

Are violent video games harmful?

Guy Porter and Vladan Starcevic

Objective: *The aim of this paper is to revisit the controversial issue of the association of violent video games and aggressive behaviour.*

Conclusions: *Several lines of evidence suggest that there is a link between exposure to violent video games and aggressive behaviour. However, methodological shortcomings of research conducted so far make several interpretations of this relationship possible. Thus, aggressive behaviour may be a consequence of playing violent video games, an expression of hostile traits that existed before exposure to these games, and/or it may be a result of several possible combinations of these and other factors. Mental health professionals need to be aware of these potentially negative effects of violent video games when assessing patients who present with aggression. There is a need for prospective, long-term studies similar to those evaluating the effects of television and film violence on children and adolescents.*

Key words: *aggression, computer, trait-hostility, video game.*

Video games are being increasingly used around the world, mainly by children, adolescents and young adults. Violent video games have raised concerns, particularly from the media, certain regulatory bodies and mental health professionals. This is underpinned by case reports and studies suggesting that there may be a relationship between the use of violent video games and subsequent aggressive or antisocial behaviour.¹ A related issue is that of the excessive, 'addictive' use of video games and the internet.

The purpose of this paper is to overview the development of violent video games and re-examine the controversial issue of an adverse impact of these games on behaviour and on mental health in general. Understanding this impact better might contribute to efforts to decrease violence in modern society, reduce potentially harmful effects of the violent video games, and improve mental health.

THE EVOLUTION OF VIOLENT VIDEO GAMES

The first video games such as 'Space Invaders' and 'Pacman' emerged in the late 1970s with simplistic graphics and a resultant low level of depicted violence. This trend continued through the 1980s, largely due to the technological limitation of 8-bit graphics. It was not until the early 1990s with the advent of 16-bit graphics that the fluid depiction of blood and more realistic depiction of killing was possible. The 1992 game 'Mortal Kombat' featured a decapitation sequence which led to US Congressional hearings giving the entertainment industry 1 year to devise its own rating system before Congress intervened. The result was the formation of the Entertainment Software Rating Board, with an age- and content-based classification system for video games that closely parallels that for TV and film.²

The classification system in itself did not halt the development of increasingly violent video games. From the mid-1990s, a new genre of

Guy Porter

Psychiatry Registrar, Westmead Hospital, Sydney, NSW, Australia.

Vladan Starcevic

Associate Professor, Discipline of Psychological Medicine, University of Sydney and Department of Psychological Medicine, Nepean Hospital, Sydney, NSW, Australia.

Correspondence: Dr Guy Porter, Department of Psychiatry, Westmead Hospital, Darcy Road, Westmead, NSW 2145, Australia.
Email: gporter222@yahoo.com.au

video game known as the 'first person shooter' emerged with the player placed in an interactive 3-dimensional environment similar to the 'virtual reality' simulators of the same decade. With the simultaneous rise of the internet since this time, players in 'first person shooters' are now able to kill one another or virtual opponents online with high levels of depicted blood, violence and gore.

VIDEO GAMES AND CRIME

The 1993 game 'Doom' belonged to the 'first person shooter' genre and was played by Eric Harris and Dylan Klebold before they went on a shooting rampage at Columbine High School in 1999, killing 12 fellow students and one teacher, before committing suicide. The two killers had mentioned the game in a video they made before the massacre, stating it would be "just like Doom". Since the Columbine massacre, there have been multiple 'copy-cat' shootings, mainly in other American high schools. Various other violent crimes committed by adolescents have also been related to specific video games, such as the 'Grand Theft Auto' series. Families of victims, parent groups and solicitors have been quick to lay the blame on violent video games, with a number of court cases filed against software developers and their distributors.^{3,4} However, establishing a causative link between violent video games and crime is fraught with difficulties from both a medical and legal perspective. In addition, statistics show that despite US annual video game sales increasing from US\$4 billion in the mid-1990s to over US\$7 billion in 2004, US rates of violent crime (rape, robbery, assault, homicide) have fallen precipitously over the same time period.⁵ How certain, then, is the link between exposure to violent video games and aggressive behaviour? This relationship has been the focus of a number of studies.

STUDIES OF THE EFFECTS OF VIOLENT VIDEO GAMES ON AROUSAL, FEELINGS, THOUGHTS AND BEHAVIOUR

Investigators have utilized three study designs – experimental, correlation and longitudinal – to assess whether exposure to violent video games is related to aggressive or violent behaviour. The methodological aspects of each type of study design and the quality and statistical power of individual studies vary considerably.

Experimental studies

Experimental studies on individuals in laboratory environments have demonstrated short-term increased levels of physiological arousal, hostile feelings, hostile attitudes and aggressive behaviour following sessions of playing violent video games compared to non-violent video games.^{6–9} Investigators measure arousal using parameters such as blood pressure and heart rate, while hostile feelings and hostile attitudes

are typically assessed by means of self-report instruments such as the State Hostility Scale.¹⁰ Aggressive behaviour is evaluated indirectly, because its actual manifestations between participants cannot be permitted on ethical grounds. The noise-blast paradigm, where participants blast each other with white noise (a complex multi-frequency sound), has been used as a proxy measure of aggression.^{6,7} In a study involving 32 college students,⁷ participants blasted their opponents with white noise for 0.16 seconds longer ($p < 0.05$) and rated themselves higher on the State Hostility Scale following sessions of playing 'Wolfenstein 3D' (a violent 'first person shooter') compared to 'Myst' (a slow-paced puzzle game). While participants rated both games as equally frustrating, 'Wolfenstein 3D' was rated as more exciting.

This study illustrates some of the methodological problems with experimental research. These include small sample sizes, arbitrary criteria for dividing games into 'violent' and 'non-violent', and the inability to control for variables such as 'excitement', which confound the interpretation of findings. The outcome measures themselves may be questionable – a noise blast that was 0.16 seconds longer after playing a 'violent' game may be statistically significant but is unlikely to suggest a significant difference in aggressive behaviour. In addition, many other experimental studies were performed in the 1980s using video games that would not be considered 'violent' by today's standards.^{11,12}

Correlation studies

Correlation studies involve participants retrospectively filling in survey forms in order to identify patterns of video game use in relation to personality and behaviour. While correlation studies have the limitation of recall bias, they have demonstrated a significant relationship between exposure to violent video games, trait hostility, and aggressive or antisocial behaviour.^{6–9,13,14} In a study involving 607 adolescents,¹³ time spent playing violent computer games was associated with trait hostility, arguments with teachers, physical fights, and poorer school performance. The increased incidence of physical fights in children who played violent video games remained statistically significant even when controlling for trait-hostility. Furthermore, low trait-hostility children who played more violent video games were more likely to get into physical fights than high trait-hostility children who played less violent games.

Longitudinal studies

The shortcomings of experimental and correlation research design might be overcome by means of prospective, naturalistic studies. To date, there has only been one published longitudinal study on the effects of video game violence showing that exposure to violent video games was related to increased

aggressive behaviour.¹⁵ However, participants in this study were also exposed to other forms of media violence, which is the obvious methodological limitation. Therefore, the effect from violent video game exposure alone was uncertain.

Summary of research

Despite considerable variation in the quality of research, the reviewed studies generally suggest that violent video game use is somehow related to aggression. A meta-analysis incorporating both experimental studies and correlation studies concluded that exposure to violent video games was linked to increases in hostile feelings, hostile attitudes, aggressive behaviour and decreases in pro-social behaviour.³ This finding has been supported by a recent literature review focusing on children and adolescents.⁶ However, the interpretation of the relationship between exposure to violent video games and aggression remains open to question and calls for an explanatory model or theoretical framework.

THEORETICAL FRAMEWORKS UNDER DEBATE

An association between exposure to violent video games and increased aggressive behaviour suggests neither causation nor a direction in the causal relationship between them, even if there is one. A 'bi-directional model' has been proposed as a compromise.^{1,13} While playing violent video games may cause or precipitate violent behaviour, it is just as likely that young people with primary, aggressive behaviour or antisocial traits preferentially select to play violent video games for recreational purposes.^{16,17} In the latter case, prominent aggressive behaviour that occurs after exposure to violent video games cannot be considered solely a consequence of that exposure. Playing violent video games may only facilitate the expression of the pre-existing propensity towards aggressive behaviour. Indeed, if the classical evolutionary theory that aggression is both innate and adaptive is upheld, any individual could manifest aggressive behaviour given the correct environmental stimuli.¹⁸ One of the crucial developmental tasks is a minimization of this aggressive potential, which is usually achieved through socialization and incorporation of the societal norms of behaviour.

The relationships between pre-existing hostility, exposure to violent video games and aggressive behaviour may be quite complex. In the 'General Aggression Model',^{7,13,19} a distinction is made between the short-term and long-term effects of exposure to violent content. In the short-run, the pre-existing or 'trait' hostility is postulated to 'moderate' direct influence of exposure to violent content on aggressive behaviour by independently promoting

aggressive behaviour. In the long-run, the pre-existing or 'trait' hostility is posited to 'mediate' the influence of exposure to violent content on aggressive behaviour. However, in accordance with the theory of risk factors,²⁰ whereby mediators occur after the putative causal factors, it is more appropriate to postulate that exposure to violent content plays a role of 'mediator' in the relationship between the pre-existing or 'trait' hostility and subsequent aggressive behaviour. While it is not clear whether a distinction between the short-term and long-term effects of exposure to violent video games does exist, there is a need to elucidate the interrelatedness within a 'conceptual triangle' involving the pre-existing or trait hostility, exposure to violent video games, and aggressive behaviour.

There have been other attempts to explain the association between violent video game use and aggression. Thus, it has been suggested that desensitization to violence occurs following repeated exposure to violent video games.²¹ In this model, desensitization to violence and, therefore, a lack of aversive response to violent cues, is a consequence of reduced empathy. The model does not address the question of whether empathy decreases because of repeated exposure to violent video games or whether there is a primary deficit of empathy. Other phenomena may be invoked to explain the effects of violent video games if desensitization is presumed to be the main mechanism. For example, high disgust sensitivity may be one of the factors that decrease the likelihood of engaging in violent behaviour. If disgust sensitivity decreases substantially in the course of exposure to violent video games, and the person desensitizes to the violence-related disgust content, this may lead to greater propensity towards violent behaviour.

Some investigators have theorized that 'interactive' media violence in video games may exert a greater effect on an individual than 'passive' media violence (such as TV and film), as the game itself rewards violent actions, conveys a message that violent responses are appropriate and effective, and increases hostile attribution bias.^{7,13} Furthermore, video games often lack a moral script and, while playing them, there is little or no time for reflection on the meaning or consequences of violence.

Finally, the proposition that playing violent video games may actually reduce aggressive behaviour by acting as an outlet for 'repressed' aggression has been put forth by at least one investigator as well as video game developers.^{7,22} However, the concept of aggression as a 'repressed' instinctual drive has largely been eclipsed by evolutionary, developmental and social learning models,¹⁸ and there is no evidence to support the notion that playing violent video games is a useful outlet for 'repressed' aggression.

FUTURE RESEARCH INTO THE EFFECTS OF VIOLENT VIDEO GAMES

Studies conducted so far have not controlled completely for confounding variables, such as genetic predisposition, socioeconomic status, violence in the home, substance abuse and psychiatric disorders. Therefore, it is not known to what extent these factors may contribute to aggressive behaviour of children, adolescents and adults, who have been playing violent video games. Obviously, future research should be based on a prospective design, with the aim of minimizing the impact of confounders and establishing causal relationships.

Rapidly advancing computer technology has presented a particular challenge for researchers interested in prospective study design. The current level of graphical sophistication in violent video games has simply not been around long enough to be evaluated longitudinally. Despite this difficulty, there remains an urgent need to plan and commence longitudinal studies in view of the ever-increasing use of violent video games. In any analysis of the data obtained from prospective studies, 'at risk' individuals (e.g. those with antisocial behaviour or conduct disorder) should be assessed separately from those who did not appear to be at risk. This is in accordance with suggestions made by Browne and Hamilton-Giachritsis.¹ There have also been calls to standardize research outcome measures in order to allow direct comparisons between studies.²³

It is important to bear in mind that the debate about whether exposure to violent media leads to violent behaviour is not a new one. Research into the effects of TV and film violence has been around for over 50 years, with findings from hundreds of studies supporting a link between watching violence on screen and subsequent aggressive behaviour.¹ Of particular interest are longitudinal studies in which children have been followed for periods of up to 17 years, with investigators controlling for numerous confounding variables, including parenting style, socioeconomic status and psychiatric disorders.^{24,25} The results demonstrated that exposure to 'passive' media violence was predictive of antisocial behaviour in early adulthood.

CONCLUSION

While playing video games outwardly appears to be an innocuous activity, the limited data available suggest that playing violent video games may be related to aggressive and/or antisocial behaviour. Regardless of the precise nature of this relationship, it has implications for psychiatry, psychology and related fields.

Mental health professionals should enquire routinely about violent video game use, particularly in adolescents, people with antisocial traits and individuals who may be genetically or developmentally predisposed to

aggressive behaviour. Some presentations to mental health facilities, especially those associated with acts of aggression or violence, may be understood better in light of this information. To the extent that it is possible, adolescents with hostile traits and individuals with antisocial personality characteristics and/or a history of delinquency or criminal behaviour should be discouraged from playing particularly violent games. However, it should not be assumed that any person who plays violent video games is likely to be more aggressive as a consequence. Efforts should be made to educate parents about the types of games that may encourage violent behaviour, as there is evidence that parental monitoring is a protective factor.¹³

The current regulatory classification system for video games in Australia is identical to that used for TV and film, and is a useful starting point for evaluating violent content.²⁶ Particularly violent games cannot be legally sold or rented to children below the age of 15 years. Organizations such as Young Media Australia provide information about video games and their classification for parents, carers, or other professionals.²⁷ Much of the research cited by local organizations is from the US as there is currently a lack of good Australian research into the effects of violent video games. Therefore, there is a need for high-quality research into this area, taking into account local circumstances. Finally, a related issue of 'addictive' use of the internet and video games, although not a subject of this paper, also merits attention from mental health clinicians and researchers.

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