violent games such as Fighters and Shooters. While boys who like violent games have outgoing temperaments, girls who like violent games were typified by less social, more controlling temperament types. The games seemed to be a channel through which they could gain control of their world and perhaps enact violent fantasies in a safe environment.

On-line gaming has expanded friendship networks for gamers. A recent AP story on QuakeCon described the event as a type of family reunion in which people who formed on-line gaming "clans" were able to meet each other in person (Slagle, 2003). A surprising aspect of the event was the growing popularity of the game among girls and families. Online games allow players to communicate with one another during game play and to form groups who meet at set times during the week to play together. Who might be interested in these gaming communities? What gratifications do they provide for players? Might this be a different group of game players from those who play other genres such as those that are limited to one player?

Those who wish to find negative effects of violent video games may want to cast their attention toward ethical behavior learned via video game play. The video game world consists of rule based competition with fuzzy borders. A highly proficient player can not only play within the rules of the game, but can figure out how to get around the rules of the games. Often times, these techniques are made available on internet 'cheat sites' or even on game maker sites. Playing around the rules, along with media stories of multimillionaires who get away with bending the corporate world rules (e.g., WorldCom, Enron, etc.) may send the message to

developing adolescents that rules are flexible and only apply to those who are not smart enough to learn how to get around them.

Conclusion

The powerful effects claims advanced by experts simply do not stand up to careful scrutiny. There has been an inclination to blame media for social problems throughout the 20th century (Wartella & Reeves, 1985). However, it is the responsibility of scientific researchers to act on fact, rather than opinion. At a minimum, the experts have jumped the gun by claiming powerful effects before evidence for these effects exists. Perhaps future ecologically valid research will show that these games are a serious health threat. When the facts as they exist today are examined, the case for violent video games causing aggression simply have not been made. Before we enact laws prohibiting these games and infringing on game makers Constitutional rights, we better be sure these games actually pose a threat. This is particularly true if the games are playing a role in lowering the health threat, which is an equally valid interpretation of the data at this point.

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