



# VIOLENT VIDEO GAMES AND AGGRESSION: A REVIEW OF THE LITERATURE

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**ABSTRACT.** *One of the main concerns that has constantly been raised against video games is that most of the games feature aggressive elements. This has led many people to assert that this may have a detrimental effect on individuals who play such games. Despite continuing controversy for over 15 years, there has been little in the way of systematic research. This article reviews the empirical studies in this area, including research methodologies such as the observation of free play, self-report methods, and experimental studies. The article argues that all the published studies on video game violence have methodological problems and that they only include possible short-term measures of aggressive consequences. The one consistent finding is that 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. However, all of these come from the use of one particular research methodology (i.e., observation of children's free play). © 1998 Elsevier Science Ltd*

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ONE OF THE MAIN concerns that has constantly been raised against video and computer games is that most of the games are claimed to feature aggressive elements. This has led some people to state that children become more aggressive after playing such games (e.g., Koop, 1982; Zimbardo, 1982). However, these assertions have been made without the backup of empirical evidence. Despite the continuing controversy for over 15 years, there has been relatively little systematic research. The issue is ever more important because new games like *Mortal Kombat* are using more explicit representations of extreme and realistic violence.

There has been a much reported (and debated) link between television violence and violence in children's behavior, that is, those children who view television violence subsequently show increases in their aggressive actions (e.g., Andison, 1977; Berkowicz, 1970;

Eron, 1982). With this in mind, Silvern, Williamson, and Countermine (1983) noted that there were similarities between television and video games in that they both have (a) entertainment value, (b) violent content, and (c) various physical feature similarities (e.g., action, pace and visual change).

Many authors claim that most computer games are violent in nature and feature death and destruction (e.g., Dominick, 1984; Loftus & Loftus, 1983). In a survey reported by Bowman and Rotter (1983), 85% of games that were examined ( $n = 28$ ) involved participants in acts of simulated destruction, killing or violence. A more recent study of computer game content by Provenzo (1991) reported that of the 47 leading *Nintendo* games that he analyzed, only seven of them did not involve violence. He reported that video games were populated by terrorists, prizefighters, SWAT teams, robotic cops, and the like, and that women were cast as “victims,” and foreigners as “baddies.” Findings, such as this, led Provenzo to conclude that video games encourage sexism, violence and racism by conditioning children to view the world in a way that they see on the computer screen.

Although analyses of video game content have led researchers to conclude that most computer games are violent, their choice of games for analysis does not necessarily coincide with those games which are the best selling. By looking at any of the “Top 10 Games” charts in the mass of monthly video game magazines, it can be seen that many of the most popular games are definitely not “violent” (e.g., *Super Mario* in which the actor jumps on mushrooms and turtles killing neither, *Sonic the Hedgehog* in which the actor jumps on shapes and spiky creatures to reveal cute animals, *Pacmania* in which the actor eats dots or spots etc.).

At present little is known about the long-term effects of playing violent video games, but great concern has been raised that video games may have a greater adverse effect on children than television because of the child’s active involvement. Television is only a passive, one-way communicative medium (Bowman & Rotter, 1983). Greenfield (1984) has further pointed out that children prefer games over television because there is greater control.

### THEORETICAL CONCERNS

Theoretically, video games might have the capacity to promote aggressive tendencies (as predicted by social learning theory) or to release aggressive tendencies (as predicted by catharsis theory). Put more simply, social learning theory (e.g., Bandura, 1986) would hypothesize that playing aggressive video games would lead to the stimulation of aggressive behavior; that is, children will imitate what they see on screen. In direct contradiction to this, catharsis theory (e.g., Feshbach & Singer, 1971) would hypothesize that playing aggressive video games would have a relaxing effect by channelling latent aggression and therefore have a positive effect on a child’s behavior. Despite continuing controversy, there has been relatively little empirical research published in the area. There are a growing number of studies examining the possible “aggression” link between video games and children’s subsequent behavior, but these have only examined the short-term effects. The rest of this article attempts to examine the growing body of research that has been carried out in order to put the debate into an empirical context. It is not the author’s intention to review every single study in the area, although it is hoped that all the major ones which highlight the issues involved are included.

**TABLE 1. Summary of Self-Report Studies Examining the Relationship Between Video Games and Aggression**

Researchers	<i>n</i>	Age	Main Finding(s)
Studies on adolescents			
Lin & Lepper (1987)	210	9–11 years	Significant relationship between amount of (arcade) video game play and aggressiveness/impulsivity.
Rushbrook (1986)	Not stated	10–16 years	Significant relationship between amount of video game play and violent attitudes.
Kestenbaum & Weinstein (1985)	208	11–14 years	Aggressive video games have a calming effect. <sup>a</sup>
Fling et al. (1992)	153	11–17 years	Regular players think they are more aggressive as do their teachers.
Griffiths & Hunt (1993)	387	12–16 years	Self-reported aggression significantly correlated with video game playing frequency.
Dominick (1984)	250	15–16 years	Significant correlation between video game playing and aggressive delinquency. However, correlation was insignificant when control variables partialled out.
Studies on young adults			
Mehrabian & Wixen (1986)	100	Mean age = 18 years	Hostile feelings increased in college students while imagining playing video games.
Anderson & Ford (1986)	60	Undergraduates	Higher aggression video games increased hostility. <sup>b</sup>
Study on mixed sample			
Gibb et al. (1983)	280	12–34 years	No relationship between amount of video game play and hostility.

<sup>a</sup> Eysenck shortform Extroversion and Neuroticism Scale (Eysenck, 1958); Singer and Antrobus Day Dreaming Scale (Singer & Antrobus, 1970).

<sup>b</sup> Multiple Affect Adjective Checklist.

### SELF-REPORT METHODS

Presence of increased aggression has been measured by self-report in a number of studies (see Table 1). Lin and Lepper (1987) found a positive relationship between self-reported video game use in males (4th to 6th grade) and their teachers' ratings of aggressiveness and impulsiveness. Rushbrook (1986) reported a correlation between the amount of video game play and violent attitudes that were more favorable to war in a group of 5th to 11th grade males. In a questionnaire study of teenage boys (10th to 11th grade), Dominick (1984) found that video game playing was correlated with aggression. However, when effects of other factors were taken out, the correlation between video games and aggression became nonsignificant. Anderson and Ford (1986) measured hostility using the Multiple Affect Adjective Checklist after undergraduates had played either very aggressive or mildly aggressive video games. Their results indicated that playing of aggressive video games can have short-term negative effects on the players' emotional state and that players of the highly aggressive video game showed increased hostility and anxiety. A similar result was found by Mehrabian and Wixen (1986) who reported that hostile feelings increased in college students while imagining playing video games. However, a self-report study on 12- to 34-year-olds by Gibb, Bailey, Lambirth, and Wilson (1983) found no relationship between the amount of video game play, hostility and self-esteem and a study

by Kestenbaum and Weinstein (1985) on 208 teenagers (aged 11 to 14 years) found that video games had a calming effect.

In a study by Fling et al. (1992) on 153 sixth to twelfth graders, it was reported that amount of video game play correlated with self-reported levels of aggression (although not self-esteem). Evidence of a relationship between amount of video game play and aggressiveness is consistent with other researchers (e.g., Dominick, 1984; Lin & Lepper, 1987). Further to this it was reported that self-esteem and aggression were positively correlated on teacher ratings but negatively on self-ratings.

Griffiths and Hunt (1993, 1995) have also reported that when video game playing adolescents were asked if they thought playing violent video games made them more aggressive, they responded that this was the case. It was further reported that this was highly significantly correlated with their frequency of playing. Both of these studies support the results of Dominick (1984) and Lin and Lepper (1987). However, they also noted that correlational results such as theirs could indicate that more aggressive children are drawn to video games rather than and/or addition to their aggression being a result of this activity.

The problem with all of this type of research is that correlational evidence is unconvincing not only because any observed positive correlations may be due to backward causation (aggressive individuals having a greater penchant for video games), but for the more plausible reason that the correlations may not be directly causal at all but may result from mediating factors (e.g., low educational attainment, low socioeconomic status, etc.) that may themselves be causally related both to video game playing and to aggressive behavior. This interpretation is well known in the literature on the effects of violent television viewing on aggressive behavior.

## EXPERIMENTAL STUDIES

There have been a number of experimental studies looking at the relationship between aggression and video game playing although a number of these studies use video games as an experimental paradigm to investigate other theoretical concerns (e.g., the relationship between aggression and temperature, the influences of social roles on sex differences using a video game; see Table 2).

Winkel, Novak, and Hopson (1987), in a study involving young teenagers (eighth grade), found that after playing violent video games there was no increase in aggression towards peers in a pretend "teacher/learner" role play situation. In the short term, it was not supported that teenagers may be mimicking the violence in video games. Violent video games may have other effects on a child's behavior other than aggression. For instance, Chambers and Ascione (1987) reported that their sample of third to eighth graders gave less money to a donation box after playing an aggressive game than in comparison to the playing of a prosocial video game.

Only experimental studies can hope to provide persuasive evidence as to causality. However, the two laboratory studies discussed above did not examine real aggression but rather fantasy aggression (i.e., a pretend "teacher-learner" role play situation, and giving money to charity). The latter is somewhat irrelevant, and increased aggression in the fantasy and role-play measures, far from confirming the hypothesis that games cause aggression, is entirely consistent with the catharsis hypothesis; that is, it might be precisely the fantasy aggression that releases the energy that would otherwise be expressed as aggressive behavior.

Scott (1995) conducted a study on university students and found no differences in

**TABLE 2. Summary of Experimental Studies Examining the Relationship Between Video Games and Aggression**

Researchers	<i>n</i>	Age	Main Finding(s)
Studies on children and adolescents			
Chambers & Ascione (1987)	160	8–13 years	Playing aggressive video games suppressed prosocial behaviour in an experimental situation.
Winkel et al. (1987)	56	12–13 years	Role playing experiment reported no increase in aggression.
Lynch (1994)	75	12–17 years	Prehostile subjects showed no differences in heart rate and blood pressure playing violent or nonviolent games.
Studies on young adults			
Lightdale & Prentice (1994)	84	Undergraduates	Males more aggressive than females in individuated condition but not in deindividuated condition.
Anderson et al. (1995)	107	Undergraduates	Increasing temperature increases state hostility, hostile cognition, and physiological arousal.
Anderson & Morrow (1995)	60	Undergraduates	Subjects killed more in a competitive situation rather than a cooperative one.
Scott (1995)	117	Undergraduates	Playing aggressive video games does not make people more aggressive.
Ballard & West (1996)	30	Undergraduates	Playing aggressive video games produced increased heart rates and an increase in hostility scores on adjective checklist.

aggressive affect while playing video games on questionnaire scores on the Buss-Durkee Hostility Inventory (Buss & Durkee, 1957) and the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975) across varying levels of video game violence. Related to the studies of aggression is a study by Lynch (1994) who hypothesized that playing video games with violent content would produce greater cardiovascular responses in adolescent males than those playing nonviolent games. His study examined heart rate and blood pressure differences between 76 hostile and nonhostile subjects (aged 12 to 16 years) but found no differences between the two groups.

Lightdale and Prentice (1994) investigated the influence of social roles on sex differences using a video game. By deindividuating their subjects they found that there were no differences in male and female aggression when playing a video game but that in the individuated condition, males were more aggressive than females. Such a finding has little to say about the relationship of video games and violence *per se*. In another experiment that used video games to examine other theoretical concerns, Anderson, Deuser, and DeNeve (1995) tested a general model of affective aggression via a study of video game playing. Using 107 undergraduate subjects, they manipulated the room temperature while subjects were playing the video games and found that raising the temperature consistently increased hostile affect and hostile cognition in players.

It could also be the case that the competitive nature of a video game may have an effect on aggression. To examine this, Anderson and Morrow (1995) extended and tested Deutsch's (1993) theory of competition effects using video games. The theory predicts

**TABLE 3. Summary of Observational Studies Examining the Relationship Between Video Games and Aggression in Children**

Researchers	<i>n</i>	Age	Main Finding(s)
Silvern & Williamson (1987)	28	4–6 years	Increase in aggression.
Schutte et al. (1988)	31	5–7 years	Increase in aggression.
Irwin & Gross (1995)	60	7–8 years	Increase in aggression.
Cooper & Mackie (1986)	84	9–10 years	Girls increase in aggression; no increase in boys.

that people view competitive situations inherently more aggressive than cooperative ones. In a study of 60 undergraduates, competition primed subjects killed significantly more video game characters than cooperation primed subjects. The increased kill ratio occurred in the absence of changes of hostility, friendliness, or liking for one’s game partner. Because laboratory studies cannot study serious aggressive behavior for ethical reasons, what is required are naturalistic field experiments. In the television violence literature, these are regarded as uniquely important but unfortunately there are no such studies of video games.

### OBSERVATIONAL STUDIES

A number of studies have examined the differences in children’s behavior after playing an aggressive video game by observing the child’s free play (see Table 3). Cooper and Mackie (1986) observed the free play of 9- to 10-year-old children in the toy room after playing and watching aggressive video games. They reported that girls’ aggressive activity significantly increased although boys remained unaffected. Silvern and Williamson (1987) found that individual 4- to 6-year-old children became more aggressive relative to a baseline condition when they were observed during free play after an aggressive video game. Both Cooper and Mackie (1986) and Silvern and Williamson (1987) noted there were no significant differences in aggression levels between active video game players and passive video game observers. Schutte, Malouff, Post-Gorden, and Rodasta (1988) also observed the free play of 5- to 7-year-old children after playing an aggressive video game and concluded that the child’s subsequent behavior is similar to the character the individual controlled while playing the video game. For instance, those who played a jungle video game played with jungle like toys during free play, whereas those who played the violent video game became more aggressive. Finally, Irwin and Gross (1995) measured interpersonal aggression and aggression toward inanimate objects in 60 second grade boys (aged 7 to 8 years). After playing video games with aggressive or nonaggressive themes, they found that those who played the aggressive games exhibited significantly more object aggression during a free play situation and more interpersonal aggression during a frustrating situation.

These studies, all of which were carried out on young children, do seem to suggest that the playing of violent video games has the effect of increasing a child’s aggressive behavior—at least in the short term. It is possible that this particular methodology (i.e., observational analysis of free play) may itself be contributing to the effect.

**TABLE 4. Summary of Other Studies Examining the Relationship Between Video Games and Aggression**

Researchers	<i>n</i>	Age	Main Finding(s)
Gardner (1991)	4	5, 7, 10 years	Case studies—video games contribute to releasing and controlling aggression.
Graybill et al. (1985)	116	7–11 years	Projective Test <sup>a</sup> —showed fewer defensive fantasies.
Graybill et al. (1987)	126	7–11 years	Projective Test <sup>a</sup> —no increase in aggression.

<sup>a</sup> Rosenzweig Picture-Frustration Study (Rosenzweig, 1978) and Response Hierarchy Measure.

### OTHER STUDIES (PROJECTIVE TESTS, CASE STUDIES)

Two studies by Graybill and his associates (Graybill, Kirsch, & Esselman, 1985; Graybill, Strawniak, Hunter, & O'Leary, 1987) have used a mixture of methodologies (self-report, experiment and observation) and have suggested that video games may have short-term beneficial effects for children (see Table 4). Graybill et al. (1985) reported that 6- to 11-year-old children exhibited fewer defensive fantasies and tended to exhibit more assertive fantasies after playing violent video games although this was a trend and not significantly significant. Aggression was assessed using a projective test—the Rosenzweig Picture-Frustration Study. The authors concluded that their results were more consistent with catharsis theory and that violent video games discharge aggressive impulses in a socially acceptable way and that playing violent video games may have a short-term beneficial effect for the children playing them.

In a further study, Graybill et al. (1987) used a behavioral measure involving apparatus in which children could push buttons to hurt or help another child, in addition to two self-report measures (the Response Hierarchy Measure and the Rosenzweig Picture-Frustration Study again). These were administered after the playing of violent and nonviolent video games but no significant differences were recorded. Graybill and his associates also reported that there may be differences between television viewing and video game playing. One obvious difference reported was that although the video game's content may be violent, the graphics are not nearly as realistic as televised violence. However, longer-term effects were not ruled out.

In a more anecdotal case study account, Gardner (1991) claimed that the use of video games in his psychotherapy sessions provided common ground between himself and his client and provided excellent behavioral observation opportunities. Gardner described four particular case studies where video games were used to support psychotherapy, and added that although other techniques were used as an adjunct in therapy (e.g., story telling, drawing, other games etc.) it was the video games that were the most useful factors in the improvement during therapy. He claimed that video games contribute to releasing and controlling aggression although there was little evidence for this except for Gardner's own anecdotal observations.

### CONCLUDING COMMENTS

These growing number of studies examining the effects of video games on aggression have only involved a measure of possible short-term aggressive consequences. The majority of the studies on very young children—as opposed to those in their teens upwards—tended

**TABLE 5. Categories of Video Games (Adapted from Griffiths, 1993)**

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1. Sport Simulations: This type is self-explanatory. These games simulate sports such as golf, ice hockey, athletics, etc. (e.g., *World Wide Soccer '97*, *NHL Powerplay '97*, etc.).
  2. Racers: This type could be considered a type of sport simulation in that it simulates motor sports like Formula 1 racing (e.g., *Human Grand Prix*, *Speedster*, *Motoracer*, etc.).
  3. Adventures: This type uses fantasy settings in which the player can escape to other worlds and take on new identities (e.g., *Atlantis*, *Star Trek Generations*, *Overboard*, etc.).
  4. Puzzlers: This type is self-explanatory. These games are “brainteasers,” which often require active thinking (e.g., *Tetris*, *Baku Baku Animal*, etc.).
  5. Weird Games: These games are not weird as such except they do not fit into any other category. They would be better termed *miscellaneous* (e.g., *Sim City 2000*, *Populous 3*, etc.).
  6. Platformers: These games involve running and jumping along and onto platforms (e.g., *Mario 64*, *Sonic*, etc.).
  7. Platform Blasters: These games are platformers but also involve blasting everything that comes into sight (*Robocop 2*, *Virtua Cop*, etc.).
  8. Beat 'Em Ups: These games involve physical violence such as punching, kicking, etc. (e.g., *Street Fighter 3*, *Tekken 2*, *Mortal Kombat*, etc.).
  9. Shoot 'Em Ups: These games involve shooting and killing using various weapons (e.g., *Blast Corps*, *Mech Warrior*, *Turok Dinosaur Hunter*, etc.).
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to show that children do become more aggressive after either playing or watching a violent video game but these were all based on the observation of a child's free play. Such evidence suggests that at a theoretical level, there is more empirical evidence supporting social learning theory than catharsis theory—particularly in younger children. However, there is much speculation as to whether the procedures to measure aggression levels are valid and reliable. There is also the question of developmental effects, that is, do video games have the same effect regardless of age? It could well be the case that violent video games have a more pronounced effect in young children but less of an effect (if any) once they have reached their teenage years. There is also the social context of playing, that is, playing in groups or individually, with or against each other may affect the results. The findings of Anderson and Morrow (1995) suggest that competitiveness increases aggression. There are also problems concerning the definition of “violent” or “aggressive” as there are numerous television cartoons such as *Tom and Jerry* which may not be regarded as violent within the operational definitions employed in mass media research. Because all video games are animated, the same argument might be used for them also. Research into the effects of long-term exposure to video games on subsequent aggressive behavior is noticeably lacking and at present remains speculative.

It is evident that video games can have both positive and negative aspects. If care is taken in the design, and if games are put into the right context, they have the potential to be used as training aids in classrooms and therapeutic settings, and to provide skills in psychomotor coordination in simulations of real life events, for example, training recruits for the armed forces. There is, however, a need for a general taxonomy of video games as it could be the case that particular types of games have very positive effects while other types are not so positive.

As Table 5 demonstrates, there are many different types of video games each of which have their own distinctive qualities. Only three of these categories (“beat 'em ups,” “shoot 'em ups,” and “platform blasters”) have any kind of aggressive element. If children and



adolescents work with this degree of definitional refinement it follows that other interested parties (e.g., educationalists, researchers, etc.) should do also. To briefly conclude, the question of whether video games promote aggressiveness cannot be answered at present because the available literature is relatively sparse and conflicting, and there are many different types of video games which probably have different effects.

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