| 22 |

VIOLENT VIDEO GAMES

Jeffrey Goldstein

It is traditional to begin pieces like this with an example of horrendous violence committed by adolescents and to note that the criminals were fond of video games with violent themes. Research is then cited to demonstrate that a relationship exists between violent video games and aggressive behavior (e.g., Anderson & Dill, 2000; Bartholow & Anderson, 2002; Fleming & Rickwood, 2001; Grossman, 1999). The goal of this chapter is to look critically at definitions and empirical studies bearing on the video game violence issue. We will also consider why and how people play violent video games, and include perspectives that go beyond traditional social psychology.

Discussions of violent video games are clouded by ambiguous definitions, poorly designed research, and the continued confusion of correlation with causality. What is a violent video game, and how does its violence differ from violence in other media, and from violence as we know it in reality? How do the consumers of violent video games perceive the violence before them?

Meanings of Violence in Video Games

There is violence and there is "violence." The violence in video games can be categorized along different dimensions: whether it involves fantasy characters or representations of humans; whether the perspective of the player's character is first-person or over the shoulder, whether the motivation for violence is clear or justified. The context of violent stories also vary along dimensions of realism, involvement, excitement, how violence/conflict begin and end, whether they are presented in an erotic or a humorous context. Variations in the nature of video game "violence" have rarely been studied.

Media researchers often speak of the amount of violence in the media, but they do not typically consider the meaning or interpretation of that violence by its audience (Gauntlett, 2001). Discussing television violence, Heather Hendershot (1998, p. 34) writes in *Saturday Morning Censors* that "violent images on TV were often simply referred to as 'television violence,' as if television representations *were* violence in the same way that, say, a kick in the head is violence. This is wishful thinking.... Unfortunately, excising bad images will not necessarily fix problems outside the world of television." Regardless of the degree of violence in a video game, players tend to focus on the game's mechanics and its objective, rather than its violence (Karlsen, 2001; Green & Bavelier, 2003).

Violence American Style?

Symbolic or mock violence seems always to have been a part of play and entertainment. Sports such as football, in which opponents "attack" and "defend" territory, are clearly military metaphors (Guttmann, 1983, 1998; Goldstein, 1994, 1995; Regan, 1994; Twitchell, 1989), but even games regarded as innocent—chess, card games, and the Japanese board game Go—have their origins in military conflict and strategy (Fraser, 1966). In this respect, video games continue a long history of incorporating conflict and fantasy aggression into play.

According to *PC Data*, in 1999, 6 percent of PC and video games sold in the United States contained violent content. Of 338 computer games published in Denmark in 1998, seventeen games (5 percent) could be judged to contain "a considerable amount of violence" (Schierbeck & Carstens, 2000, p. 130). Of the top-selling games in the U.S. in 2002, 11.5 percent were shooters (www.theesa.com/pressroom.html).

The exaggerated, punctuated use of violence in films and video games may be a particularly American product, according to Marsha Kinder (2001). Acts of violence are used in a comic way to further a story about guilt and punishment. The serial and comic use of a rhythmic violent spectacle is similar to dance numbers in a musical film, "until it is no longer certain whether the narrative is orchestrating the violence or whether

the violent events are orchestrating the narrative." Online games such as Anarchy, Ultima, and EverQuest grant "more agency to their thousands of players who come from all over the world. Perhaps these are the sites where players will invent new modes of representing violence and generate peaceful alternatives" (Kinder, 2001).

To investigate children's engagement with violent video games, Holm Sorensen and Jessen (2000) interviewed and observed thirty-one Danish boys and girls, age five to seventeen years, while the children played video games. The researchers note that competition, challenge, and achievement are crucially important, particularly for boys. It is especially significant for the children that computer games offer them influence over the course of the game.

The social aspect *of playing computer games is another essential reason for the children's interest.... Computer games generate friendship and social events, and computer games can be cultivated as a common interest.... Children's fascination with violent computer games cannot be understood without considering the above-mentioned [i.e., social] aspects. The violent elements fascinate some children, but this fascination should not be mistaken for a fascination with violence in the real world. On the contrary, all children in the investigation repudiated real-life violence. The violent elements in computer games are attractive as spectacular effects, but also because they prompt excitement and thrill. Computer games are, thus, in line with genres known from the film industry: action movies, animation, thrillers and horror movies. Computer games have inherited the content of violence from a cultural tradition within fiction, as well as genre features, such that spectacular effects are emphasized. Generally, these effects contain an element of exaggeration, which is fully recognized by children. In relation to this, the act of playing violent computer games can be seen as a parallel to the violent and "rough" play traditionally found among boys.* (p. 120)

Television Violence and Video Game Violence

Research on the effects of televised violence is often applied willy-nilly to video games.

For instance, Dill and Dill (1998) argue that video games with violent themes should have the same negative effects as television violence, namely, "priming of aggressive thoughts, weakening of inhibitions against antisocial behavior, modeling, reinforcement, decreased empathy for others, and the creation of a more violent world view." (p. 409)

Anderson and Dill (2000), in a section titled "Unique Dangers of Violent Video Games," write that video games may have greater effects than violent television or violent movies for at least three reasons: first, identification with the aggressor, especially in first-person shooter games; second, the active participation and involvement in video games; third, the "addictive nature" of video games. Anderson and Dill claim that violent video games are the ideal means by which to learn aggression, with exposure to aggressive models, reinforcement, and behavior rehearsal.

Of course, as a unique medium, video games differ from television and film not only in their interactivity, but in the nature of their stories, in their open-endedness, and in their ability to satisfy different needs of their users. According to Holm Sorensen and Jessen (2000), involvement with characters in a video game differs from involvement with fictitious characters in other media. In games, the characters do not act or react as they do on film, thus weakening identification with them. "Identification with computer games is not as strong as with movies.... Playing computer games does not lead to a sort of intensified movie experience. It is a question of another type of excitement and experience that is more closely related to game and play experiences than to fiction genres, such as film or, for that matter, literature" (p. 121). The Danish children in the Holm Sorensen and Jessen study judge violence on TV, film, and video to be much worse, more violent and realistic than violence in computer games. (For other attempts to understand how viewers interpret media violence see Buckingham, 1993; Coelho, 1998; and Messenger Davies, 1997.)

Tobin (2000) says there are unstated assumptions in the media violence debate:

Researchers, teachers, and other adults can understand media effects on children solely by analyzing texts because children are naïve, ignorant, and vulnerable media consumers who unthinkingly soak up the meanings of the noxious media texts to which they are exposed. I disagree with these assumptions about the power media texts hold over children. I am not suggesting that children's readings are always insightful and resistant. Rather, my position is that we cannot know in advance of doing research how particular children will make sense of particular media texts.... Children can watch a movie full of ideological messages we find repugnant, and emerge unscathed, just as they can go through a lesson full of educational messages we find uplifting and come out having learned little or nothing. (pp. 147–148)

Third-Person Effects in Media Research

Those least familiar with video games are most likely to believe that they are harmful (Casas, 2000; Ferreira & Pais-Ribeiro, 2001; Sneed & Runco, 1992). The belief that the media affect others, but not oneself, is known as the "third-person effect" in media research (Perloff, 1999). Criticism of youth culture reflects the belief that the media are capable of turning good children bad. Even young people demonstrate the third-person effect. In studies by Aisbet (1997), Cumberbatch, Maguire, and Woods (1993), and Kline (2000), older children expressed concern for the potential impact of violent video games on younger children.

Critics of media violence claim that harmful material influences us by making us the same. "So horrible things will make us horrible, not horrified. Terrifying things will make us terrifying, not terrified. To see something aggressive makes us feel aggressive, not aggressed against. And the nastier it is, the nastier it is likely to make us. This idea is so odd, it is hard to know where to begin in challenging it," writes Barker (2001, p. 38).

Theoretical Mechanisms

Social and cognitive learning and imitation are the most often cited mechanisms that transform media violence into real violence (Fleming & Rickwood, 2001; Schutte et al., 1988; Silvern & Williamson, 1987). Dill and Dill (1998) write, "Repeated exposure to aggressive video games could make aggressive cognitions and affect chronically available, thus increasing the likelihood of aggressive responses. In the long term, this would mean that chronic exposure to violent video games would lead to increases in the tendency of an individual to act aggressively and that this effect would be pervasive."

According to Anderson (2001),

Only the cognitive route is specifically tied to the violent content of video games. Even nonviolent games can increase aggressive affect, perhaps by producing high levels of frustration. Similarly, exciting nonviolent games can increase arousal. But only violent games should directly prime aggressive thoughts and stimulate the long-term development of aggressive knowledge structures.... The real crux of the violent video game debate lies in their unique ability to directly increase aggressive cognitions.

One obvious interpretation of any media effect is that it is due to arousal. Exposure to violent video games increases physiological arousal. According to Jonathan Freedman (2001),

If the violent video game is more arousing than the nonviolent comparison program, one would expect more aggression in the condition with higher arousal. If so, there is no reason to attribute the effect to the violence—it might be just the arousal.... Because of this problem, one must be extremely cautious in interpreting the results of this research and especially cautious in deciding that the effects are due to the amount of violence in the games.

In speculating on the long-term effects of violent video games, Anderson and Dill (2000) write,

Each time people play violent video games, they rehearse aggressive scripts which teach and reinforce vigilance for enemies, aggressive action against others, expectations that others will behave aggressively, positive attitudes towards use of violence, and beliefs that violent solutions are effective and appropriate. Furthermore, repeated exposure to graphic scenes of violence is likely to be desensitizing.... Long-term video game players can become more aggressive in outlook, perceptual biases, attitudes, beliefs, and behavior than they were before the repeated exposure. (p. 774)

The mechanisms through which these presumed effects arise are thought to be social learning and imitation, the physically arousing effects of violent imagery, and the development of cognitive structures supporting aggression.

Three research strategies have been used to study the effects of violent video games: correlational studies, including field studies, experiments, and meta-analyses. Each approach has its strengths and weaknesses, but none of this research can tell us whether or when violent video games cause aggressive behavior in whom.

Correlates of Playing Video Games with Violent Themes

The majority of consumers of video games are male, and those who prefer violent video games are likely to be above average in aggression, and to show other characteristics of aggressive males: namely, poorer school performance, more delinquency, and so on (Anderson & Dill, 2000; Funk et al., 2002; Wiegman & van Schie, 1998). These correlations do not imply

causality, although some researchers interpret their correlations in causal terms (e.g., Wang & He, 2000).

Correlational studies do not necessarily indicate that violent video games cause these problems. On the contrary, aggressive children may be drawn to violent video games. Or a third factor, such as hyperactivity, need for arousal, or low educational attainment, could be a cause of both aggressive behavior and the desire for violent entertainment. In some studies, either no such effects were found (Gibb et al., 1983; Winkel, 1987), or were found only for arcade games (Lin & Lepper, 1987), or only for one sex. For instance, in a sample of Portuguese twelve- to seventeen-year-olds, Ferreira and Pais-Ribeiro (2001) found that playing violent video games was predictive of physical aggression, but *only in the female subsample*. The frequency of boys playing video games *in video arcades* was predictive of total, physical, and verbal aggression.

Rather than assuming that video games are responsible for these correlates, Roe and Muijs (1998) suggest that some youngsters use video games as a means of displaying competence and gaining status that they are unable to obtain through other means, such as performance in school. In other words, poor grades may give rise to an interest in playing video games, rather than the other way around.

Wiegman and van Schie (1998) examined the relationship between amount of time children spent playing video games and aggressive as well as prosocial behavior. No significant relationship was found between video game use in general and aggressive behavior, but a significant negative correlation with prosocial behavior was found. Children who prefer aggressive video games were less prosocial than those with other game preferences. Children who preferred playing aggressive video games tended to be less intelligent than those with other game preferences.

Colwell and Payne (2000) studied the relationships among questionnaire measures of social isolation, self-esteem, and aggression among 204 twelve- to fourteen-year-old students in North London. "Analysis of a scale to assess needs fulfilled by game play provided some support for the notion of 'electronic friendship' among boys, but there was no evidence that game play leads to social isolation." (p. 295) Play was *not* linked to self-esteem in girls, but a negative relationship was obtained between self-esteem and frequency of play in boys. Self-esteem was not related to the number of games with aggressive content named among three favorite games, but was positively correlated with total exposure to game play.

Funk and colleagues (2002) examined relations between a preference for violent electronic games and adolescents' self-perceptions of problem behaviors and emotions. Thirty-two boys and girls aged eleven to fifteen completed the Youth Self-Report (YSR), a standardized self-report measure of adolescent problem behaviors, and listed their favorite electronic games. The predicted relationships with externalizing behaviors, including aggression, were not found. However, across all YSR subscales, children with higher preference for violent games had more clinically significant elevations than those with low preference for violent games.

A recent review of correlational studies concluded that they were ambiguous (Subrahmanyam et al., 2001).

Does Playing Violent Video Games Cause Aggressive Behavior?

Correlational studies are inherently unable to establish cause-and-effect, so psychologists resort to laboratory experiments in which some factors are manipulated, whereas others are controlled. In the typical laboratory experiment, university students are randomly assigned to play a violent video game or a nonviolent video game, for anywhere from four to seventy-five minutes, typically around fifteen minutes. Following play, some measure of "aggression" is made. We will examine each component of this situation, and ask whether subjects *play* a video game, whether the video game can be regarded as *violent*, and whether the experiment measures *aggressive behavior*.

Playing *Violent Video Games?*

Play is a voluntary, self-directed activity (Garvey, 1991), an experience that probably cannot be captured in a laboratory experiment. In video game research, the duration of play is too short for anything like the play experience to be replicated. Being required to play a violent video game on demand for ten or fifteen minutes is not "playing."

Few studies have considered how and why people play violent video games, or why people play at all. Experimental research does not recognize the fact that video game players freely engage in play, and are always free to stop. They enter an imaginary world with a playful frame of mind, something entirely missing from laboratory studies of violent video games. One of the pleasures of play is this very suspension of reality. Laboratory experiments cannot tell us what the effects of playing video games are, because there is no sense in which participants in these studies play.

Playing Violent *Video Games?*

There is much confusion about the definition of "aggression" and terms such as "media violence" and "violent video games." Psychologists define violence and aggression as "the intentional injury of another person." However, there is neither intent to injure nor a living victim in a video game. Players do not engage in aggressive behavior when playing a video game, but participate in a fantasy involving mock violence. They push buttons or manipulate a joystick that has consequences for digital characters on a two-dimensional screen. During play they display none of the facial expressions and experience none of the emotions normally associated with real life aggression, but instead reflect those of concentration and play (Holmes & Pellegrini, this volume; Holm Sorensen & Jessen, 2000).

Distinguishing Fantasy from Reality Some educators have expressed concern that children below a certain age cannot distinguish real violence from fantasy aggression and therefore are at greater risk of learning and imitating violent behaviors. Whether this is so is an empirical question that has not very often been studied. However, researchers themselves sometimes fail to distinguish real from fantasy violence. For example, Dill and Dill (1998) write,

> *In violent video games, aggression is often the main goal, and killing adversaries means winning the game and reaping the benefits. While in real life, murder is a crime, in a violent video game, murder is the most reinforced behavior.... The violent video game player is an active aggressor ... the players' behavioral repertoire is expanded to include new and varied aggressive alternatives.* (p. 412)

Of course, in a video game there is no literal killing, murder, or aggressive behavior.

Does the interactive nature of video games make them more influential than the more passive activities of television or film viewing? On the contrary, according to a study by Holm Sorensen and Jessen (2000). They assessed how capable Danish children were of distinguishing between fiction and reality and to establish whether they are able to account for this distinction:

> *The children in the investigation, including the youngest who were five years old, are fully aware and can account for the difference between computer games as fiction and computer games as reality.... It is also important that this exact feature [interactivity], which is usually described as a problem in relation to violent computer games—the fact that the player himself must conduct violent deeds—actually makes children aware that their actions take place in a fictitious universe. For children, computer games are in fact "games" with their own rules. From an early age, they are aware that these rules do not apply outside the realm of the game, with the exception that children can include elements and rules from the games in their play.* (pp. 120–121)

Causes Aggressive Behavior?

Reviews of video game research are as variable in their conclusions as the individual studies that comprise them. The same two dozen or so studies of violent video games are said to support different conclusions. Some reviews conclude that violent video games cause aggressive behavior (Anderson & Dill, 2000; Ask, 1999; Dill & Dill, 1998; Unsworth & Ward, 2001), whereas others find the evidence is inadequate to reach any conclusion (Bensley & Vaneenway, 2001; Cumberbatch, 2001; Durkin, 1995; Durkin & Low, 1998; Federal Trade Commission, 2001; Gunter, 1998; Griffiths, 2000; van Feilitzen, 2000).

Sakamoto (2000) reports that the same controversies surround violent video games in Japan as in western countries. "The arguments concerning the harmfulness of video games have become heated every fifth year (p. 66)." Sakamoto notes that early research found no relationship between video games and violence, but recent Japanese research has occasionally reported such a relationship. Sakamoto concludes, as have many others who have reviewed the research, that it is insufficient to draw conclusions about a causal connection between video games and violence. The clear consensus is that there is no consensus.

Inconsistent Results It is difficult to know what to make of complex and inconsistent results between and within video game studies. For example, Kirsh (1998) had boys and girls aged eight to eleven play either a "very violent" video game (*Mortal Kombat II*) or an "action-oriented, non-violent video game" (*NBA Jam*). Immediately following video game play, children interpreted a series of ambiguous stories in which a same-sex peer caused a negative event to happen, but where the intent of the peer was unclear—for example, a child is hit in the back with a ball. After each story, children were asked six questions about the harmdoer's intent and emotional state, and potential retaliation and punishment. Responses were coded in terms of amount of "negative and violent content."

According to Kirsh, children exposed to the violent video game "responded more negatively" to the ambiguous provocation stories than children exposed to the relatively nonviolent *NBA Jam* on three of the six questions. There was no significant difference between those who played *Mortal Kombat* or *NBA Jam* in whether they regarded the other's behavior as intentional or accidental. Kirsh hypothesized that children who played the violent video game would retaliate more and expect more punishment than children who played the nonviolent video game. This hypothesis was partially supported. When asked, "What would you do next?" children playing the violent video game responded "significantly more negatively" than children playing the nonviolent video game. However, the question about prospective punishment for the harmdoer, "Do you think the kid should be punished a lot, a little, or not at all?" was not significant. Do these data support any conclusion whatsoever about the effects of violent video games?

Two meta-analyses (Anderson & Bushman, 2001; Sherry, 2001) report small effect sizes ($r = .19$ and .15, respectively). In the Sherry meta-analysis, playing time emerged as a *negative* predictor of aggression ($r = -.19$). That is, the more one played violent video games, the weaker the relation to aggressive behavior.

In a study by Anderson and Ford (1986), university students who played a "highly aggressive" video game (*Zaxxon*) for twenty minutes were not more hostile than a group that played a less aggressive game (*Centipede*). Likewise, in studies by Ballard and Lineberger (1999), Scott (1995), and Winkel et al. (1987), the level of aggressive content in video games bore no relation to subjects' aggressive behavior.

In an experiment by Ballard and Lineberger (1999), 119 male university students played either a nonviolent video game (*NBA Jam*) or one of three levels of a violent video game (*Mortal Kombat*). After playing the video game for fifteen minutes, participants rewarded and punished a male or female confederate in a teacher/learner situation. Participants rewarded male (but not female) confederates with significantly more jellybeans after playing *NBA Jam* than under any of the *Mortal Kombat* conditions. Participants punished confederates significantly more after playing *Mortal Kombat II* than after playing *NBA Jam*. However, those who played the more violent *Mortal Kombat II* were not more punitive than those who played a less violent version of *Mortal Kombat*.

In a study of elementary school children, Graybill, Strawniak, Hunter, and O'Leary (1987) found no effects of video games on aggressive behavior, which was measured by pushing buttons that could reward or punish another child.

Scott (1995) measured the aggressiveness of university students with the Buss-Durkee Hostility Inventory and the Eysenck Personality Questionnaire. No signficant differences in aggressiveness were found between students after playing a nonaggressive, a moderately or a highly aggressive video game. Scott concludes that there is a "general lack of support for the commonly held view that playing aggressive computer games causes an individual to feel more aggressive."

Cooper and Mackie (1986) randomly assigned eighty-four boys and girls, ten to eleven years old, to play or to observe a violent video game (*Missile Command*), a nonviolent video game (*Pac-Man*), or a pen-and-paper game for eight minutes. They were then observed during a free play period, where they could choose from a variety of toys, including an aggressive toy (a spring-release fist that fires darts), an active toy (basketball), a skill game (pinball), and a quiet toy (building logs). Children were then given an opportunity to punish or reward another child for various actions. Children who played or observed the aggressive video game spent more time playing with the aggressive toy than did other children. This was particularly so for girls. Boys' play with the aggressive toy was not affected by the type of video game played. Cooper and Mackie also found that children who played the violent video game were more active afterwards, changing often from one activity to another. Although video games clearly influenced the children's postgame *play*, the video games had no effect on *interpersonal aggression*. Children who played *Missile Command* did not differ from those who played *Pac-Man* in how much punishment or reward they administered.

Perhaps the best-known experiment of video games with violent themes was conducted by Craig Anderson and Karen Dill (2000). They selected video games as similar as possible on enjoyment, frustration, and physiological arousal, but which differed in whether they contained violent themes. They chose *Castle Wolfenstein 3D* as the violent game and *Myst* as the nonviolent game.[1]

In the main experiment, more than two hundred university students participated in two sessions, during which they played the assigned video game three times for fifteen minutes each. In the first session, participants played the game for fifteen minutes and completed measures of affect and world view, and played the game again for fifteen minutes before completing a

cognitive measure, namely, the *reaction time* to recognize aggressive words (e.g., "murder"). Anderson and Dill claimed people with quicker reactions have relatively greater access to aggressive thoughts. During the second session, participants played the game for fifteen minutes and completed a behavioral measure—twenty-five trials in a "competitive reaction time task" in which the participant is told to push a button faster than his or her opponent. If participants lose this race, they receive a noise blast at a level supposedly set by their opponent. Aggressive behavior was operationally defined as the intensity and duration of retaliatory noise blasts the participant delivered to the unseen opponent.

The predicted effect of the violent video game on aggression was found only for the *duration* of noise, but not for the *intensity* of noise blasts. That is, participants pressed the noise button longer, but did not deliver louder (i.e., more "aggressive") noise blasts. There were no statistically significant effects of any of the independent variables—sex, trait irritability, video game type—on the noise intensity settings. On the other hand, Bartholow and Anderson (2002) report effects with noise *intensity* but *not duration*.

The type of video game played had no effect on state hostility or on measures of crime perception or feelings of safety.

Those who played the violent video game recognized aggression-related words more quickly than those who played the nonviolent game. Anderson and Dill conclude that "playing the violent video game increased accessibility of aggressive thoughts and aggressive behavior, but did not reliably increase state hostility. These findings suggest that violent video games takes a cognitive and not an affective path to increasing aggressive behavior in short-term settings" (p. 786). Thus, according to Anderson and Dill, the danger in exposure to violent video games seems to be in the ideas they teach and not primarily in the emotions they incite in the player. However, the validity of their dependent measure as an indication of aggressive cognition is unknown. Word recognition is typically used to reflect perceptual or semantic salience (Grainger & Dijkstra, 1996), a phenomenon that has no clear connection to aggressive behavior.

Brown (2000) finds Anderson and Dill's conclusions "disturbing." Of the behavioral measure of aggression (blasts of noise), Brown (2000) writes,

> *For whatever reason, the intensity of the noise didn't vary with any of the factors tested: gender, irritability score, and game type had no effect on the intensity of the sound chosen by the participant. The duration of the sound did vary, however. As one might predict, participants tended to be more aggressive in general when setting the duration of the noise immediately following trials where they "lost" (i.e., were subjected to a burst of noise). Following a "win" trial, the only pattern was that females tended to be more aggressive than males, delivering longer noise blasts.*

In an Australian sample of eight- to twelve-year-olds, Fleming and Rickwood (2001) found no differences between violent and nonviolent video game play on a paper-and-pencil test of aggressive mood (though play was limited to four minutes!).

Dill and Dill (1998) review video game research as it relates to violence. "Precious few true experiments have been done to assess the effects of playing violent video games on aggression-related outcomes; there is no real 'programmatic' line of research yet in this area. Much of what has been done has focused on very young children and has examined aggressive free play as the main behavioral dependent measure" (p. 419). "All experiments that measured aggressive affect, in contrast, have used undergraduate participants. Two of these studies showed increases in aggressive affect after violent video game play, one found no differences between violent and nonviolent video game play, and two found no differences." (p. 419)

Among the unsettled issues surrounding violent video games is whether repeated play has more intense or qualitatively different effects than short-term play; whether it is boys or girls who are most influenced by violent games; whether it is affect, behavior, or cognition that is influenced by the violent content of games. What cognitions (besides reaction time) does video game content affect? How do players use their experience with violent video games in their relationships with others? It has been said that violent video games are apt to promote violent solutions to problems, but I know of no research on this issue.

Measures of Aggression It is not possible to observe real aggression in the laboratory, so researchers must improvise indirect indicators of potential aggression. For example:

- Hitting a bobo doll (Schutte et al., 1988).
- Coding children's interpretations of ambiguous stories (Kirsh, 1998).
- Listing aggressive thoughts and feelings (Calvert & Tan, 1994).

- Administering blasts of white noise to an unseen person, in the "teacher-learner" paradigm, in which errors on a "learning task" are "punished" (Anderson & Dill, 2000; Bartholow & Anderson, 2002; Wiegman, van Schie, & Modde, 1997).
- Withholding money from another (Winkel, Novak, & Hopson, 1987).
- "Killing" characters in a video game (Anderson & Morrow, 1995; Ask, 1999; Ask, Autoustinos, & Winefield, 2000).
- Time elapsed to recognize aggressive words (Anderson & Dill, 2000).

Ask, Autoustinos, and Winefield (2000) studied experienced video game players, who competed in a *Mortal Kombat 3* (*MK3*) tournament. In *MK3* the winning player has the opportunity either "to kill or not kill" the opponent's fighter at the end of each round. This was used as the measure of aggressive behavior. Ask and colleagues had two teachers rate each player for aggression toward peers and toward teachers. They report that "the competitor's tendency to kill their opponent's videogame character upon winning was associated with their aggressive behavior at school" (p. 91). Players who used more "kill" responses in *MK3* were also students who teachers saw as more aggressive.

In experiment 1, sixteen males competed in a *MK3*_tournament with cash prizes for the winners. The final playoff took place before an audience of about forty other students. Six of the sixteen players never used the "kill" option and were thus excluded from the analysis (!), leaving ten competitors in the sample. In the pre-tournament trials, the ten players used the kill option 67 percent of the time, whereas in the competitive tournament, they used the kill option 84 percent of the time. This is a statistically significant increase. Ask et al. note that the results could have been due to (a) the reward offered to winners, or (b) the presence of an audience, and did not necessarily have anything to do with the violent images in *MK3*.

Experiments 2 and 3 eliminated the audience and rewards for winners and instead offered each participant $5. In experiment 2, there was no support for the hypothesis that competition would increase the use of the "kill" option, whereas in experiment 3, there were more "kill" responses under competitive than under noncompetitive conditions. This research shows a tendency for experienced game players to choose the "kill" option in *Mortal Kombat 3* more when they are in competition against others than when playing individually. Perhaps there is greater reliance on the "kill" option during competition because it is a strategic response within the game—for example, it could demoralize the opponent. Ask and colleagues do not report the relationship between use of the "kill" option and success in the tournament, so we do not know whether it was a winning strategy or not.

Almost all of the research involved analogues of aggression rather than the real thing. One can and I believe should question whether these analogues have anything to do with aggression. . . . There is not the slightest evidence that playing violent video games causes any long-term or lasting increase in aggressiveness or violence. . . . There is no scientific reason to believe that violent video games have bad effects on children or on adults, and certainly none to indicate that such games constitute a public health risk. (Freedman, 2001)

Aggressive Play and Aggressive Behavior Studies of violent video games do not always distinguish *aggressive play* from *aggressive behavior* (for example, Schutte et al., 1988; Silvern & Williamson, 1987). Observations of children on the playground may confuse mock aggression (pretending to engage in martial arts) with real aggression (attempting to injure someone). What appears to an observer to be aggressive behavior may instead be aggressive *play*, where there is no intent to harm anyone. In the rare study that measures both aggressive *play* and aggressive *behavior* (e.g., Cooper & Mackie, 1986), violent video games affect the former and not the latter.

According to Griffiths (1999), "the majority of studies on very young children tend to show that children become more aggressive after playing or watching a violent video game, but *these were all based on the observation of free play*." (pp. 209–210) Grififfths questions whether this is a valid measure of aggression.

The objective of a study by Robinson and colleagues (2001) was to assess the effects of reducing television, video tape, and video game use on aggressive behavior and perceptions of a mean and scary world. Third- and fourth-grade children (mean age 8.9 years) in an elementary school in California received a six-month classroom curriculum to reduce television, video tape, and video game use (the children were encouraged to limit media use to 7 hours a week). A second, control school, did not receive such instruction. In September (pre-intervention) and April (post-intervention), children rated their peers' aggressive behavior and reported their perceptions of the world as a mean and scary place. A random sample of children was observed for physical and verbal aggression on the playground. Parents (more than 80 percent of them mothers) were interviewed by telephone and reported aggressive and delinquent behaviors on a behavior checklist.

Compared to controls, children who had received instruction in reducing media use showed statistically significant decreases in peer ratings of aggression and verbal aggression. Differences in observed physical aggression, parent reports of aggressive behavior, and perceptions of a mean and scary world were *not* statistically significant between the two groups.[2] The authors note that the intervention was targeted at all television, video tape, and video game use, instead of violent media. They did not assess specific exposure to violent media, so they do not know whether violent media exposure was reduced. Nevertheless, the authors conclude, "These findings support the causal influences of these media on aggression and the potential benefits of reducing children's media use."

Poole (2001) has criticized the methods and conclusions of Robinson et al. (2001). Children's "aggression" was measured in five different ways:

1. peer ratings of aggression (classmates answered questions such as "Who says 'Give me that' a lot?")
2. observed verbal aggression (observers stood in the playground and counted instances of "verbally aggressive" acts per minute)
3. observed physical aggression (playground observation)
4. parent reports of aggressive behavior
5. the children's perceptions of the world as a "mean and scary" place.

In fact, the psychologists found statistically significant decreases in what they called "aggression" in the study group only on the first 2 measurements above. That is, actual physical aggression did not decrease after 6 months of limited exposure to television, video tapes and video games. That ought to be surprising if you buy the idea that media actually affect behavior. Nor did parents report any decrease in their children's aggression; nor did children say that they found the world less mean and scary.

It would be a step forward if researchers differentiated levels and types of media violence, distinguished real from dramatic from fantastic violence, and considered aggressive play something other than aggressive behavior.

Meta-Analysis of Video Game Research

Meta-analysis combines the results of many different studies into a single statistical analysis. It is a correlational technique that estimates the average effect size among variables over a number of independent studies that used different measurements and participant samples. Like a correlation coefficient, effect size is represented by a figure ranging between 0 and 1.0. An effect size is considered "small" if it is .30 or less, "moderate" if it is between .30 and .60, and "large" if it exceeds .60. Meta-analysis is about the *quantity*, not the *quality* of data. For example, if aggression is not clearly defined and measured in individual studies, combining studies will not improve their reliability or validity.

Two meta-analyses of violent video games have been published, Anderson and Bushman (2001) and Sherry (2001). Anderson and Bushman analyzed thirty-five research reports, with a total of 4,262 participants. They included a study if it examined the effects of playing violent video games on aggressive cognition, affect, aggressive behavior, physiological arousal, or prosocial behavior.

The average effect size of thirty-three tests of the relation between video game violence and aggressive behavior was $r = .19$, and with aggressive affect, $r = .18$, small effects. Effects were greater if the target in the games was an inanimate object rather than an image of a person. This finding may have a bearing on discussions of game realism, where it has been suggested that increasing realism necessarily strengthens the association between aggressive behavior and games with violent images. These data suggest that it is unrealistic images that are associated with the most aggressive behavior. Interviews with gamers by Holm Sorensen and Jessen (2000) corroborate this.

Prosocial behavior, which was measured in eight studies, was negatively correlated with violent video games ($r = -.18$), suggesting that those who play violent video games tend to be less prosocial. Violent video games are positively correlated with physiological arousal.

Video game violence was related to aggressive cognition ($r = .27$). Anderson and Bushman conclude, "Therefore, violent video games may increase aggression in the short term by increasing aggressive thoughts." However, "aggressive thoughts" have not been measured directly, but through such measures as reaction time to selected words. Whether this bears any connection to aggressive behavior remains to be seen.

It is difficult to draw firm conclusions from the existing research because different, incompatible measures of aggression are used, and this threatens the validity of the research. Measures range from actual behavior (aggression during free play, willingness to help

or harm another) to paper-and-pencil measures of aggressive feelings. Sherry (2001) asks, "Do video games cause people to *act* aggressively or to *feel* aggressive or both?" He also observes that "the literature on video game effects is littered with mixed findings from studies that use a wide range of games, treatment exposure times, and subject pools, obscuring clear conclusions."

Sherry gathered thirty-two independent studies in which violent video game play was the independent variable and some measure of aggression was the dependent variable. This compares with thirty-three studies in Anderson and Bushman's sample (2001).

The overall correlation between video game play and aggression in this meta-analysis, based on a sample of 2,722 individuals, is $r = .15$, a small effect size. This is far lower than the effect of television violence on aggression. According to Sherry, "Overall, this analysis suggests that there is a correlation between video game play and aggression, but that relationship is smaller than that found for television.... Researchers in this area will need to develop new theories that acknowledge experiential and social differences between video game use and television viewing."

Conclusion: Video Games and Aggressive Behavior

Nearly everyone who reviews the existing research on violence and electronic games arrives at the same conclusion: the research is too inconsistent and insubstantial to allow any conclusions to be drawn. Bensley and Van Eenwyk (2001) review all available studies and find flaws in each of them. They summarize: "In conclusion, current research evidence is not supportive of a major concern that violent video games lead to real-life violence." Van Feilitzen (2000), in her introduction to a UNESCO volume on children and media violence, notes:

Several authors in this book emphasize precisely the fact that inquiries on influences of the violence in electronic games are very few and have employed a limited number of methods. According to some studies, young children become more aggressive in their subsequent play, *but these studies have used only one type of method. Among the very few studies that have included the newer, more violent electronic games, there are some ... indicating that the games can contribute to aggression also among older children and young people. At the same time, however, other studies have provided conflicting or inconclusive findings.* (p. 19)

Mark Griffiths (2000), writing in the same UNESCO volume, summarized the published research on video game violence:

All the studies that have examined the effects of video games on aggression have only involved measures of possible short-term aggressive consequences. The majority of the studies on very young children—as opposed to those in their teens upwards—tend to show that children do become more aggressive after either playing or watching a violent video game but all these studies were based on the observation of a child's free play after playing a violent video game *[emphasis added].... There is much speculation as to whether the procedures to measure aggression levels are methodologically valid and reliable.* (p. 32)

Nevertheless, some researchers reason that "because so many people are exposed to violent media, the effect to society can be immense even if only a small percentage of viewers are affected by it.... It might be that only 1 in 1,000 viewers will behave more aggressively immediately after viewing a particular program, but the cumulative effects may well increase the aggressiveness of most (if not all) of the 1,000 viewers" (Bushman & Anderson, 2001, p. 482). Of course, there may also be one in a thousand viewers who benefit, for example, using entertainment as distraction from emotional distress.

Of course the media affect emotions and behavior. That is why people use them. However, there is no evidence that media shape behavior in ways that override a person's own desires and motivations. Can a violent video game make a person violent? It can if he wants it to. Why don't violent video games increase aggression among the researchers who study them? Because they have a higher purpose—understanding violent video games—that transcends the contents of the game. The focus is on something other than the mock aggression taking place on the screen. Young people may also have other goals in mind when they play violent video games, including trying to improve their score, distraction, emotional and physiological self-regulation, and to have common experiences to share with friends. The media may affect some people, but not necessarily in ways that media violence researchers typically fear. Media effects may vary from relaxation and distraction to emotional and physical reactions. There is no evidence that media influence people in ways that go against their grain.

Dissenting Views of Media Violence

Some psychologists have made strong claims about the causal link between media violence and violence in society. The American Medical Association, American Psychological Association, and the American Academy of Pediatrics have issued public health warnings about violent video games. Bushman and Anderson (2001) state that the scientific community speaks with one voice about media violence, with only the entertainment industry and news media failing to accept the conclusion that portrayals of violence in film, television, and video games cause aggressive behavior. However, there are three types of dissenting view. First, there are disagreements within the scientific community itself. Not all researchers agree that the existing research supports the conclusion that media violence is a causal factor in interpersonal violence. Second, although social psychologists have appropriated the topic of media violence as their own, other scholars engaged in media studies have come to different conclusions about the role of media violence in society. European media scholars are especially critical of the American "effects model." Third, there are commentators from various quarters who remain unconvinced by the scientific evidence produced by psychologists. We describe these dissenting strands of literature further below.

Variance among Researchers

Not every study finds evidence of a causal link between media violence and real violence. For example, field studies by Charlton, Gunter, and Hannan (2002), Feshbach and Singer (1971), and Milgram and Shotland (1973) found no effects of media violence on aggressive behavior. Nor did research by Doob and MacDonald (1979), Hennigan et al. (1982), Messner (1986), Wiegman, Kuttschreuter, & Baarda (1992), or Winkel, Novak, and Hopson (1987). Neither are all psychologists convinced that the evidence to date is sufficient to support a causal connection (Fowles, 1999; Freedman, 2001, 2002; Gadow & Sprafkin, 1989). British media researcher David Gauntlett (1995) has gone so far as to write, "The search for direct 'effects' of television on behavior is over: Every effort has been made, and they simply cannot be found" (p. 120).

In a re-examination of studies claiming to show harmful effects of media violence, Fowles (1999) and Freedman (2002) point to inconsistencies and misinterpretations of studies central to the debate. For instance, Fowles criticizes the often-cited research of Eron for its methods and ambiguous results. "It is difficult to believe that a study with such a weak single finding has been taken so seriously by so many thoughtful people" (p. 37). The multinational study by Eron and Huesmann obtained results that are uneven from country to country.

In the Polish study, although average violence viewing increased during the 3-year research period, aggression decreased.... For the Australian children studied, the result was null: "Present data did not indicate that a relation exists in Australia between children's early violence viewing and the level of their aggression three years later," wrote Eron and Huesmann (p. 192). Positive correlations were found for city children in Israel but not for rural children. Finally, the Dutch researchers [Wiegmann et al., 1992], like the Australian researchers, could discern no correlation.

It is often asserted that repeated exposure to media images of violence desensitizes people to the real thing. Fowles does not believe that the research supports this view. "Even George Comstock, normally sympathetic to the violent effects literature, concedes about desensitization studies that 'what the research does not demonstrate is any likelihood that media portrayals would affect the response to injury, suffering, or violent death experienced firsthand'" (p. 30).

Freedman (2001) addresses two problems with existing research on violent video games: the choice of games and demand characteristics. It is very difficult to do adequate experimental research on violent video games. One problem is the difficulty of finding two video games that are equal in all respects, except one of them contains violence and the other does not. Only then could we be sure, if they have different effects, that this is due to the violent content and not to some other feature of the games, such as their level of excitement, involvement, activity, or sound effects.

Medical research uses the "double-blind" technique to insure against unintentional bias. In a double-blind experiment, neither the recipient of a treatment, nor the person administering the treatment, knows whether it is the actual treatment or a placebo. Nothing approaching this standard is possible in media violence research.

When experimenters choose a violent game, they may be giving the message that they approve of such games and might therefore approve of or even expect the subjects to behave violently.... The possibility of demand causing the results is not unlikely or far-fetched. It is a well-known phenomenon in experimental research and a continual almost ubiquitous source of problems in interpretation.... This leaves almost all of the results open to the alternative and uninteresting interpretation that they are caused by demand factors rather than the variable of interest, namely the direct effect of violence in the video game." (Freedman, 2001)

Another problem with laboratory experiments of violent video games is how the participants perceive them, when they are often told nothing about why they are being asked to play a violent video game.

Media Studies

Social psychologists are not the only scholars interested in media violence. Media studies scholars trained in the European tradition of critical theory tend to dismiss the "media effects" research as irrelevant for understanding media violence, or as inadequate to the task (Carter & Weaver, 2003). Martin Barker and Julian Petley (2001) write, "It could be said that there is little point in trying to question the methodology of those people working within the effects model, because, by our own definition of that work, they are much more concerned with creating an illusion of empiricism to support their prejudged conclusions than in designing methodologically sound research. In other words, they're not going to stop." Savage (2004), a criminologist, finds no reason to conclude that media violence is a cause of criminal violence.

Gauntlett (2001, p. 5) believes the solution is "to raise awareness of the flaws in that research in the hope that this will make it more difficult for the press to report their findings uncritically and, perhaps more importantly, to produce new kinds of research which will tell us [something] more subtle and interesting about possible media influences than anything which the effects researchers can provide."

Other Critics

Child clinical psychologist and crime novelist Jonathan Kellerman (1999) calls media violence "the scapegoat we love to hate." Concerning juvenile crime he writes, "If increased public safety is our goal, efficiency also dictates that we cease pouring money into research and clinical activities that have little direct impact upon rates of child criminality. A prime example of such diminished returns is the flood of studies conducted on the factor most often blamed for childhood criminality: media violence" (p. 71).

Richard Rhodes (2000) asks,

Is there really a link between entertainment and violent behavior? The American Medical Association, the American Academy of Pediatrics, and the National Institute of Mental Health all say yes. They base their claims on social science research that has been sharply criticized and disputed within the social science profession, especially outside the United States. In fact, no direct, causal link between exposure to mock violence in the media and subsequent violent behavior has ever been demonstrated, and the few claims of modest correlation have been contradicted by other findings, sometimes in the same studies.... If we want to reduce (violence) even further, protecting children from real violence in their lives—not the pale shadow of mock violence—is the place to begin.

One study cited as establishing a causal relationship between media violence and real violence is the epidemiological research of Centerwall (1989), who found an increase in murder rates following the introduction of television in South Africa. Rhodes notes that homicide rates in France, Germany, Italy, Japan, and the United States failed to change with increasing television ownership in the same period, and in some cases actually declined. In the most recent such study, Charlton, Gunter, and Hannan (2002) failed to find any effect of the introduction of television to the south Atlantic island of St. Helena.

Among claims by researchers are that repeated exposure to media violence desensitizes children to witnessing aggression and raises the likelihood that they will use it, and that children learn from TV, film, and video games that violence is rewarded.

"Though some statistical support has been obtained for [these] suppositions, not a single causal link between media violence and criminality has ever been produced," writes Kellerman (1999, p. 72). He continues:

This is not to say media violence is harmless. To the extent that gory junk attracts high-risk youngsters, it's anything but. Is it possible that an already psychopathic boy with a head full of violent impulses that have festered since early childhood, sitting around the house sucking on a joint or sniffing glue while he watches Scream, *can be spurred to imitate what he sees on the screen? Absolutely. The same is true of printed violence—serial killers often collect violent pornography and true-crime magazines in order to heighten sexual arousal.... Given no bloody books, no Freddy Krueger on video, no thrash metal or gangsta rap, would Billy Rotten of bullying, cat-mutilating proclivities have picked up a knife and stabbed his mother anyway? No way to know for sure, but I'd bet yes. And the likelihood of Billy's engaging in serious violence somewhere along the line would remain extremely high no matter what he read or viewed, because the variables that strongly influence violent behavior are likely to be a lot more personal than those elicited by wielding the remote control.* (pp. 77–78)

What's Missing from Video Game Research?

The role of volition or choice is absent from video game research. What are the effects of voluntary (as opposed to enforced) exposure to violent entertainment? Missing from research is any acknowledgment that video game players freely engage in play, and are always free to leave, or pause. Except in laboratory experiments, no one is forced to play a violent video game.

The Attractions of Violent Video Games

Almost no studies of the presumed harmful effects of video games have considered how and why people play them. People play video games for many different reasons. Some play to experience excitement, some to become experts or to impress their friends, others because video games are challenging or educational. Some play widely vilified games in order to elicit predictable, if negative, reactions from teachers or parents. Immersion in a game can be highly pleasurable (Koepp et al., 1998). Men and women enjoy different kinds of games and enjoy play for different reasons (Goldstein 1994, 1998, 1999; Kline 2000; Malone, 1981).

When there are few cues to their unreality, bloody images lose their appeal (McCauley, 1998). In one study, boys who played video games with violent themes showed the same positive facial expressions, quality of peer interaction, and enjoyment as those who played "neutral" games (see Holmes & Pellegrini, this volume). Similarly, violence, if it is to be entertaining, must fulfill certain requirements: it must have a moral story, in which good triumphs over evil, and it must carry cues to its unreality—music, sound effects, a fantasy storyline, cartoonlike characters. People are highly selective in the violence they seek or tolerate (McCauley, 1998; Zillmann, 1998).

We play video games largely for the expected effects they will have on us. Youngsters are willing to expose themselves to unpleasant media images because the benefits of doing so outweigh the costs. Players, like researchers, have overriding reasons for engaging with violent themes, even if they find them repugnant.

It is surprising that social psychologists so rarely consider the social lives of gamers. A Danish study of five- to seventeen-year-olds did so, and concluded that violent computer games could not be understood without considering their social aspects (Holm Sorensen & Jessen, 2000).

Not all questions can be answered with the tools of social psychological research. To quote John Dewey, "An idea has no greater metaphysical stature than, say, a fork. When your fork proves inadequate to the task of eating soup, it makes little sense to argue about whether there is something inherent in the nature of forks or something inherent in the nature of soup that accounts for the failure. You just reach for a spoon."

Notes

1. According to Andy Brown (2000) in *The Tech Report*, the games studied by Anderson and Dill are not comparable: *Myst* is an adventure game with "brain teaser" puzzles, whereas *Wolfenstein* is a first-person shooter game.
2. Of Gerbner's notion that children who consume long hours of television are likely to see the world as a "mean and scary place," Burke and Burke (1999, p. 198) write, "Well, good for TV, because the world sure as hell is a mean, scary place—and has been for most of this (20th) century. Those heavy TV viewers are going into life with their eyes open" (p. 198).

References

Aisbett, K. (1997). How children view aggressive content in interactive games: Are they doomed? In T. Newlands & M. Roger (Eds.), *Children and interactive multimedia: A place to play?* Sydney: College Institute of New South Wales, Australia.

Anderson, C. A. (2001). Playing by the rules. University of Chicago, Public Policy Institute. http://cultural-policy.vchicago.edu.

Anderson, C. A., & Bushman, B. J. (2001). Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: A meta-analytic review of the scientific literature. *Psychological Science, 12,* 353–359.

Anderson, C. A., & Dill, K. E. (2000). Video games and aggressive thoughts, feelings, and behavior in the laboratory and in life. *Journal of Personality and Social Psychology, 78,* 772–790.

Anderson, C. A., & Ford, C. M. (1986). Affect of the game player: Short-term effects of highly and mildly aggressive video games. *Personality and Social Psychology Bulletin, 12,* 390–402.

Anderson, C. A., & Morrow, M. (1995). Competitive aggression without interaction: Effects of competitive versus cooperative instructions on aggressive behavior in video games. *Personality and Social Psychology Bulletin, 21*, 1020–1030.

Ask, A. (1999). To kill or not to kill: Competitive aggression in adolescents Ph.D. dissertation, University of Adelaide, Australia.

Ask, A., Autoustinos, M., & Winefield, A. H. (2000). To kill or not to kill: Competitive aggression in Australian adolescent males during videogame play. In C. van Feilitzen & U. Carlsson (Eds.), *Children in the new media landscape* (pp. 83–92). Goteborg, Sweden: UNESCO International Clearinghouse on Children and Violence on the Screen.

Ballard, M. E., & Lineberger, R. (1999). Video game violence and confederate gender: Effects on reward and punishment given by college males. *Sex Roles, 41*, 541–558.

Barker, M. (2001). The Newson report. In M. Barker & J. Petley, *Ill effects: The media/violence debate* (2d ed.) (pp. 27–46). London: Routledge.

Barker, M., & Petley, J. (2001). *Ill effects: The media/violence debate* (2d ed.). London: Routledge.

Bartholow, B. D., & Anderson, C. A. (2002). Effects of violent video games on aggressive behavior: Poetntial sex differences. *Journal of Experimental Social Psychology, 38*, 283–290.

Bensley, L., & Van Eenwyk, J. (2001). Video games and real-life aggression: Review of the literature. *Journal of Adolescent Health, 29*, 244–257.

Buckingham, D. (1993). *Children talk television*. London: Routledge.

Burke, T., & Burke, K. (1999). *Saturday morning fever: Growing up with cartoon culture*. New York: St. Martin's.

Bushman, B. J., & Anderson, C. A. (2001). Media violence and the American public: Scientific facts versus media misinformation. *American Psychologist, 56*, 477–489.

Calvert, S. L., & Tan, S. (1994). Impact of virtual reality on young adults' physiological arousal and aggressive thoughts. *Journal of Applied Developmental Psychology, 15*, 125–139.

Carter, C., & Weaver, C. K. (2003). *Violence and the media*. Buckingham, UK: Open University Press.

Casas, F. (2000). Perception of video games among Spanish children and parents. In C. van Feilitzen & U. Carlsson (Eds.), *Children in the new media landscape* (pp. 123–126). Göteborg, Sweden: UNESCO.

Centerwall, B. S. (1989). Exposure to television as a cause of violence. In G. Comstock (Ed.), *Public communication and behavior* (vol. 2, pp. 1–59). San Diego, CA: Academic Press.

Charlton, T., Gunter, B., & Hannan, A. (2002). *Broadcast television effects in a remote community*. Mahwah, NJ: Lawrence Erlbaum Associates.

Coelho, K. A. (1998). *Deciphering violence: The cognitive structure of right and wrong*. New York: Routledge.

Colwell, J., & Payne, J. (2000). Negative correlates of computer game play in adolescents. *British Journal of Psychology, 91*, 295–310.

Cooper, J., & Mackie, D. (1986). Video games and aggression in children. *Journal of Applied Social Psychology, 16*, 726–744.

Cumberbatch, G. (2001). *Video violence: Villain or victim? A review of the research evidence concerning screen violence (video and computer games) and violence in the real world*. London: Video Standards Council. www.videostandards.org.uk.

Cumberbatch, G., Maguire, A., & Woods, S. (1993). Children and video games: An exploratory study. Birmingham: Communications Research, Aston University.

Dill, K., & Dill, J. (1998). Video game violence: A review of the empirical literature. *Aggression and Violent Behavior, 3*, 407–428.

Doob, A. N., & MacDonald, G. E. (1979). Television viewing and fear of victimization. *Journal of Personality and Social Psychology, 37*, 170–179.

Durkin, K. (1995). *Computer games, their effects on young people: A review*. Sydney: Office of Film & Literature Classification.

Durkin, K., & Low, J. (2000). Computer games and aggression research in Australia and New Zealand. In C. van Feilitzen & U. Carlsson (Eds.), *Children in the new media landscape* (pp. 79–82). Göteborg, Sweden: UNESCO.

Ferreira, P. A., & Pais-Ribeiro, J. L. (2001). The relationship between playing violent electronic games and aggression in adolescents. *Aggressive Behavior, 27*, 166–167.

Feshbach, S., & Singer, D. (1971). *Television and aggression: An experimental field study*. San Fancisco: Jossey Bass.

Fleming, M. J., & Rickwood, D. J. (2001). Effects of violent versus nonviolent video games on children's arousal, aggressive mood, and positive mood. *Journal of Applied Social Psychology, 31*, 2047–2071.

Fowles, J. (1999). *The case for television violence*. Thousand Oaks CA: Sage.

Fraser, A. (1966). *A history of toys*. London: Weidenfeld & Nicholson.

Freedman, J. (2001). Evaluating the research on violent video games. Cultural Policy Center, University of Chicago. http://culturalpolicy.uchicago.edu/.

Freedman, J. (2002). *Media violence and its effect on aggression*. Toronto: University of Toronto Press.

Funk, J. B. (2001). The violence debate. Cultural Policy Center, University of Chicago. http://culturalpolicy.uchicago.edu/.

Funk, J. B., Hagan, J., Schimming, J., Bullock, W. A., Buchman, D. D., & Myers, M. (2002). Aggression and psychopathology in adolescents with a preference for violent electronic games. *Aggressive Behavior, 28*, 134–144.

Garvey, C. (1991). *Play* (2d ed.). Cambridge, MA: Harvard University Press.

Gauntlett, D. (1995). *Moving experiences*. London: John Libbey.

Gauntlett, D. (2001). The worrying influence of "media effects" studies. In M. Barker & J. Petley, *Ill effects: The media/violence debate* (2d ed.). London: Routledge, pp. 47–62.

Gibb, G. D., Bailey, J. R., Lornbirth, T. T., & Wilson, W. P. (1983). Personality differences between high and low electronic video game users. *Journal of Psychology, 114*, 143–152.

Goldstein, J. (1999). The attractions of violent entertainment. *Media Psychology, 1*, 271–282.

Goldstein, J. (1998). Immortal Kombat: The attractions of video games with violent themes. In J. Goldstein (Ed.), *Why we watch: The attractions of violent entertainment* (pp. 53–68). New York: Oxford University Press.

Goldstein, J. (1995). Aggressive toy play. In A. D. Pellegrini (Ed.), *The future of play theory* (pp. 127–150). Albany: State University of New York Press.

Goldstein, J. (1994). Sex differences in toy play and use of video games. In J. Goldstein (Ed.), *Toys, play, and child development* (pp. 110–129). New York: Cambridge University Press.

Grainger, J., & Dijkstra, A.F.J. (1996). Visual word recognition: Models and experiments. In A.F.J. Dijkstra & K.J.M. de Smedt (Eds.), *Computational psycholinguistics*. London: Taylor & Francis.

Graybill, D., Strawniak, M., Hunter, T., & O'Leary, M. (1987). Effects of playing vs. observing violent vs. non-violent video games on children's aggression. *Psychology: A Quarterly Journal of Human Behavior, 24*, 1–8.

Green, C. S., & Bavelier, D. (2003). Action video game modifies visual selective attention. *Nature, 423*, 534–537.

Griffiths, M. (2000). Video game violence and aggression: A review of research. In C. van Feilitzen & U. Carlsson (Eds.), *Children in the new media landscape: Games, pornography, perceptions. Children and media violence, yearbook 2000* (pp. 31–34). Goteborg, Sweden: UNESCO International Clearinghouse on Children and Violence on the Screen.

Griffiths, M. (1999). Violent video games and aggression: A review of the literature. *Aggression & Violent Behavior, 4*, 203–212.

Griffiths, M. (1997). Video games and aggression. *The Psychologist*, Sept., 397–401.

Grodal, T. (2000). Video games and the pleasures of control. In D. Zillmann & P. Vorderer (Eds.), *Media Entertainment* (pp. 197–214). Mahwah, NJ: Erlbaum.

Grossman, D. (1995). *On killing: The psychological cost of learning to kill in war and society*. Boston: Little, Brown.

Grossman, D. (1999). *Stop teaching our kids to kill: A call to action against TV, movie and video game violence*. New York: Crown.

Gunter, B. (1998). *The effects of video games on children: The myth unmasked*. Sheffield, UK: Sheffield Academic Press.

Guttmann, A. (1983). Roman sports violence. In J. Goldstein (Ed.), *Sports violence* (pp. 7–20). New York: Springer Verlag.

Guttmann, A. (1998). The appeal of violent sports. In J. Goldstein (Ed.), *Why we watch: The attractions of violent entertainment* (pp. 7–26). New York: Oxford University Press.

Hendershot, H. (1998). *Saturday morning censors: Television regulation before the V-chip*. Durham: Duke University Press.

Hennigan, K. M., Del Rosario, M., Heath, L., Cook, T. D., Wharton, J. D., & Calder, B. J. (1982). Impact of the introduction of television on crime in the United States: Empirical findings and theoretical implications. *Journal of Personality and Social Psychology, 42*, 461–477.

Holm Sorensen, B., & Jessen, C. (2000). It isn't real: Children, computer games, violence and reality. In C. van Feilitzen & U. Carlsson (Eds.), *Children in the new media landscape: Games, pornography, perceptions. Children and media violence, yearbook 2000* (pp. 119–122). Goteborg, Sweden: UNESCO International Clearinghouse on Children and Violence on the Screen.

Holmes, R. M., & Pellegrini, A. D. (1999). Children's social behavior during video game play with aggressive and non-aggressive themes. Paper presented at International Toy Research conference. Halmstad, Sweden.

Karlsen, F. (2001). *Computer games and violence: A qualitative analysis of elements of violence in computer games*. OSLO, Norway, Norwegian Film Board.

Kellerman, J. (1999). *Savage spawn: Reflections on violent children*. New York: Ballantine.

Kinder, M. (2001). Violent ruptures. University of Chicago, Cultural Policy Center, Oct. 27. http://culturalpolicy.uchicago.edu/.

Kirsh, S. J. (1998). Seeing the world through Mortal Kombat-colored glasses: Violent video games and the development of a short-term hostile attribution bias. *Childhood, 5*, 177–184.

Kline, S. (2000). Killing time? A Canadian meditation on video game culture. In C. van Feilitzen & U. Carlsson (Eds.), *Children in the new media landscape: Games, pornography, perceptions. Children and media violence, yearbook 2000* (pp. 35–60). Goteborg, Sweden: UNESCO International Clearinghouse on Children and Violence on the Screen.

Koepp, M. J., Gunn, R. N., Lawrence, A. D., Cunningham, V. J., Dagher, A., Jones, T., Brooks, D. J., Bench, C. J., & Grasby, P. M. (1998). Evidence of striatal dopamine release during a video game. *Nature, 393*, 266–268.

Lin, S. & Lepper, M. R. (1987). Correlates of children's usage of video games and computers. *Journal of applied social psychology, 17*, 72–93.

Malone, T. (1981). Toward a theory of intrinsically motivating instruction. *Cognitive Science, 4*, 333–369.

McCauley, R. C. (1998). When violence is not attractive. In J. Goldstein (Ed.), *Why we watch: The attractions of violent entertainment* (pp. 144–162). New York: Oxford.

Messenger Davies, M. (1997). *Fake, fact, and fantasy: Children's interpretations of television reality*. Mahwah, NJ: Erlbaum.

Messner, S. F. (1986). Television violence and violent crime. *Social Problems, 32* (3), 218–235.

Milgram, S., & Shotland, L. (1973). *Television and antisocial behavior: Field experiments*. New York: Academic Press.

Perloff, R. M. (1999). The third person effect in mass media research. *Media Psychology, 1*, 353–378.

Poole, S. (2001). The latest report on media "aggression" analysed. www.joystick101.org.

Regan, P. M. (1994). War toys, war movies, and the militarization of the United States, 1900–1985. *Journal of Peace Research, 31*, 45–58.

Rhodes, R. (2000). Hollow claims about fantasy violence. *New York Times*, Sept., 17.

Robinson, T. N., Wilde, M. L., Navracruz, L. C., Farish Haydel, K., & Varady, A. (2001). Effects of reducing children's television and video game use on aggressive behavior. *Archives of Pediatrics & Adolescent Medicine, 155*.

Roe, K., & Muijs, D. (1998). Children and computer games: A profile of the heavy user. *European Journal of Communication, 13*, 181–200.

Sakamoto, A. (2000). Video games and violence: Controversy and research in Japan. In C. van Feilitzen & U. Carlsson (Eds.), *Children in the new media landscape: Games, pornography, perceptions. Children and media violence, yearbook 2000* (pp. 61–78). Goteborg, Sweden: UNESCO International Clearinghouse on Children and Violence on the Screen.

Savage, J. (2004). Does viewing violent media really cause criminal violence? A methodological review. *Aggression and violent behavior, 10*, 99–128.

Schierbeck, L., & Carstens, B. (2000). Violent elements in computer games: An analysis of games published in Denmark. In C. van Feilitzen & U. Carlsson (Eds.), *Children in the new media landscape: Games, pornography, perceptions. Children and media violence, yearbook 2000* (pp. 127–132). Goteborg, Sweden: UNESCO International Clearinghouse on Children and Violence on the Screen.

Schutte, N. S., Malouff, J. M., Post-Gorden, J. C., & Rodasta, A. L. (1988). Effects of playing video games on children's aggressive and other behaviors. *Journal of Applied Social Psychology, 18*, 454–460.

Scott, D. (1995). The effects of video games on feelings of aggression. *Journal of Psychology, 129*, 121–132.

Sherry, J. (2001). The effects of violent video games on aggression. *Human Communication Research, 27*, 409–431.

Silvern, S. B., & Williamson, P. A. (1987). The effects of video game play on young children's aggression, fantasy, and prosocial behavior. *Journal of Applied Developmental Psychology, 8*, 453–462.

Sneed, C., & Runco, M. A. (1992). The beliefs adults and children hold about television and video games. *Journal of Psychology, 126*, 273–284.

Subrahmanyam, K., Kraut, R., Greenfield, P., & Gross, E. (2001). New forms of electronic media. In D. G. Singer & J. L. Singer (Eds.), *Handbook of children and media* (pp. 73–99). Thousand Oaks, CA: Sage.

Tobin, J. (2000). *"Good guys don't wear hats" Children's talk about the media*. New York: Teacher's College Press, Columbia University.

Twitchell, J. (1989). *Preposterous violence*. New York: Oxford University Press.

Unsworth, G., & Ward, T. (2001). Video games and aggressive behavior. *Australian Psychologist, 36*, 184–192.

Van Feilitzen, C. (2000). Electronic games, pornography, perceptions. In C. van Feilitzen & U. Carlsson (Eds.), *Children in the new media landscape* (pp. 9–12). Goteborg, Sweden: UNESCO International Clearinghouse on Children and Violence on the Screen.

Van Schie, E.G.M., & Wiegman, O. (1997). Children and video games: Leisure activities, aggression, social integration, and school performance. *Journal of Applied Social Psychology, 27*, 1175–1194.

Wang, J., & He, M. (2000). Investigation of personality and mental health status of electronic game addicted adolescents and youth. *Chinese Mental Health Journal, 14*, 316.

Wiegman, O., & van Schie, E.G.M. (1998). Video game playing and its relations with aggressive and prosocial behaviour. *British Journal of Social Psychology, 37*, 367–378.

Wiegman, O., Kuttschreuter, M., & Baarda, B. (1992). A longitudinal study of the effects of television viewing on aggressive and prosocial behaviors. *British Journal of Social Psychology, 31*, 147–164.

Wiegman, O., van Schie, E.G.M., & Modde, J. M. (1997). Computerspelletjes en hun effecten. [Computer games and their effects.] *Justitie Verkenningen, 23*, 21–34.

Winkel, M., Novak, D. M., & Hopson, H. (1987). Personality factors, subject gender, and the effects of aggressive video games on aggression in adolescents. *Journal of Research in Personality, 21*, 211–223.

Zillmann, D. (1998). The psychology of the attraction of violent entertainment. In J. Goldstein (Ed.), *Why we watch: The attractions of violent entertainment* (pp. 179–211). New York: Oxford University Press.